



Sustainable Circular Economy

White Paper: Reusable Container Industry

Part.1 Driving Circularity in F&B Sector



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1. Introduction

0 Executive Summary

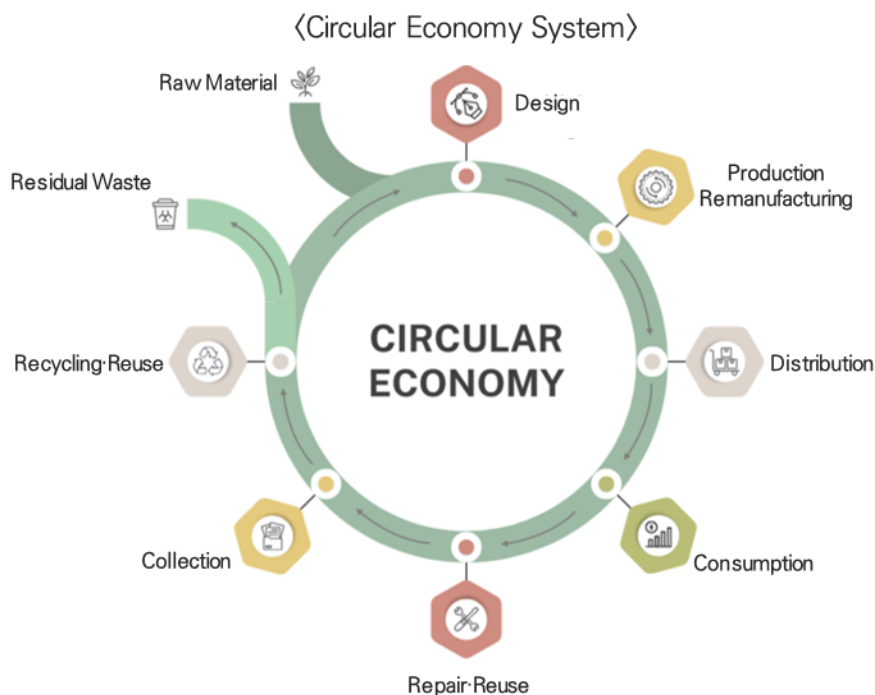
As global awareness of the climate crisis continues to intensify, the reusable packaging industry is emerging as a key solution for a sustainable future. The COVID-19 pandemic further underscored the need for such change. While reduced industrial activity led to a temporary decline in carbon emissions—offering a glimpse into the possibility of environmental recovery—the surge in demand for food delivery resulted in a significant increase in single-use plastic waste. This paradox highlighted the urgent need for eco-friendly alternatives in everyday life and reinforced the importance of sustainable solutions such as reusable packaging systems.

In the post-pandemic era, the rapid expansion of delivery culture, coupled with high coffee consumption, has accelerated the use of disposable packaging and elevated public concern over environmental impacts. At the same time, values-based consumption is becoming more widespread, strengthening demand from both consumers and businesses for sustainable alternatives.

Yet, recycling-centered systems face fundamental constraints. Material complexity, sorting challenges, and the rise of composite products limit improvements in recycling rates, while the recycling process itself generates significant carbon emissions. Consequently, reuse-based circular economy models are gaining prominence as more effective and resource-efficient solutions.

Despite its potential, the reusable packaging industry remains in the early stages of development. Clear definitions and operational guidelines exist, but further research is required to assess economic viability and environmental performance. Most initiatives remain small-scale pilots, revealing gaps in infrastructure, market stability, hygiene management, and regulatory frameworks.

In light of these challenges and opportunities, this white paper provides a concise assessment of current conditions and key challenges in the reusable packaging sector. It aims to outline strategic directions for building a robust industrial ecosystem that achieves both environmental benefits and economic efficiency, supporting the evolution of reusable packaging from an environmental option into a scalable, innovation-driven industry.



1. Introduction

1 Background of the Research

— The Rapid Growth of Single-Use Plastic Consumption

The heightened global climate crisis awareness and the surge in food-delivery demand during COVID-19 have underscored the severity of single-use plastic waste. Plastic delivery container use rose by 120.8% from 2017 to 2020, highlighting the rapid expansion of the delivery culture.

<Plastic Consumption by Type in Korea>

Year		PET Bottle	Plastics Cup	Single-Use Bags	Plastic Container	Total
2017	Annual consumption per person (units)	96	65	466	258 ¹⁾	885
	Annual consumption per person (weight)	1.4kg	0.9kg	9.4kg	2.4kg ¹⁾	14.1kg
		14.3% Increased	55.6% Increased	13.8% Increased	120.8% Increased	Average of 34.8% Increased
2020	Annual consumption per person (units)	109	102	533	568	1,312
	Annual consumption per person (weight)	1.6kg	1.4kg	10.7kg	5.3kg	19.0kg

1) Calculated using the production volume of the year of 2017
Source: Greenpeace(2023), Plastic Korea 2.0

Korea has already established itself as the world's third-largest coffee market (3.8B USD) and ranks second globally in per capita coffee consumption. The country also records one of the highest food-delivery usage rates in the world, with an average of 1.1 orders per week. These patterns result in very high per capita single-use plastic consumption and waste generation. However, despite this heavy reliance on disposables, scalable and effective alternatives remain limited.

<Annual per capita Coffee Consumption>



Figure 1. Annual per capita coffee consumption in major countries
Source: Korea Agro-Fisheries & Food Trade Corporation(2024)

<Domestic Delivery Usage>

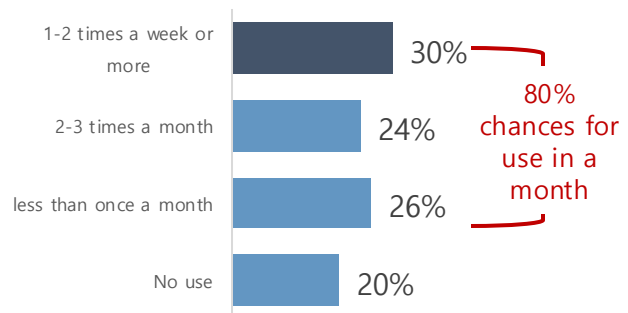
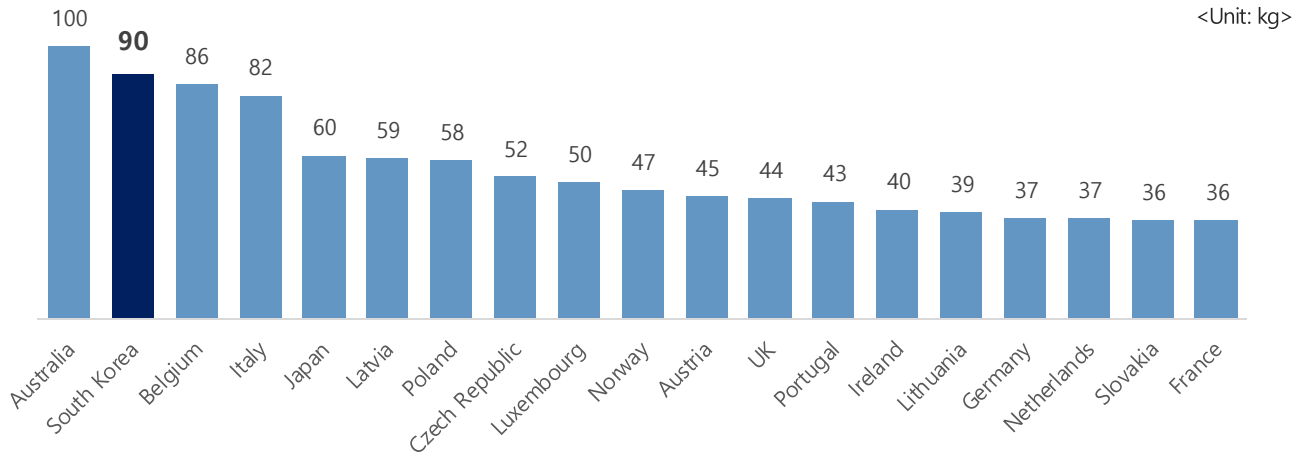


Figure 2. Domestic Delivery Usage
Source: Consumer Insight(2024)

1. Introduction

As of 2024, Korea generates 90 kilograms of plastic waste per capita annually, the second highest in the OECD after Australia. This highlights the urgent need for stronger plastic waste management, especially as global concerns over plastic pollution continue to rise.

<Annual Per Capita Plastic Waste Generation by Country, 2024>



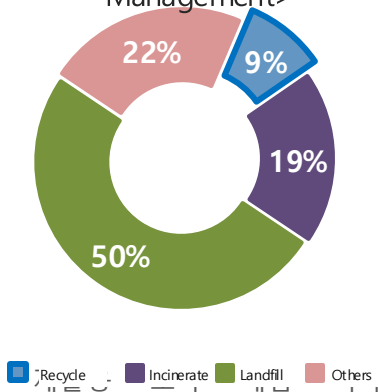
Source: OECD(2025), Environment at a Glance Indicators

Despite Korea's high plastic consumption and waste generation, effective policies and fundamental alternatives remain limited.

Limitations of Recycling-driven approach

With the growing impacts of single-use plastics, reuse systems are increasingly recognized as a more fundamental solution than recycling. Globally, only 9% of all plastic produced is recycled, while 91% is landfilled, incinerated, or discarded. In Korea, the material recycling rate is around 27%, but household waste recycling remains just 16.4%.

<Global Approaches to Waste Management>



Source: University of Michigan(2024), Plastic Waste

<Domestic Recycling status of Household Waste>

Activities	Recycle rate
Material Recycling	16.4%
Thermal Recycling (With Energy recovery)	38.2%
Incinerate (Without energy recovery)	32.6%
Landfill	12.8%
Disposed (Marine/Land)	Unknown

Source: Greenpeace(2023), Plastic Korea 2.0

"The analysis highlights the limits of the 'produce → use → dispose → recycle' model, emphasizing the need to extend product lifespans through reuse."

1. Introduction

Global Efforts to Climate Crisis and Transition to a Circular Economy

Through the Paris Agreement and the UN SDGs, the international community is addressing climate change and promoting resource reuse. In this context, circular economy models emphasizing reuse over disposable products are emerging as a key paradigm, contributing directly or indirectly to 49 of the 169 SDG targets.

< SDG 12: Responsible Consumption and Production >



Source: UN SDGs(2015), 2030 Agenda for Sustainable Development

With rising international pressure to reduce plastic waste, the shift to sustainable consumption and production is accelerating. In March 2022, 175 countries at UNEA-5 agreed to create the first legally binding treaty on the full lifecycle of plastics by the end of 2024. However, disagreements over production limits delayed negotiations, which continued through 2025, including INC-5.2 in Geneva (August 5–15), but the treaty text was ultimately not finalized.

< Progress in advancing the UN Environment Assembly's international agreement on plastic phase-out >



Key Points of the International Plastics Treaty

- The draft treaty reviewed the need to regulate microplastics, bio- and biodegradable plastics, and support R&D.
- Limiting primary plastic polymer production and securing funding for implementation emerged as key issues.
- Final agreement failed due to opposition from oil-producing countries such as Saudi Arabia and Russia, with further negotiations scheduled for 2025.

5th IINC for the Convention to legally End Plastic Pollution

- Despite intense negotiations until the final day of INC-5.2, the treaty text was not finalized, and the session concluded without agreement.
- Based on the discussions so far, member states decided to hold additional negotiation meetings in the future to continue the talks.

Source: KPMG(2025)

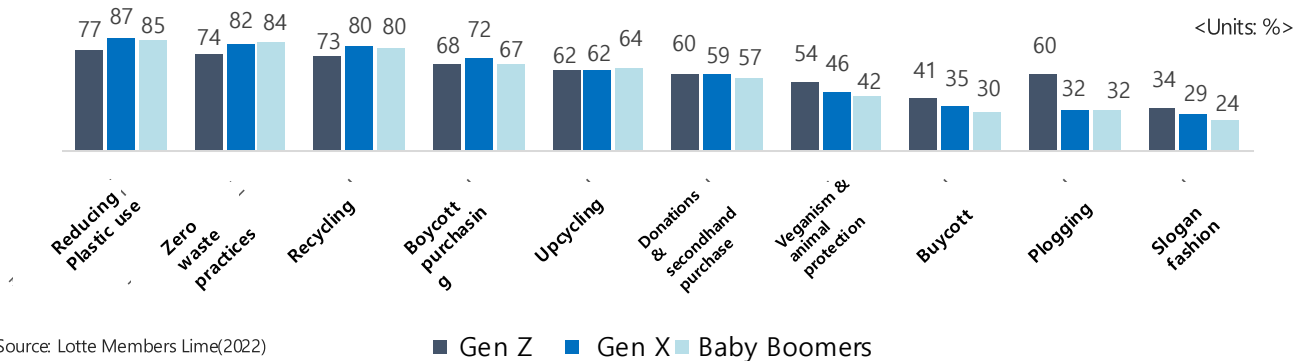
The plastic issue is becoming an international obligation, with reuse-focused circular economy models emerging as the global standard.

1. Introduction

Shifts in Social Awareness and the Emergence of New Consumer Culture

Environmental concerns over plastics now span generations, influencing consumers to consider not only product performance and price but also ethical production and environmental impact. Participation in recycling, zero-waste, and upcycling is consistent across age groups, reflecting broad societal awareness of plastic waste. While consumers are willing to reduce single-use plastics and accept some inconvenience or cost, current eco-friendly alternatives remain limited due to low reuse and recycling rates. Circular economy solutions that prevent waste at the source and promote continuous reuse are emerging as effective responses aligned with evolving consumer expectations.

<Value-Based Consumption by Generation>



Corporate ESG performance is increasingly central to company evaluation and consumer trust. Consumers actively monitor and share environmental initiatives via digital platforms, prompting companies to prioritize visible actions like reducing single-use plastics. Solutions that deliver immediate, measurable environmental impact are therefore essential for effective ESG performance management.

<ESG disclosure items>



Source: Korea Development Institute(KDI)

Shifts in consumer awareness and behavior provide a crucial social foundation for the growth of the reusable container industry. Rising preference for eco-friendly packaging drives market demand for reusable systems, while the spread of value-based consumption enhances the cultural acceptance of reuse. These social changes position the industry not only as a target of environmental policy but also as an innovative sector shaping new consumption culture.

The rise of value-based consumption and corporate ESG practices is creating a social and cultural climate for the reusable container industry to evolve from a policy-driven sector to a market-led innovation industry.

1. Introduction

2 The Necessity of Research

— The Urgent Need for Industry Systematization

The reusable container industry holds significant value for environmental protection and resource circulation but remains in an early stage of development. Despite the establishment of basic definitions and operational standards, further systematic research on economic efficiency, environmental impact, and social acceptance is needed.

In the domestic (Korea) market, despite policy support from the Ministry of Environment and local governments, a more structured understanding of the reusable container ecosystem and long-term development strategies is needed. Additional considerations remain for building viable business models and scaling the market. While various government policies are underway, an integrated, industry-specific policy framework would offer clearer direction for long-term investment and business planning for companies and service operators within the circular economy.


Current research focuses mainly on replacing single-use products and reducing environmental impacts, highlighting the need for studies on industry structure, economic viability, and sustainable business models. Most initiatives remain localized pilot projects, effective for demonstrating environmental benefits but insufficient for scaling and standardization needed for broader industry expansion.

— Barriers to Adoption and the Need for Awareness Shift

The main challenges in adopting reusable container systems center on concerns over hygiene and safety, as well as the financial burden of establishing initial infrastructure. In the food and retail sectors, uncertainties persist due to insufficiently defined hygiene protocols and operational standards for reuse. Additionally, the costs associated with building washing systems and return networks present significant barriers to entry.

These structural challenges highlight the need for greater recognition of the indirect economic benefits and environmental value that reusable systems can deliver. Limited awareness of their impact on business operations and markets stems from the lack of objective evaluation metrics and widely shared success cases. Strengthening these elements is essential for driving broader perception shifts.

From a long-term perspective, achieving a transition toward a sustainable business paradigm requires consumer awareness campaigns, support programs that promote technological innovation, and policy incentives that can alleviate the initial adoption burden for companies.



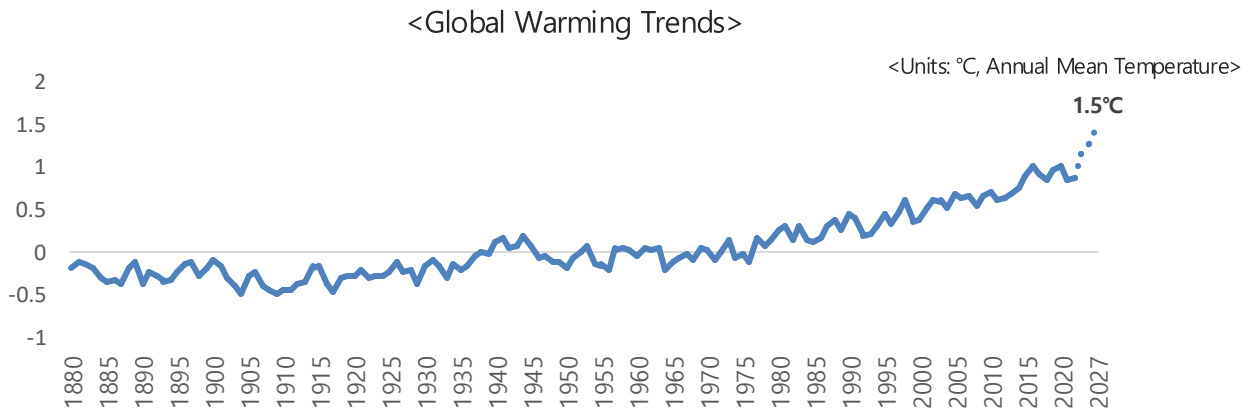
Although reusable container services are gaining attention as a sustainable alternative, there is an urgent need to develop practical models that can ensure both economic viability and environmental performance.

2. Industry Definition

1 Emergence of the Reusable Container Industry

Escalating Global Warming and Rising Greenhouse Gas Emissions

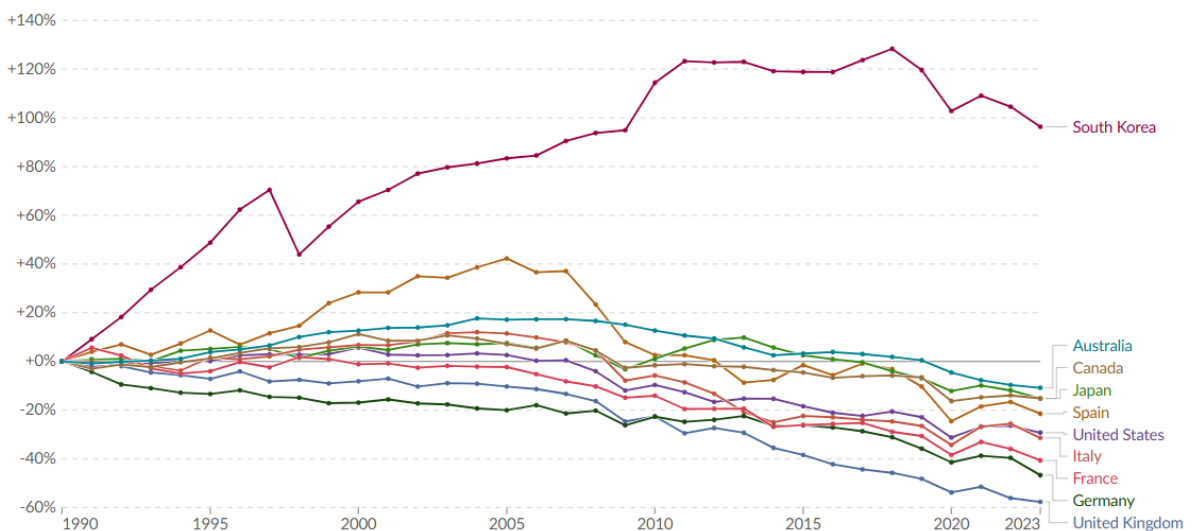
Global temperatures continue to rise due to human-induced climate change and are projected to exceed the Paris Agreement threshold within the next two years. Increasing greenhouse gas concentrations are intensifying the greenhouse effect, driving a temperature increase of about 1.47°C above pre-industrial levels. The WMO estimates a 66% probability that the global average temperature will surpass 1.5°C by 2027.



* Used average temperature from 1951–1980 as a baseline
Source: NASA(2025), Temperatures Rising: NASA Confirms 2024 Warmest Year on Record

Korea is the only major OECD country showing an increase in per capita CO₂ emissions, rising about 96.34% from 1990 to 2023, while most others have decreased by 10–50%. This reflects the impact of rapid economic growth and changing consumption patterns, highlighting the urgent need for a shift toward sustainable consumption.

<Changes in Per Capita Greenhouse Gas Emissions in Major OECD Countries>



Source: Our World in Data(2024), Per capita CO₂ emissions

A comprehensive assessment of the reusable container industry is needed to propose practical, economically and environmentally viable solutions and to support its growth as an innovative sector.

2. Industry Definition

— Global Efforts to Climate Change

The global community has recognized the urgency of the climate crisis and established international response frameworks through the UNFCCC, the Kyoto Protocol, and the Paris Agreement. The UNFCCC, adopted in 1992 and in force since 1994, now includes 197 Parties, with Korea joining as the 47th Party in 1993. International cooperation further advanced with the 2021 Glasgow Climate Pact, but continued progress is required to secure stronger implementation and enforceability.

<Progress of International Cooperation Through Major UNFCCC Conferences of the Parties>



Berlin Mandate (1995. 3.)

- At the first Conference of the Parties, member states set a goal to reduce greenhouse gas emissions to 1990 levels by 2000 and initiated discussions on introducing legally binding reduction commitments.

Kyoto Protocol (1997. 12.)

- At the first Conference of the Parties, members set a goal to reduce greenhouse gas emissions to 1990 levels by 2000 and initiated discussions on adopting legally binding reduction commitments.
- Emission Reduction Obligations for Developed Countries

Bali Roadmap (2007. 12.)

- Outlined a roadmap for the post-Kyoto regime, initiating negotiation procedures for greenhouse gas reductions involving both developed and developing countries, along with discussions on long-term reduction goals.
- Enabled broad participation from both developed and developing countries.

Paris Agreement (2015. 12.)

- The first global climate accord in which all Parties agreed to limit the global temperature increase to well below 2°C above pre-industrial levels, and ideally to 1.5°C.
- Launch of a new climate regime imposing greenhouse gas reduction obligations on all countries.

Glasgow Climate Pact (2021. 10.)

- Emphasized concrete actions to address the climate crisis, including the phasedown of coal power, reduction of fossil-fuel subsidies, and expanded support for developing countries.
- Completion of the Paris Agreement Implementation Rules

Although international agreements and cooperation frameworks for climate action have continued to evolve, fundamental challenges remain, particularly the lack of strong enforceability and effective implementation.



2. Industry Definition

Global Policy Trends in Carbon Neutrality and the Circular Economy

Major advanced economies—including the United States, Japan, the European Union, and Korea—are pursuing a range of policy measures tailored to their national contexts to achieve carbon neutrality. These policies reflect each country's distinct environmental and social conditions, resulting in differentiated approaches.

<Carbon Neutrality Policies Across the Globe>

Category	US	EU	Japan
Objectives	<ul style="list-style-type: none"> 'Net Zero by 2025 '50% reduction from 2005 levels by 2030 	<ul style="list-style-type: none"> 'Net Zero by 2025 '55% reduction from 1990 levels by 2030 	<ul style="list-style-type: none"> 'Net Zero by 2025 '46% reduction from 2013 levels by 2030
Regulations	<ul style="list-style-type: none"> Executive Orders and Legislation by Sector Low legal enforceability 	<ul style="list-style-type: none"> Legislated as a climate law High legal enforceability 	<ul style="list-style-type: none"> Legislated through the Act on Promotion of Global Warming Countermeasures Moderate legal enforceability
Policies	<ul style="list-style-type: none"> Focused on incentives and investment Use of market-based mechanisms 	<ul style="list-style-type: none"> Combination of regulatory and market mechanisms Comprehensive framework approach 	<ul style="list-style-type: none"> Industry-focused strategy Emphasis on public-private collaboration
Key instruments	<ul style="list-style-type: none"> IRA tax incentives Expansion of energy investment 	<ul style="list-style-type: none"> Emission Trade System Carbon Border Adjustment Mechanism(CBAM) 	<ul style="list-style-type: none"> Sector roadmap of the green growth strategy Green Transformation(GX) Bonds

Across major advanced economies, carbon-neutrality strategies are increasingly rooted in the circular economy, which moves beyond the traditional "take-make-dispose" model toward continuous resource circulation that supports both economic value and environmental sustainability.

<Circular Economy Policies in Major Global Economies>

Category	US	EU	Japan
Key policies	Circular Economy Program(2019)	Circular Economy Action Plan(2020)	Plastic Resource Circulation Strategy(2019)
Resource Circulation	<ul style="list-style-type: none"> With USD 3 billion in funding, educational programs have been established to address problems within the current plastic production and consumption system. Development of measurements, standards, models, and data for plastic decomposition/manufacturing processes 	<ul style="list-style-type: none"> Expansion and strengthening of Eco-design Guidelines for sustainable product design Strengthened policies for seven resource-intensive/circular product groups (Electronics & ICT, Batteries/Vehicles, Packaging, Plastics, Textiles, Construction/Buildings, Food/Water/Nutrients) 	<ul style="list-style-type: none"> Reduced reliance on non-renewable resources by replacing them with renewables and recovering resources for multiple reuse cycles Shift to reusable/recyclable plastic product designs and expansion of their use (100% by 2030)
Waste	<ul style="list-style-type: none"> Research on resource decomposition and reuse 	<ul style="list-style-type: none"> Strengthened waste policies, including reduction targets, expanded producer responsibility, and enhanced sharing of recycling-related information 	<ul style="list-style-type: none"> Prioritizing waste prevention, reuse, and recycling, with final waste converted into resources



Carbon neutrality is emerging not just as a national environmental policy but as a key driver of the global shift toward a circular economy.

2. Industry Definition

Domestic Policy Trends in Carbon Neutrality and the Circular Economy

Korea is strengthening its circular economy strategy to achieve 2050 carbon neutrality. The 2050 Carbon Neutrality Strategy and the Korean New Deal 2.0 both position circular economy promotion as a core policy, emphasizing resource reuse and recycling to reduce emissions.

<Carbon Neutrality Policies in South Korea>

Year	Policy Pillar	Action/Initiatives
2020	Announce of Korean New Deal	<ul style="list-style-type: none"> Simultaneous pursuit of GHG reduction, job creation, and inequality mitigation National strategy toward an eco-friendly, low-carbon economy and green industry development
	Declaration of a national climate emergency	<ul style="list-style-type: none"> National Assembly's declaration of a "climate emergency" and adoption of a resolution urging enhanced 2030/2050 GHG reduction targets and a just transition
	Declare of Carbon Neutrality by 2050	<ul style="list-style-type: none"> Official declaration of carbon neutrality by 2050 as a national goal, clarifying the nation's commitment to the international community
	Announcement of the 2050 Carbon Neutrality Strategy	<ul style="list-style-type: none"> Development of detailed implementation strategies for 2050 carbon neutrality, including three policy directions—low-carbon economic transition, creation of new low-carbon industrial ecosystems, and just transition—and ten priority tasks
2021	Announcement of the Korean New Deal 2.0 Implementation Plan	<ul style="list-style-type: none"> Expansion of the Digital and Green New Deal into a national innovation strategy by adding the people-centered "Human New Deal," pursuing digital/green transitions and an inclusive society simultaneously

Korea's circular economy policies have evolved over time. Until the 1980s, the focus was on safe waste disposal; from the 1990s to the early 2000s, policies emphasized recycling; and since the mid-2000s, the focus has shifted to resource circulation.

Previous reduction and reuse policies—focused on single-use product regulations, oversized packaging limits, volume-based waste fees, industrial waste reduction, and deposit-return systems—revealed significant limitations. To address these, Korea launched the National Resource Circulation Basic Plan (2018–2027), a ten-year strategy promoting a sustainable circular economy through systematic resource circulation across the entire lifecycle from production to recycling.

<Progress of Domestic Circular Economy Policies>

'1980s	'1990s to early 2000s	'Mid 2000s onward
Safe disposal	Recycle	Resource circulation
Waste Management Act (1986)	<ul style="list-style-type: none"> Act on the Promotion of Saving and Recycling of Resources (1992) Act on the Transboundary Movement of Wastes('94) Act on the Promotion of Installation of Waste Disposal Facilities (1995) Act on the Promotion of Recycling of Construction Waste (2003) 	<ul style="list-style-type: none"> Act on Resource Circulation for Electrical/Electronic Products and Vehicles (2007) Framework Act on Resource Circulation (2016) Framework Act on Resource Circulation (2018) Act on the Promotion of Transition to a Circular Economy Society (2022) Amendment to the Act on the Promotion of Resource Saving and Recycling (2023)
	<ul style="list-style-type: none"> National Waste Management Master Plan (Phase 1 and 2) Master Plan for Resource Recycling (Phase 1, 2, and 3) 	<ul style="list-style-type: none"> 2nd National Comprehensive Waste Management Plan (Revised Plan) 4th Basic Plan for Resource Recycling Comprehensive Measures for Waste-to-Energy (2008) Measures for Recycling Waste Metal Resources (2009) Basic Plan for Resource Circulation (2011) 1st Basic Plan for Resource Circulation (2018) Measures for De-plasticization of Municipal Waste (2020) Industrial New-Growth Strategy through Circular Economy Promotion (2023)

Source: Ministry of Environment, Korea(2018)

Korea's circular economy policies have moved from fragmented regulations to a full-lifecycle approach, but ensuring effective implementation remains a key challenge.

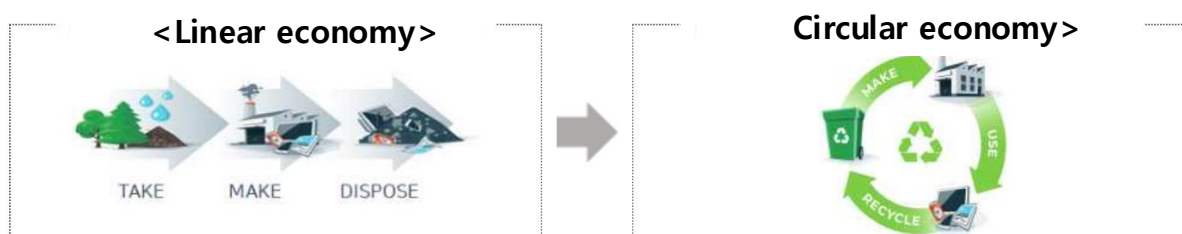


2. Industry Definition

Linear Economy and Circular Economy

Major global economies recognize the importance of the circular economy in addressing resource depletion and environmental pollution and are making active efforts to transition toward circular systems. This shift marks a move away from the traditional linear economy—characterized by a “take–make–use–dispose” model that relies on one-time resource use and leads to resource depletion and pollution—toward a circular economy focused on preserving resource value and minimizing waste through reuse, recycling, and remanufacturing. In a circular economy, products are designed from the outset with recyclability in mind, enabling more efficient resource use and stronger environmental protection throughout the value chain.

<Linear Economy and Circular Economy>



Source: Ministry of Trade, Industry and Resources(2023), "Industry growth strategy through circular economy"

The circular economy is a new paradigm that promotes efficient resource use and environmental protection, emerging as a key solution for a sustainable future. By minimizing waste through biological and technical cycles and generating integrated economic and environmental value within closed-loop systems, it provides a blueprint for sustainable development.

<Definitions and Roles of Circular Economy by stage>

Stages	Definition	Action/Initiatives
Stage 0	Linear Economy	<ul style="list-style-type: none"> • One-way flow from resource extraction to production, consumption, and disposal • Most products discarded after use • Leads to resource depletion and environmental pollution
Stage 1	Recycling-Oriented Economy	<ul style="list-style-type: none"> • Partial recycling of waste to reintroduce resources • Recovery of some resources during the post-production disposal process • maintains a disposal-focused structure
Stage 2	Resource-Efficiency-Oriented Economy	<ul style="list-style-type: none"> • Maximizing resource efficiency at the product design and manufacturing stages • Energy savings, extended product lifespan, and efficient use of materials • Reduces environmental impact but remains largely linear in structure
Stage 3	Circular Economy	<ul style="list-style-type: none"> • Circular system that eliminates the concept of disposal entirely • Integrated application of reuse, repair, remanufacturing, recycling, and the sharing economy • Ensure sustainability by integrating circularity from the design stage • Maintain circulation loops of biological and technical resources

The circular economy has become an essential system in an era of resource scarcity, advancing alongside environmental protection and driving a fundamental shift in the global economic paradigm.



2. Industry Definition

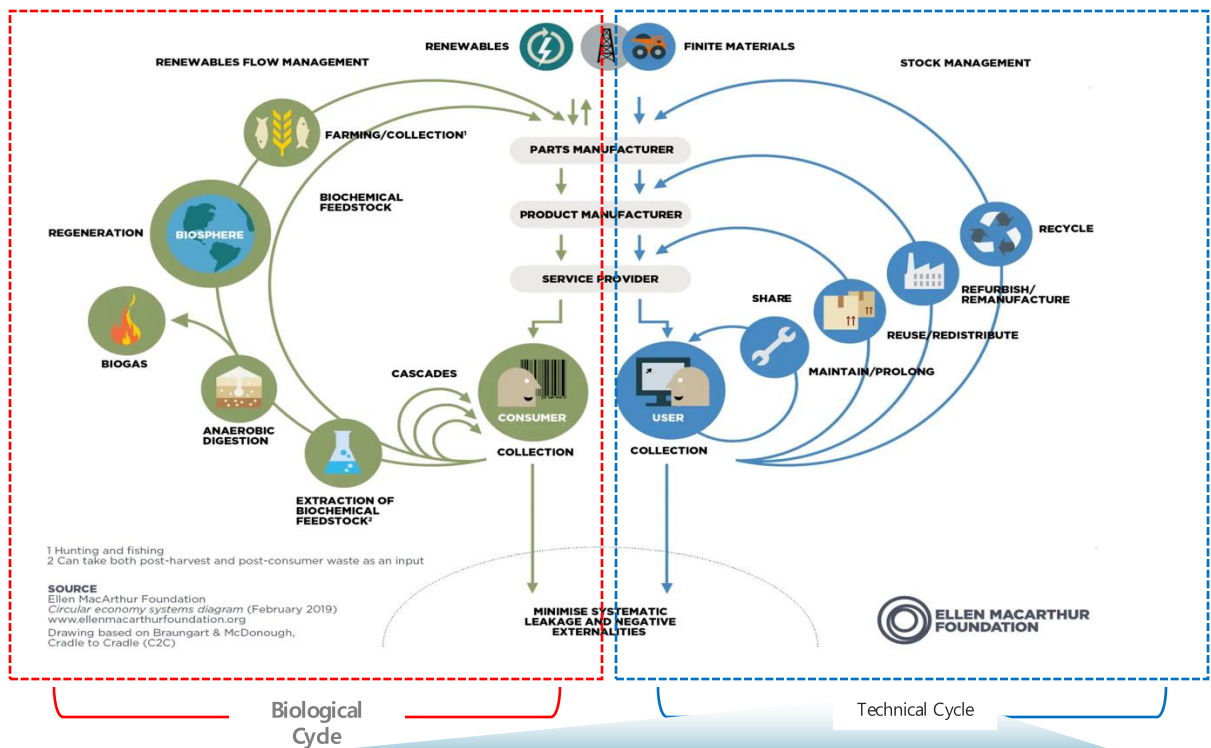
Definitions of the Circular Economy by Stages

While no universal definition exists, the circular economy is generally seen as a system that preserves economic and environmental value by keeping products and materials in continuous use. The Ellen MacArthur Foundation¹⁾ emphasizes maintenance, reuse, remanufacturing, and recycling to prevent waste and decouple economic activity from finite resources, while Bourguignon²⁾ highlights sharing, leasing, repair, and recycling within (nearly) closed loops.

1) Ellen MacArthur Foundation: A key partner of the UN Environment program in circular economy

2) Researches at the European Parliamentary Research Service (EPRS)

<The butterfly diagram>



Stages	Objectives	Approaches	Use Cases
Sharing & Maintenance	Extend product lifespan and maximize utilization	<ul style="list-style-type: none"> Operate sharing platforms Provide periodic maintenance services Offer collection and care services 	<ul style="list-style-type: none"> Public library sharing programs Car-sharing services Free clothing repair/care services
Reuse & Redistribution	Sustain the product's original form and intended function	<ul style="list-style-type: none"> Reusable package system Product-to-service transition Closed Loop System 	<ul style="list-style-type: none"> Reusable takeout container Reusable bottle Reusable tableware
Refurbishing & Remanufacturing	Restore product value and improve performance	<ul style="list-style-type: none"> Component repair and replacement Functional upgrades Aesthetic and usability improvements 	<ul style="list-style-type: none"> Refurbished mobile phones "Right to Repair" initiatives Product performance enhancement through redesign
Recycle	Preserve material value	<ul style="list-style-type: none"> Material recovery and transformation Manufacturing using recycled content Design for high recyclability 	<ul style="list-style-type: none"> Recycling of disposable packaging Products made with recycled materials Design optimized for material separation and recovery

Source: Ellen MacArthur Foundation(2013), Toward the Circular Economy: Economic and Business Rationale for Accelerated Transition

In the circular economy, the core principles of "closed loops" and "continuous reuse" highlight reusable container systems as the most concrete and feasible model.

2. Industry Definition

2 Industry Definition and Conceptual Framework

Reusable Container Defined across the Globe

With the global spread of the circular economy paradigm, the reusable container industry is emerging as a new growth sector. However, a clear global definition and classification of reusable containers are lacking, and development varies across countries depending on policies and market conditions. The market is currently shaped largely by early-stage startups with innovative business models, making the establishment of industry definitions and standards a critical transitional step. Such standardization is essential for scaling the market and ensuring sustainable industry growth.

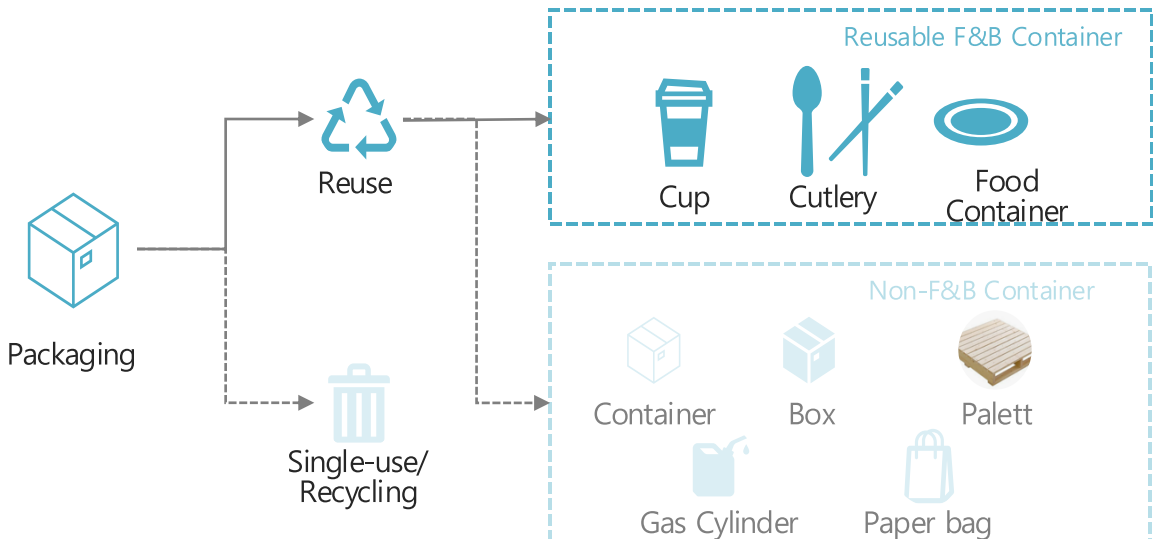
<How Major Economics Defines Reusable Container>

Country	Definition	Key Characteristics
EU	Packaging designed, engineered, and marketed for multiple uses or refills for the same original purpose	<ul style="list-style-type: none"> Businesses must allow customers to use their own reusable cups/containers without additional charges. Targets 10% reusable packaging share by 2030 in retail and foodservice sectors
Germany	Packaging designed and intended for repeated use for the same purpose, which can be refilled or reused before disposal at the end of its life	<ul style="list-style-type: none"> Cafés, bakeries, restaurants, and delivery platforms are mandated to offer reusable alternatives alongside disposables. Foodservice establishments with a floor area of at least 80m² and employing five or more staff are mandated to provide reusable container options
France	Packaging designed for multiple uses, collected, cleaned, and refilled or reused for the same purpose	<ul style="list-style-type: none"> Restaurants and foodservice businesses are required to provide reusable dine-in tableware (cups, plates, utensils) instead of single-use items
US	Packaging designed for multiple uses and safely reusable after cleaning	<ul style="list-style-type: none"> Regulations vary by state and municipality. Several jurisdictions are introducing required reuse options and restrictions on single-use plastics.
Japan	Container designed for repeated use which can be collected, cleaned, and refilled	<ul style="list-style-type: none"> Reuse programs are currently voluntary and pilot-driven. However, government policy is shifting toward standardized reusable container systems.
Taiwan	Container designed for multiple use which can be collected, cleaned, and reused	<ul style="list-style-type: none"> Offers consumer incentives to encourage reusable cup/container use. Covers cafés, convenience stores, and take-out food vendors; excludes dine-in tableware systems.

Source: Synthesis of publicly available government datasets and policy documents across multiple national jurisdictions.

In major global economies, reusable containers are generally categorized into “reusable/multi-use” and “single-use/recyclable.” The reusable/multi-use category typically encompasses a wide range of products, including cups, containers, tableware, boxes, pallets, gas cylinders, and paper bags.

<Scope of Reusable Container>



In major global economies, reusable containers are commonly and specifically defined as “containers designed for multi-use for the same purpose, which can be collected, cleaned, and reused.”



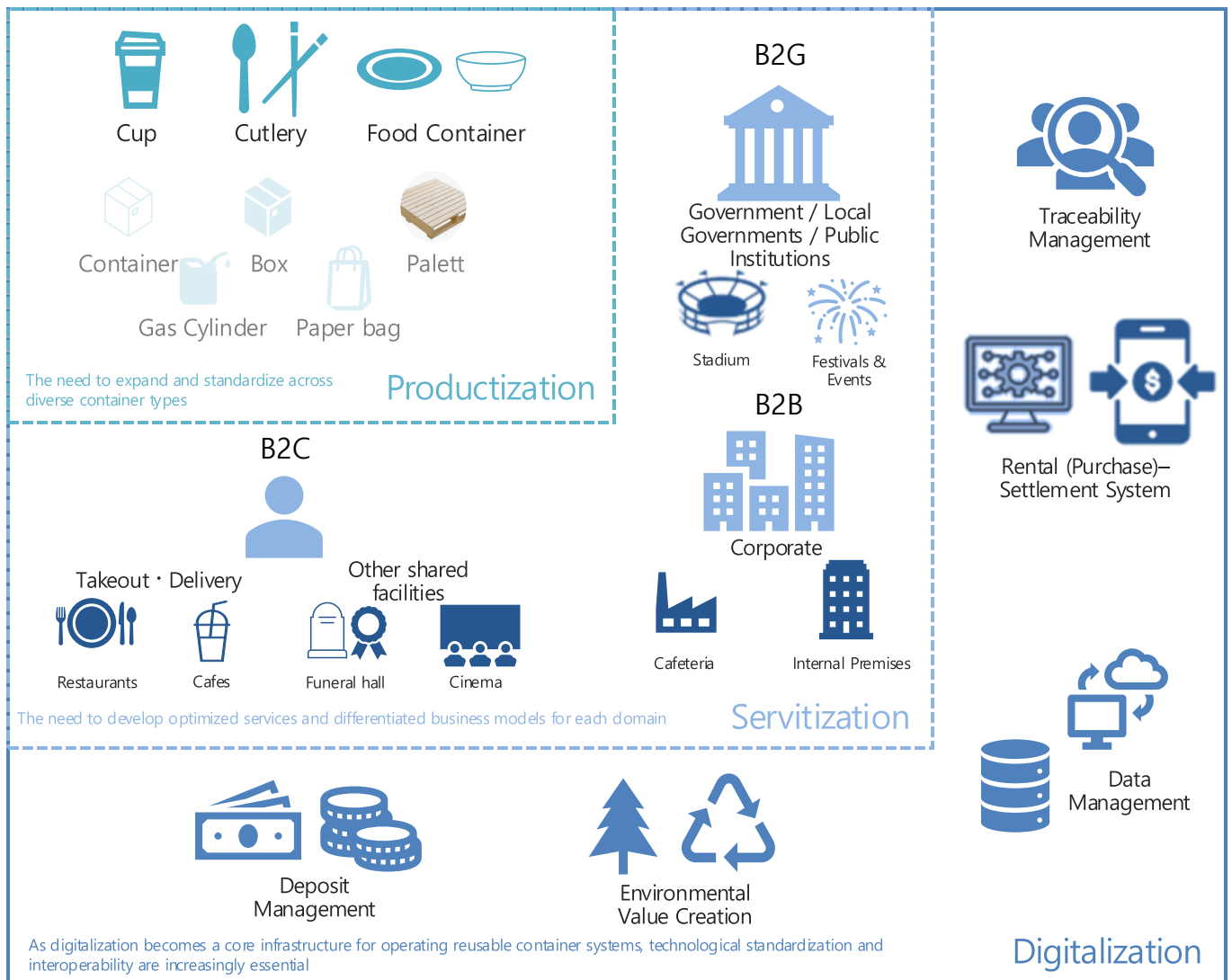
2. Industry Definition

Definition of Reusable Container

The February 27, 2023, amendment to the Resource Recycling Act defines reusable containers as “products designed for repeated use of two or more times for the same purpose.” This legal framework allows national and local governments to financially support businesses that collect, wash, and redistribute reusable containers, aiming to reduce packaging waste and curb disposable product use.

While the amendment established the foundation for the reusable container industry, detailed standards—such as container lifespan, washing protocols, and facility requirements—remain to be developed. In July 2023, the Ministry of Environment issued draft guidelines for hygiene standards and subsidy implementation for reusable container distribution, providing a basic operational framework. The industry identifies the systematic establishment of these standards as essential for sustainable growth, with further specification needed by industry and usage type.

<Scope of Reusable Container Service>



The reusable container industry has entered a stage of comprehensive ecosystem development, but establishing a robust institutional framework has emerged as a key task for its continued growth.

3. Industry Landscape

1 Economic Landscape

— Domestic (Korea) Market Trend

Financial data from nine leading domestic reusable container companies were analyzed to assess industry growth trends from 2021 to 2024.

The analysis revealed that five companies with under KRW 1 billion in 2021 had exited, reflecting market consolidation, while slower growth in manufacturers indicates stabilized demand and the settling of a reuse culture.

Notably, growth varied by business model. Traditional manufacturing and sales companies recorded modest growth (-4.8% to 2.7%), whereas firms offering rental and cleaning services showed higher growth. Among them, three total solution providers covering rental, cleaning, platform, and return infrastructure achieved robust CAGRs of 2.8% to 703.2% from 2021 to 2024.

The growth of total solution providers signals a shift toward platform-based, reuse-focused circular systems in the reusable container industry.

<Annual Growth of Revenue for Reusable Container players>¹⁾

<Units: USD, %>

Company	Business Area	2021	2022	2023	2024	CAGR
A	Reusable Container Production and Sales	7.4M	7.5M	6.5M	6.4M	-4.8%
B	Integrated Solution ²⁾	185K	168K	506K	-	64.8%
C	Integrated Solution	12M	13.4M	13.9M	13.4M	2.8%
D	Reusable Container Production and Sales	13.9M	14.1M	14.8M	15.1M	2.7%
E	Reusable Container Production, Rental, and Washing	82K	1.2M	2.3M	2.7M	221.8%
F	Reusable Container Production and Rental	85K	32K	128K	1.2M	142.9%
G	Reusable Container Production, Rental, and Washing	539K	1.2M	2.1M	3.4M	86.2%
H	Reusable Container Production, Rental, and Washing	330K	686K	1.2M	1.6M	70.2%
I	Integrated Solution	-	123K	3.3M	7.9M	703.2%


1) Total annual revenue by each corporate (some included revenues that are out of reusable container business)

2) Integrated solution: a solution that includes all the process, covering manufacturing, clean, return, platform

3) Founded in 2021; the first fiscal year is not fully reflected

4) USD 1 = KRW 1,463

Source: Data Analysis, Retrieval and Transfer System Korea (DART), NICE Information Service, Korean Agricultural and Fishery Food Venture Investment Association (KAVIA)



The reusable container industry is growing in an unbalanced structure centered on total solution services, highlighting the need to develop upstream and downstream sectors and infrastructure for a balanced ecosystem

3. Industry Landscape

2 Policy Landscape

Domestic Policy Initiatives for the Reusable Container Industry

Korea's reusable container industry began with the Framework Act on Resource Circulation. Pilot projects launched under the 2020 Plastic Reduction Policy led to the 2021 K-Circular Economy Implementation Plan, which expanded single-use bans and promoted deposit-based reusable cups. The plan aims for practical, domestically adapted circular economy strategies to boost recycling, transition to renewable resources, and achieve carbon neutrality by 2050, with standardization targeted for 2023.

<K-Circular Economy Implementation Plan>

Vision	Completing Circular Loops Across All Social and Economic Sectors		
Objective	(Zero Waste) Complete Recycling of Waste Resources	(2050 Carbon Neutrality) Minimizing Net Greenhouse Gas Emissions in the Resource Circulation Sector	(Circular Economy Society) Establishing a Full-Cycle Circular System Across Production, Consumption, and Regeneration
Task	12 Specific Implementation Tasks		
	By Stage of the Circular Process	Full-Cycle Resource Management	① (Raw Material Production) Use of Circular Resource-Based Materials ② (Product Manufacturing) Circular Manufacturing and Processes ③ (Consumption) Sustainable Product Reuse ④ (Distribution) Reduction of Packaging Waste ⑤ (Disposal) Expansion of Waste Resource Collection and Recycling
	By Policy Actor	Promoting the Implementation and Expansion of the Circular Economy	① (Consumers) Strengthening Consumer Rights ② (Companies) Promoting Corporate Environmental Responsibility Fostering Circular Economy New Industries ③ (Cities) Reinforcing Circular Systems at the Urban/Spatial Level ④ (Cross-Cutting) Public Awareness, Education, and Expanded Private Sector Participation
By Key Items	Establishment of Circular Systems by Product	① Activation of the Circular Resource Recognition System ② *Expansion of Circular Use for the Seven Key Items * Packaging Materials, Plastics, Textiles, Electrical & Electronic Equipment, Vehicles & Batteries, Food Waste, Construction Materials	

Since 2021, reusable container pilot projects have been rolled out in stages. B2B logistics packaging and foodservice sectors—restaurants, campsites, and festivals—received support for container distribution and washing. Institutional foundations, including a Resource Circulation Practice Platform and service certification system, aim to expand nationwide by 2025, covering 123 local governments with a 19.3 billion KRW budget (13.3M USD).

<Pilot projects for Reusable Container>

Category	Project Type	Year/Period	Key Details
Package	Reusable Delivery Boxes	'2021 ~'2022	<ul style="list-style-type: none"> Creating a New Business Model to Support the Collection and Cleaning of Reusable Delivery Boxes for Small and Medium-Sized Retailers Without Existing Return Systems
	Reusable Transport Packaging	2022	<ul style="list-style-type: none"> Nine Companies and Organizations, Including Korea Container Pool, Participate to Replace Single-Use Packaging with Reusable Alternatives in the B2B Logistics Sector
Food Container	Support to Local Governments through Ministry of Environment Subsidy Programs	2021 ~	<ul style="list-style-type: none"> Support to Local Governments through Ministry of Environment Subsidy Programs 2025: 10 billion KRW provided to 123 local governments
	Financial Support for the Purchase and Cleaning of Reusable Containers	2022 ~	<ul style="list-style-type: none"> Pilot Project for Reusable Food Delivery Containers Implemented in eight regions, including Seoul, Gyeonggi, and Gyeongbuk, providing financial support for the purchase and cleaning of reusable containers.
	Reusable Containers at Campsites	2024~	<ul style="list-style-type: none"> Collaboration between the Ministry of Environment and Yangpyeong County: First Implementation at a Private Campsite Visitors experience the service for free, with costs shared between the Ministry of Environment and Yangpyeong County.
Policy and Infrastructure	Reusable Containers at Local Festivals	2022 ~	<ul style="list-style-type: none"> Ministry of Environment-Led Pilot at Three Festivals, Including Gwangyang Maehwa Festival Developing a model for nationwide expansion to regional festivals
	Resource Circulation Practice Platform	2021 ~	<ul style="list-style-type: none"> Provision of Information on Zero-Packaging Stores and Reusable Container Delivery Outlets As of December 2021, over 380 businesses were registered
	Reusable Container Service Certification System	2022 ~	<ul style="list-style-type: none"> Announcement of the Introduction of the Reusable Container Service Certification System Certification system for environmental performance and hygiene to be officially implemented in 2025
	Environmental Labeling Certification System for Reusable Containers	2023~	<ul style="list-style-type: none"> Environmental Label Certification for Products That Minimize Energy and Resource Consumption Across All Stages of the Life Cycle Environmental Label Certification for Products That Minimize Pollutant Emissions

Long-term plans for resource circulation and plastic reduction are underway, with pilot projects, support policies, and infrastructure development promoting reusable containers.



3. Industry Landscape

Global Policy Initiatives for the Reusable Container Industry

Countries generally define reusable containers as those designed for multiple uses for the same purpose, collectable, washable, and reusable, but policy implementation varies widely. The EU leads with the PPWR (March 2024), mandating 10% of packaging to be reusable by 2030. Germany requires reusable containers under the 2019 New Packaging Act since 2023, while France gradually strengthened regulations under the 2020 Anti-Waste Law, including banning single-use tableware in restaurants with 20 seats or more from 2023. Taiwan introduced personal tumbler discounts in 2022 and is phasing in policies toward a full plastic ban by 2030. Japan maintains traditional glass bottle reuse, but modern reusable systems are in early stages. In contrast, the USA reversed plastic regulations under the Biden administration after Trump-era rollbacks (2025), showing no strong federal mandate. Overall, global reusable container policies exhibit diverging regional approaches.

<Definitions and Policy Status of Reusable Containers in Key Countries>

Country	Definition	Key Policy Measures	Implementation Status
EU	Designed for multiple uses, collected, washed, and reused	<ul style="list-style-type: none">Final Approval of the PPWR (March 2024)Mandates that 10% of packaging containers be reusable by 2030Ban on single-use plastic packagingObligation to provide services without additional charges when consumers use their own containers	Effective February 2025 (Mandatory Compliance by August 2026)
Germany	Designed and intended for multiple uses for the same purpose, which can be returned and reused through an appropriate logistics system	<ul style="list-style-type: none">Implementation of the New Packaging Act (VerpackG) (since 2019)Mandatory provision of reusable containers (from January 1, 2023)Applicable to businesses with store area $\geq 80m^2$ and ≥ 5 employeesDeposit system (Pfand) may be applied	Mandatory since 2023
France	Designed for multiple uses at minimum, which is collected, cleaned, and refilled/reused to serve the same purpose	<ul style="list-style-type: none">Anti-Waste Law for the Circular Economy (since 2020)Ban on single-use tableware in restaurants with 20 seats or more (from January 2023)Comprehensive ban on the use of plastic items such as straws and disposable utensilsObligation to provide reusable tableware	Gradual enforcement from 2023
Japan	Designed for multiple uses, collected, washed, and reused	<ul style="list-style-type: none">Operation of the Packaging Recycling ActTraditional reusable container systems exist (e.g., glass bottles)Modern reusable container systems are still in the early stages	Early Stage
US	designed for at least multiple uses, which can be safely cleaned, sanitized, and reused (based on California and Washington State standards)	<ul style="list-style-type: none">No unified federal definitionTrump administration and subsequent Biden administration reversed plastic regulation policiesDiscontinuation of paper straws; return to plastic strawsState-level individual policies implemented	Policy Reversal (from 2025)
Taiwan	Designed for multiple uses, collected, washed, and reused	<ul style="list-style-type: none">Minimum discount of 5 TWD for using personal tumblers (since July 2022)Ban on provision of single-use plastic cupsGoal to completely ban the provision of plastic products by 2030Implementation of Marine Waste Management Action Plan	Being Gradually Strengthened

Source: Official Government Data



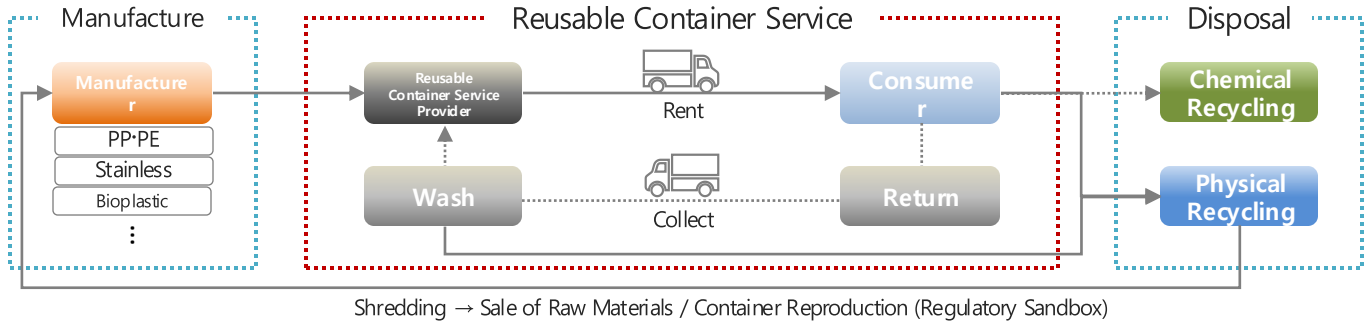
Global reusable container policies are spreading around the EU's stringent mandatory regulations, but approaches vary by region, reflecting each country's economic and social conditions.

3. Industry Landscape

3 Technological Landscape

— Lifecycle and Technology Application in the Reusable Container Industry

The reusable container industry is a service-based, reverse logistics model where food and beverage containers are produced, rented, collected, cleaned, and reused. Unlike the single-use container industry, operators manage the containers' full lifecycle from production to disposal.



A reusable container system requires end-to-end lifecycle management, including manufacturing, rental, collection, cleaning/sterilization, and disposal or recycling. It is essential to implement reusable materials and traceable management systems, selecting technologies that ensure both hygiene and sustainability at each stage.

<Technologies Applied Across the Lifecycle of Reusable Containers>

Life Cycle	Key Technologies	Advantages	Limitations	Features	Competitiveness
Manufacture	PP	<ul style="list-style-type: none"> No Detection of Endocrine Disruptors Low Initial Manufacturing Cost Heat Resistance and Durability 	<ul style="list-style-type: none"> Plain Appearance Limited Number of Reuse Cycles Adhesion and Printability Issues 	<ul style="list-style-type: none"> Ensuring Both Safety and Recyclability 	
	Stainless	<ul style="list-style-type: none"> Durability Full Recyclability Premium Brand 	<ul style="list-style-type: none"> High Manufacturing Cost High Carbon Emissions Due to Complex Production Processes Increased Weight 	<ul style="list-style-type: none"> Enables Differentiation Through Premium Services Cost Burden 	
	Bioplastic	<ul style="list-style-type: none"> Eco-Friendly Image Biodegradable 	<ul style="list-style-type: none"> Lack of Heat Resistance High Manufacturing Cost Immature Technology 	<ul style="list-style-type: none"> Requires Phased Implementation with Future Technologies 	
Rental-Return	QR	<ul style="list-style-type: none"> Low Cost Versatility and Ease of Use Durability During Laser Printing 	<ul style="list-style-type: none"> Potential for Code Contamination or Damage 	<ul style="list-style-type: none"> Ensuring Both Convenience and Cost-Effectiveness 	
	NFC	<ul style="list-style-type: none"> Near Field Communication (NFC) Convenient Contact / Easy Access 	<ul style="list-style-type: none"> High Cost Limited Device Compatibility Range Limitations 	<ul style="list-style-type: none"> Provides Convenience in Specific Environments Limited Versatility 	
	RFID	<ul style="list-style-type: none"> Simultaneous Multi-Item Recognition Contactless 	<ul style="list-style-type: none"> High Cost Infrastructure Development Required 	<ul style="list-style-type: none"> Advantageous for High-Volume Processing Cost Burden 	
Washing: Sanitization	High-Temperature, High-Pressure Automatic Cleaning	<ul style="list-style-type: none"> Standardized Hygiene Management Compliance with HACCP Standards 	<ul style="list-style-type: none"> High Capital Investment 	<ul style="list-style-type: none"> Key Technologies for Ensuring Hygiene and Safety 	
	AI Vision Inspection	<ul style="list-style-type: none"> Detection of Micro Contaminants Automated Quality Control 	<ul style="list-style-type: none"> System Implementation Complexity 	<ul style="list-style-type: none"> Improved Accuracy and Efficiency 	
	UV and Ozone Combined Sterilization	<ul style="list-style-type: none"> Minimized Use of Chemical Detergents Environmentally Friendly 	<ul style="list-style-type: none"> Energy Consumption 	<ul style="list-style-type: none"> Future Trends in Eco-Friendly Cleaning 	
	Automation	<ul style="list-style-type: none"> Enhanced Cleaning and Sterilization Efficiency Sustained High-Quality Hygiene Prevention of Human Error 	<ul style="list-style-type: none"> High Recovery Difficulty in Case of Equipment Failure System Implementation Complexity 	<ul style="list-style-type: none"> Improved Reusable Container Turnover and Reliability Reduced Fixed Costs to Enhance Unit Cost Competitiveness 	
Dispose	Chemical Recycling	<ul style="list-style-type: none"> 100% Material Recovery Realization of a Circular Economy 	<ul style="list-style-type: none"> Dependence on Separate Recycling Systems 	<ul style="list-style-type: none"> Key to Implementing a Circular Economy 	
	Upcycling	<ul style="list-style-type: none"> Conversion to High Added Value Minimization of Waste 	<ul style="list-style-type: none"> Technological and Market Limitations 	<ul style="list-style-type: none"> Ensuring Economic Viability Through Value Creation 	

Although various technological options exist across the lifecycle for implementing reusable container services, it is necessary to set the direction for future technology selection by comprehensively considering safety, economic feasibility, and efficiency in each domain.



3. Industry Landscape

Key Technologies across Stages of the Reusable Container Industry

PP (Polypropylene) is environmentally safe, with no BPA or BPS detected, and is suitable for reusable containers due to its recyclability and cost-effectiveness. Carbon emissions per material are: bioplastics 1.2 kg CO₂, PP 2.4 kg CO₂, stainless steel 3.2 kg CO₂. While stainless steel has a long lifecycle, bioplastics face commercialization limits due to high cost and lower strength and water resistance.

*Material recycling is only feasible under specific conditions, such as regulatory sandboxes, and cannot be generalized.

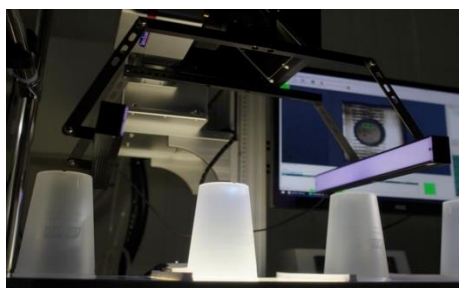
<Carbon Emissions per 1 kg of Material>

Material Type	PP	Stainless	Bioplastic
Carbon Emission (Production)	2.4kgCO ₂	3.2kgCO ₂	1.2kgCO ₂

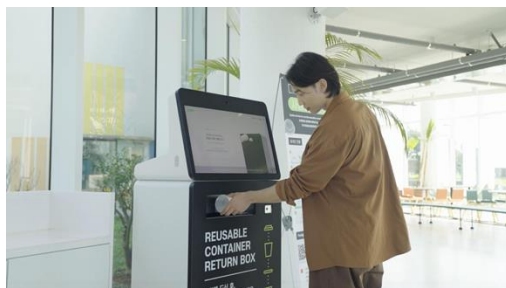
Source: Korea Development Bank(2020), Issue Brief: Current Status and Challenges of the Bioplastics Industry

QR codes are a practical identification technology for reusable container returns due to their cost-efficiency, versatility, and convenience. Challenges include recognition errors from contamination or damage, cumbersome individual registration, inventory loss from collection errors, and secondary contamination risks. Improving durability through laser printing, simplifying registration via an integrated digital system, and providing a one-stop deposit and refund service with user-friendly authentication and reward points are key to creating a streamlined, secure, and user-oriented management framework.

<QR Code Laser Printing Method>



<Integrated System Approach>



To ensure consistently high hygiene and quality standards, washing processes must be standardized and measurable. Manual washing has limits due to worker-dependent variation and constrained processing capacity. Automated washing systems maintain uniform quality under preset conditions and support continuous, high-volume operations. Thus, automation is essential for reliable quality control and scalable reuse system management.

<Comparison of Washing and Sanitization Processes>

Manual / Semi-Manual Process	Category	Automated System
<ul style="list-style-type: none"> Simple line setup per task; low initial investment 	Process Setup	<ul style="list-style-type: none"> Requires full process design and integration upfront, making line configuration complex Higher initial investment due to integrated transport, washing, and sanitization systems
<ul style="list-style-type: none"> Requires personnel for all stages (transport, washing, sanitization) and equipment monitoring Skilled workers must be secured and maintained for each process step 	Labor Structure	<ul style="list-style-type: none"> Entire process can be operated with minimal staff for equipment operation and monitoring Standardized system allows new personnel to operate the line immediately
<ul style="list-style-type: none"> Process efficiency varies by equipment setup and worker skill level Overall throughput is largely dependent on the number of workers 	Operational Efficiency	<ul style="list-style-type: none"> Standardized equipment maintains a consistent processing rate Process efficiency is system-driven, ensuring stable and reliable operation
<ul style="list-style-type: none"> Washing quality varies depending on worker skill and operating conditions Higher risk of quality defects, leading to rework and associated loss costs 	Quality Consistency	<ul style="list-style-type: none"> Preset process parameters ensure consistent washing quality Low likelihood of rework due to minimal quality deviations
<ul style="list-style-type: none"> Fixed labor costs incurred for multiple workers across transport, washing, and sanitization tasks 	Operation Cost	<ul style="list-style-type: none"> Labor costs are limited to minimal operating and monitoring staff

Low-carbon, cost-efficient PP reusable containers, combined with standardized automated washing and sanitization, are essential for delivering a reliable and sustainable reuse service.



3. Industry Landscape

Future Directions for Reusable Container Technology

The reusable container service industry is improving in technical maturity, supported by government guidelines and collaboration across the ecosystem. Four core technology areas show clearly established leading solutions, and further integration and standardization are expected to enhance system efficiency and reliability.

PP is recognized as the optimal container material due to its safety, recyclability, and cost-effectiveness. QR code-based rental and return systems provide the best balance of low cost, universality, and ease of use, and laser marking ensures durability. In washing and sanitization, high-temperature automated systems aligned with HACCP standards, along with AI inspection and UV/ozone sterilization, secure consistent hygiene and sustainability. At end of life, physical recycling and upcycling enable full material recovery, supporting a complete circular economy.

<Comprehensive Analysis of the Current Technological Landscape>

Lifecycle	Optimized Technology	Key Advantages	Technical Characteristics	Evaluation Indicators
Manufacturing	PP (Polypropylene)	<ul style="list-style-type: none"> Non-detection of BPA/BPS Low production cost 100% physical recycling 	<ul style="list-style-type: none"> Proven safety Environmentally friendly Cost-effective 	<ul style="list-style-type: none"> 100% recyclability Environmental safety certification
Rental / Return	QR Code-Based System	<ul style="list-style-type: none"> Low-cost implementation High compatibility and scalability 	<ul style="list-style-type: none"> Laser marking ensures durability Supports real-time data tracking 	<ul style="list-style-type: none"> Efficient operational management Enhanced user convenience
Washing /Sanitization	Automated high-temp/high-pressure washing HACCP aligned with HACCP standards	<ul style="list-style-type: none"> Standardized hygiene control HACCP-compliant sanitization process Automated workflow 	<ul style="list-style-type: none"> UV + ozone combined sterilization Environmentally sustainable washing system AI-powered visual inspection 	<ul style="list-style-type: none"> Stable and continuous hygiene assurance Improved turnaround efficiency Strengthened competitive capacity
Disposal	Physical Recycling	<ul style="list-style-type: none"> 100% raw material recovery Value-added upcycling Enabling a Closed-Loop Circular Economy Minimal CO₂ emission 	<ul style="list-style-type: none"> Closed-loop recycling system Maximized resource efficiency Cost-effective 	<ul style="list-style-type: none"> 100% material reuse rate Creation of circular value

Standardization and Integration of Technologies

- Best-in-class solutions have been firmly established across each technical domain, making standardization and technology integration the key drivers of industry advancement

Data-Driven Operations

- Real-time data collection and management via QR-based systems support ESG management, policy alignment, and operational optimization

Balance of Environmental Safety and Economic Viability

- PP containers offer both environmental safety and cost efficiency, making material selection a key factor in long-term sustainability

Realization of a Circular Economy

- A closed-loop reuse model is achieved through system design that considers recyclability from manufacturing to end-of-life recovery

A total integrated solution combining safe PP containers, QR-based management automated hygienic washing, and full circular recycling is expected to become the standard model for the reusable container service industry.



3. Industry Landscape

4 Social and Cultural Landscape

— Impact of Social and Cultural Factors

The COVID-19 pandemic heightened environmental awareness but also increased single-use consumption due to contactless and convenience-driven habits. Meanwhile, younger generations are placing greater value on sustainability, and the rise of single-person households is boosting demand for simple and convenient service models. Looking ahead, deposit and regulatory measures on disposable packaging from 2025 are expected to accelerate the growth of the reusable container market.

<Trends and Influencing Factors in the Reusable Container Market>

Category	Positive Impact	Negative Impact	Opportunities	Challenges
COVID-19	<ul style="list-style-type: none"> Increased environmental awareness Recognition of need for reusable models Emerging need for innovation in contactless service models 	<ul style="list-style-type: none"> Surge in disposable product use Heightened hygiene concerns Implementation of restrictions on single-use containers 	<ul style="list-style-type: none"> Development of integrated hygiene management systems Expansion of return logistics Growth of delivery market 	<ul style="list-style-type: none"> Ongoing hygiene risk concerns Cost burden of collection and washing Cost vs. convenience trade-off
Value-based Consumption	<ul style="list-style-type: none"> Strong interest in ethical and eco-friendly brands Growing awareness of the severity of environmental issues(96%) Spread of SNS-driven sustainability culture Gen Z leading eco-friendly campaigns 	<ul style="list-style-type: none"> Gap between sustainable intention and actual behavior Cost burden of eco-friendly products(35%) Skepticism toward corporate sustainability initiatives(87%) 	<ul style="list-style-type: none"> Growing environmental culture, including upcycling practices Use sustainability as a brand value strategy Strengthen digital/Gen Z engagement 	<ul style="list-style-type: none"> Need for credible proof of sustainability Addressing economic cost burdens Overcoming "green fatigue"
Increase in Single-Person Households	<ul style="list-style-type: none"> Demand for compact, simple, and convenient services Growth of takeout and delivery culture 	<ul style="list-style-type: none"> Limited storage capacity due to space constraints Higher unit cost burden Lifestyle variability by generation 	<ul style="list-style-type: none"> Design of refillable/compact service models Culture shifting from ownership to usage Expansion of infrastructure such as IoT-based return stations Policy incentives for reuse adoption 	<ul style="list-style-type: none"> Need to shift consumer habits Economic Viability Improve usability

Source: Kantar(2023), 2022 Sustainability Sector Indicators

Source: Ministry of Environment, Korea (2024), National Survey on Environmental Awareness



The reusable container industry is gaining new momentum at the intersection of post-pandemic social shifts and changing consumer trends. However, developing innovative service models that balance conflicting social demands has become a key challenge.

3. Industry Landscape

Future Social and Cultural Directions of the Reusable Container Industry

Social trend analysis indicates that the reusable container industry is shaped by both supportive and conflicting forces. The pandemic heightened environmental awareness but also increased single-use consumption due to hygiene concerns, highlighting the need for reusable systems that ensure both safety and sustainability.

Generational differences are evident: the MZ generation drives value-based, sustainability-focused consumption, while older generations prefer familiar, traditional eco-practices. This calls for differentiated engagement strategies.

Meanwhile, the growth of single-person households and delivery culture has strengthened demand for convenience and personalization, yet actual reuse adoption remains limited by perceived cost burden.

To respond to these needs, the integration of IoT-based return infrastructure, automated hygienic washing, and accessible service models will be essential. These combined solutions are expected to guide the industry's future development.

<Comprehensive Analysis of Social and Cultural Landscape>

Category	Key Phenomena	Core Challenges	Strategic Responses
Addressing the Paradox	Rising environmental awareness vs. increased single-use consumption <ul style="list-style-type: none"> Heightened recognition of environmental crisis during the pandemic Shift toward contactless, convenience-driven consumption Social perception of "hygiene = single-use" becoming normalized 	Balancing hygiene safety and environmental sustainability <ul style="list-style-type: none"> Develop reusable container systems that ensure both hygiene and environmental sustainability Enabling efficient use in contactless consumption environments 	<ul style="list-style-type: none"> Develop hygiene-assured reusable systems Public awareness and behavior shift campaigns
Resolving the tension between hygiene · Sustainability while driving behavior change · Aligning policy with market needs			
Generational Approaches	Active practice among Gen Z vs. habit retention among older generations <ul style="list-style-type: none"> Expansion of SNS-driven environmental movements Growing demand for authenticity in corporate sustainability Increasing emphasis on applying reuse and recycling in daily life 	Closing the generational perception gap <ul style="list-style-type: none"> Analyze differences between older generation and Gen Z Develop generation-specific communication strategies Strategies to link digital and analog touchpoints 	<ul style="list-style-type: none"> Develop generation-specific engagement strategies Influencer marketing
Digital natives vs. digital immigrants · Individual identity vs. collective values · Immediate change vs. gradual adaptation			
Consumption Pattern Shifts	40% single-person households; 229% growth in delivery market <ul style="list-style-type: none"> Growth of "minimal lifestyle" culture Shift from ownership to usage-based value Emphasis on space efficiency 	Demand for convenience, personalization <ul style="list-style-type: none"> Combining space efficiency with economic viability Reducing perceived burden of participation Develop personalized service offerings 	<ul style="list-style-type: none"> Develop innovative business models Adopt space-efficient product and service designs Implement subscription-based rental services
Urbanization and reduced living space · Entrenched contactless culture · Expansion of individualistic values · Need for new business models			
Addressing	96% awareness vs. 24% actual practice rate <ul style="list-style-type: none"> High willingness but low conversion into action Low awareness to action Environmental concerns overshadowed by economic pressure 	Lowering initial costs and friction <ul style="list-style-type: none"> Reduce price barriers for eco-friendly products Improve accessibility Provide meaningful incentives 	<ul style="list-style-type: none"> Utilize carbon-neutral point programs Improve economic accessibility Provide strong incentives or implement regulatory measures
Knowledge-behavior gap · Economic accessibility barriers · Psychological distance · Lack of established social norms · Limited policy effectiveness			
Technology Integration	Growing demand for contactless, space-efficient, and hygiene-assured operations <ul style="list-style-type: none"> Application of digital-based technologies Adoption of advanced technologies to enhance washing quality 	Need for integrated system-level solutions <ul style="list-style-type: none"> Integrate online and offline platforms Establish efficient collection and washing systems Optimize the user experience 	<ul style="list-style-type: none"> Automated integrated systems Gradual expansion of infrastructure Platform standardization
Technology adoption · Return on investment · Data governance · Platform economy readiness · Regulatory alignment			

The reusable container industry must advance through integrated solutions that combine hygiene, convenience, economic viability, and environmental sustainability, supported by generation-specific digital service models.

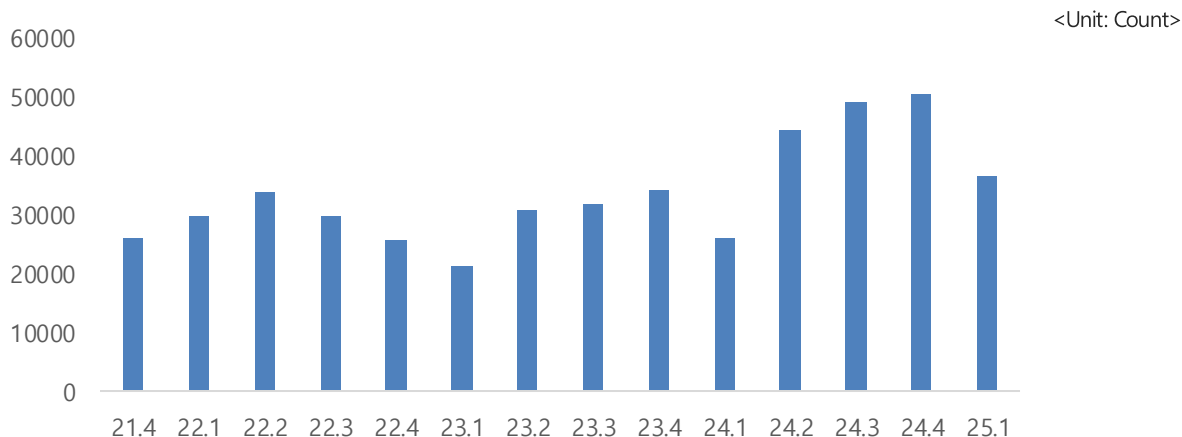


3. Industry Landscape

Trend Analysis of Public Interest

Public interest in reusable containers rose after the Seoul pilot project in late 2021 and continued to grow through 2022, though it fluctuated with policy shifts. Interest peaked in Q4 2023 when the Ministry of Environment moved from voluntary to mandatory regulations, accelerating public-private collaboration and signaling a transition toward stable, scalable operations. This peak (50,661 search cases) indicates that the industry is entering a structured growth phase where policy consistency will be critical to continued expansion.

<Trend in Information Volume>



Source: Lucy2.0 Online Mentions and Keyword Trend: "Reusable Containers"

Period	Key Phase	Change in Awareness	Key Drivers	Characteristics
2021 Q4	Introduction	Initial Awareness	• Launch of Seoul pilot program	• Introduction to public service system
2022	Expansion	Gradual increase	• 2nd-stage public pilot projects	• Policy-based awareness expansion
2023 1H	Regulatory Signal	Continued rise	• Early regulatory guidance discussions	• Growing expectations for regulation
2023 Nov.	Policy Transition Phase	Operational confusion	• Regulatory shift (mandatory → voluntary)	• Triggered debate over policy effectiveness
2024 Q1	Stagnation	Temporary decline	• Growing skepticism due to policy uncertainty	• Increased uncertainty
2024 Q2	Private Sector Entry	High growth	• Expansion of private-sector participation	• Visible market activation
2024 Q4	Peak	Highest interest	• Large-scale system deployment and initiatives	• Policy support linked to market maturity
2025 Q1	Adjustment	Decline	• Seasonal fluctuations	• Interpreted as temporary adjustment phase

Seasonal Pattern Analysis

Interest in reusable containers shows a clear seasonal pattern, typically rising in Q2–Q3 (spring/summer) and decreasing in Q1 (winter). Higher activity during festivals, outdoor events, and increased delivery usage indicates that consumption behavior is influenced by seasonal lifestyle changes. This suggests that strategic campaigns, marketing, and pilot deployments would be most effective during peak-interest periods.

The industry is transitioning from public-led demonstration to private-led expansion. However, synchronized efforts between consumers and policy frameworks are still necessary to achieve stable adoption.

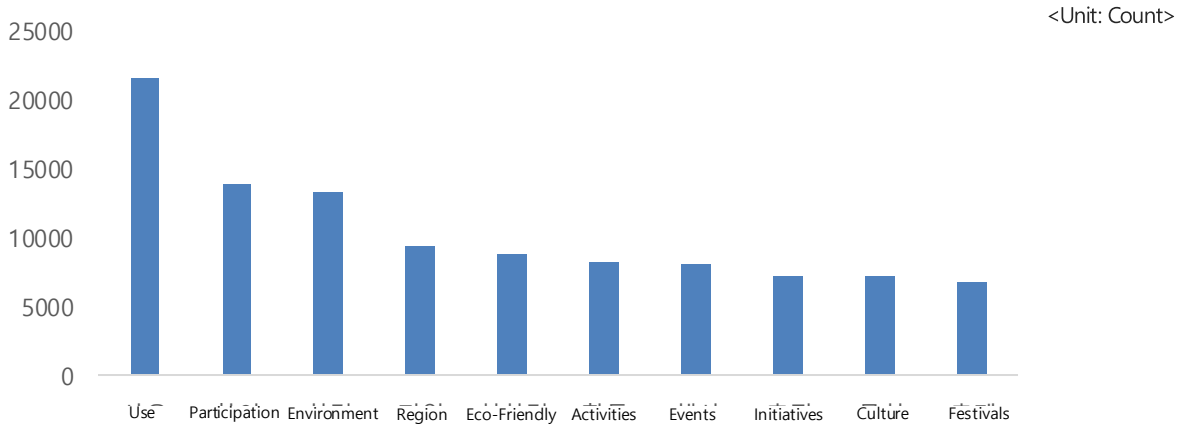


3. Industry Landscape

Overall Top Keyword Analysis

Keyword analysis from 2021–2025 shows that, alongside basic terms like “use,” “participation,” and “environment,” event-related terms such as “festival” and “culture” ranked highly. This indicates that reusable packaging has been primarily associated with event settings rather than everyday use, highlighting the need for strategies that shift adoption from special events to daily life.

<Average Information Volume per Quarter>

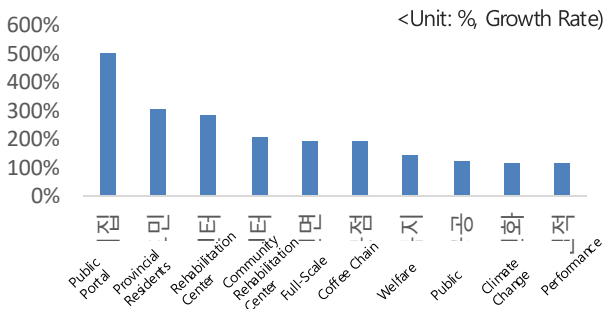


Source: Lucy2.0 Online Mentions and Keyword Trend: “Reusable Containers”

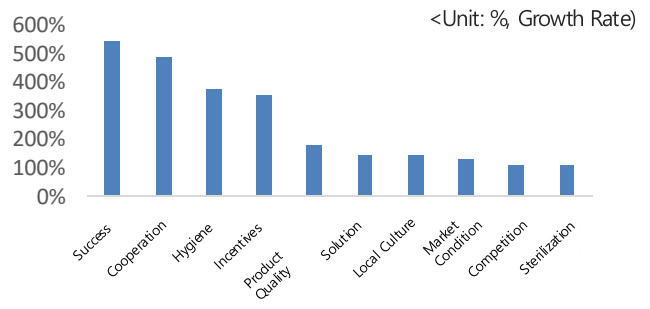
Yearly Analysis of Emerging Keywords

The shift in rising keywords between 2023 and 2024 reflects a transition in the reusable packaging industry. In 2023, public-sector and regulation-related terms indicated a foundation-building phase led by government initiatives. In 2024, the sharp rise of “successful” and “cooperation” suggests positive evaluations of pilot programs and increasing emphasis on consumer and private-sector participation. This indicates the industry is moving from institutional setup to market expansion, with continued growth depending on active consumer engagement.

<2023>



<2024>



Source: Lucy2.0 Online Mentions and Keyword Trend: “Reusable Containers”

The next phase requires consumer-driven and market-driven adoption, not just public demonstration projects.



4. Field Survey & Findings

1 Overview

— Selection of Survey Targets

Survey targets were selected in accordance with relevant recycling and disposable-use regulations, focusing on facility types where reusable containers are currently used or applicable. Representative segments were then identified based on actual usage characteristics.

Category	Sub-category	Description	Selection Criteria
*Large Enterprises	Internal Business Premises	Facilities with in-venue dining operations	Top 30 facilities by market capitalization (1st selection); select 2–3 for sampling
Festivals	Cultural/Local Festivals	Festivals operating food/beverage stands	Major cultural festivals designated by local governments
Funeral Hall	Hospitals	Funeral halls providing meals for visitors	Selected based on regional scale (Number of memorial rooms)
Multi-purpose Venues	Sports Complexes, Arenas	Venues with concession operations	Annual visitor scale
Cinemas	Multiplex & Independent Cinemas	Theaters operating concession food sales	Regional chain and independent theaters
Restaurants	Cafés & Foodservice Outlets	Dining establishments using disposable or reusable containers	Local foot traffic by region

1) Classifying the top 30 companies by market capitalization into primary industry segments, 2–3 leading companies were selected within each segment, resulting in a total sample of 30 companies for the survey.

— Survey Design

Item	Description
Survey Targets	Facilities using disposable, reusable, or rentable reusable containers (6 types)
Method	Email survey, site visits, and structured interviews
Region	Domestic (South Korea)
Period	April 1, 2025 – May 9, 2025

— Definitions of Terms

Term	Definition	Example
Disposable Container	Used once and discarded on-site (includes contaminated waste)	Paper or plastic takeout cups and food containers
Standard container	Washed and reused by the business itself	Stainless steel cups, in-store reusable tableware
Reusable Container	Managed by a rental service provider (return + wash + redistribution)	Container rental, collection, and washing services

4. Field Survey & Findings

2 Key Findings – Summary

— Awareness of Reusable Container Services

Survey results show a clear gap in awareness across different sectors. Awareness is highest among large enterprises (100.0%) and festivals (88.9%), followed by traditional markets (80.0%), reflecting strong engagement from municipal and public institutions and existing partnership networks. In particular, festivals show naturally higher awareness due to policy-linked pilot programs and public support.

On the other hand, awareness in restaurants (27.3%) remains low. This suggests limited exposure to related policy information and weak communication channels in this sector. Restaurants rely more on recommendations within local business communities rather than policy or media channels.

Multipurpose facilities (66.7%) and cinemas (75.0%) show mid-level awareness, supported mainly by internal searches and self-directed information collection rather than structured industry communication.

A key insight is that awareness alone does not guarantee understanding or operational readiness. Several sectors understand the concept but lack practical knowledge of how reusable services operate, indicating a need for clearer, sector-specific communication strategies. Government messaging and industry promotion must therefore differentiate by sector and leverage existing internal networks where effective.

Rank	Sector	Level of Awareness	Level of Understanding	Awareness Channel
1	Large Enterprises	100.0%	100.0%	Media reporting; internal and external communication
2	Festivals	88.9%	50.0%	Local government / public sector promotion
3	Funeral Halls	80.0%	30.0%	Public sector announcements; press coverage
4	Multipurpose Facilities	66.7%	66.7%	Local government / public sector promotion
5	Cinemas	75.0%	75.0%	Self-directed searches; media exposure
Source: 2025 Field Survey (N=127)				
6	Restaurants	27.3%	18.2%	Referrals via nearby businesses



There is an urgent need to build differentiated communication infrastructure for low-awareness sectors and to establish sector-specific information channels that encourage voluntary engagement.

4. Field Survey & Findings

Adoption and Utilization of Reusable Containers

Adoption rates differ significantly across sectors. Festivals (55.5%) and cinemas (42.1%) show the highest adoption, followed by multipurpose facilities (37.5%), large enterprises (36.7%), and traditional markets (20.0%). In contrast, restaurants generally continue to use disposable or owner-managed reusable containers, showing limited adoption.

Large enterprises, traditional markets, and cinemas tend to adopt reusable containers through internal ESG management policies. Festivals adopt them based on event organizers' decisions, which indicates stronger alignment with government and municipal initiatives.

However, infrastructure limitations and the absence of stable operational models make continuous service difficult in some sectors. Where adoption depends heavily on headquarters-level decisions or policy incentives, long-term sustainability is particularly sensitive to external conditions.

Restaurants already operate their own washing and container management systems but find current rental service models costly or impractical. Their needs differ structurally from large or public-sector facilities, highlighting the requirement for diversified service models and sector-specific approaches.

Rank	Sector	Operating Method	Adoption Rate
1	Large Enterprises	Internal ESG management	36.7%
2	Festivals	Organizer-led decision	55.5%
3	Funeral Halls	Headquarters ESG management	20.0%
4	Multipurpose Facilities	Association-led ESG management	37.5%
5	Cinemas	Internal ESG management	42.1%
6	Restaurants	-	-

Source: 2025 Field Survey (N=127)



Active adopters require expansion support and service infrastructure, selective adopters need sustainable operational systems, and non-adopters require sector-specific service model development.

4. Field Survey & Findings

Key Drivers Behind the Adoption of Reusable Packaging Systems

Analysis of adoption drivers shows that sector-specific approaches are essential. For funeral halls (75.0%), cinemas (53.3%), and festivals (50.0%), environmental values are the primary motivation, reflecting their strong customer-facing nature and the importance of brand image. In funeral halls, increased expectations for ESG practices have strengthened willingness to adopt, though practical infrastructure support remains limited.

Sectors driven by economic benefits are also clearly distinct. Multipurpose sports facilities adopt reusable containers primarily for cost reduction (75.0%), while restaurants cite convenience of existing container use (75.0%) as the main reason for non-adoption. Although these operators prioritize operational efficiency over environmental value, current service models and incentive structures are insufficient to support adoption.

For large enterprises, adoption motivations center on user acceptance and satisfaction. User discomfort was initially cited as the main concern (37.5%), but post-adoption results show notable increases in user satisfaction (28.6%). This indicates that sustained exposure and awareness-building among employees—the primary users—are critical to successful adoption.

Overall, adoption drivers are shaped not simply by industry category but by market environment, customer behavior, and maturity of existing operational systems. Safety-oriented motivations appear in sectors where user experience is critical; value-driven motivations in sectors where brand identity matters; and cost-driven motivations in competitive operational environments. This underscores the need for motivation-specific strategies and ecosystem-tailored support systems, rather than a single uniform model.

Sector	Motivation Type	Primary Driver	Motivation Rate
Large Enterprises	Safety & hygiene values	Container hygiene	50.0%
Festivals	Environmental values	Environmental impact	50.0%
Funeral Halls	Environmental values	Environmental impact	75.0%
Multipurpose Facilities	Economic benefits	Cost reduction	75.0%
Cinemas	Environmental values	Environmental impact	53.3%
Restaurants	-	Low perceived demand	-

Source: 2025 Field Survey (N=127)



Differentiated infrastructure must be developed to reflect sector-specific priorities: safety-focused sectors require enhanced service quality, value-driven sectors need marketing and engagement infrastructure, and cost-driven sectors require service models that emphasize expense reduction.

4. Field Survey & Findings

— Barriers to Reusable Container Adoption

The analysis shows that familiarity with existing practices is the strongest barrier across all sectors. This resistance is most pronounced in restaurants (75.0%), cinemas (52.6%), and funeral halls (42.9%), where operators are generally satisfied with their current container management systems. More importantly, there is a lack of effective reusable service models and transition support infrastructure that can replace these existing workflows.

Initial cost burden is a key barrier for sectors with many small operators. At festivals (42.9%), the burden falls on the event organizer, who must cover higher unit costs and potential loss compensation due to large-scale usage, despite operational convenience benefits for individual vendors. This indicates a need for financial and operational support mechanisms.

A lack of perceived necessity is another barrier. Multipurpose facilities (66.7%) report not experiencing clear performance benefits under current systems. Meanwhile, large enterprises (37.5%) expressed concerns about user acceptance, although post-adoption data shows that user satisfaction improves once the service is experienced, suggesting perception barriers can be overcome through actual use.

These findings highlight the need for sector-specific strategies. Since barriers differ by business environment and operational structure, providing tangible benefits aligned with each sector's priorities will be most effective. At the same time, the improvement in user attitudes observed in large enterprises suggests that hands-on experience is key to reducing resistance. The priority is to design low-risk entry strategies that allow stakeholders to experience immediate practical benefits.

Barrier Type	Description	Sectors	Barrier Rate
Resistance to existing practices	Preference for current convenience and self-managed systems	Funeral halls	42.9%
		Cinemas	52.6%
		Restaurants	75.0%
Initial implementation cost	Upfront investment burden	Festivals	42.9%
Service performance limitations	Insufficient reliability of current service systems	Multipurpose facilities	66.7%
Customer acceptance	Concern over user inconvenience or dissatisfaction	Large enterprises	37.5%

Source: 2025 Field Survey (N=127)

To address barriers systematically: familiarity with existing practices requires phased transition support, cost burden should be eased through financial assistance, low perceived necessity should be addressed by sharing successful use cases, and customer acceptance should be improved through enhanced user experience.



4. Field Survey & Findings

Future Adoption Outlook and Intentions

Survey results show distinct differences in future adoption intentions across sectors. Among large enterprises, 25.0% plan gradual expansion, while 60.0% of festivals expect to expand, including 40.0% gradual and 20.0% full expansion. This reflects strong environmental value orientation and high expectations for brand enhancement through reusable containers. Festivals also benefit from relatively well-established government support programs and service-linked infrastructure.

Sectors maintaining current levels—funeral halls, multipurpose sports facilities, and cinemas—share an intention to continue use, but for different reasons. Funeral halls focus on ESG branding, cinemas continue within headquarters policy and cost-efficiency goals, and multipurpose facilities plan continued usage as long as economic benefits persist. Although these sectors are satisfied with current service performance, they lack the additional incentive or infrastructure needed for expansion.

Restaurants, on the other hand, show little intention to adopt, primarily due to reliance on self-managed washing systems and the absence of service models or incentives tailored to small-scale operators. Current reusable service models are optimized for large-volume users, leading to limited accessibility in this sector.

Overall, the reusable container ecosystem is experiencing concentrated growth in a few sectors, which may hinder balanced industry development. Additionally, sectors maintaining current service levels remain vulnerable to external policy and market shifts, indicating the need to transition from pilot-oriented expansion to stable, scalable, and sustainable operating models that can support long-term industry growth.

Sector	Status/Outlook	Key Response	Willingness to Adopt
Large Enterprises	Expansion expected	25.0% plan expansion	Gradual expansion (25.0%)
Festivals	Expansion expected	60.0% plan expansion	40.0% gradual expansion / 20.0% full expansion
Funeral Halls	Maintain current level	100.0% continued usage planned	continued use driven by ESG and brand goals (60.0%)
Multipurpose Facilities	Maintain current level	100.0% continued usage planned	Continued use if economic benefits maintained (75.0%)
Cinemas	Maintain current level	100.0% continued usage planned	Continued use if costs remain manageable (~47.1%) Mandatory regulation (41.2%)
Restaurants	Low adoption expected	100.0% no expansion planned	Preference for existing systems

Source: 2025 Field Survey (N=127)



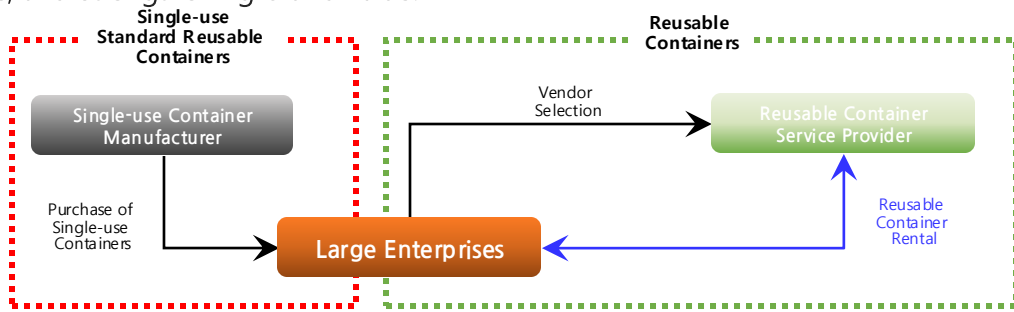
In the short term, expand through festival-led models; over the long term, support maintenance sectors and provide tailored solutions to encourage voluntary adoption.

4. Field Survey & Findings

2 Key Findings by Sector

Large Enterprises

Large enterprises have high awareness and strong adoption willingness, driven by industry trends and brand reputation needs. Usage is centered in offices, employee cafeterias, and café take-out areas. Reusable containers function as a tool for demonstrating environmental performance, meeting ESG requirements, and strengthening brand value.



Among large enterprises, 50.0% became aware of reusable container systems through media coverage. Usage is concentrated in in-house cafés and cafeterias (50.0%), followed by office areas and customer-facing spaces (25.0% each). The most important consideration when adopting reusable containers is the level of hygiene and cleanliness management (50.0%), followed by service cost suitability and container design and functionality.

<Awareness & Adoption Drivers>

Awareness of reusable systems		Awareness Channel		Areas of container use		Key decision factors	
Highly aware	100.0%	Media coverage	50.0%	In-house café / cafeteria	50.0%	Hygiene & cleaning standards	50.0%
		Providers' proposals	25.0%	Office pantry	25.0%	Cost structure	37.5%
		Internal department suggestion	25.0%	Visitor service areas	25.0%	Container design & functionality	12.5%

The improvement in environmental performance (42.9%) appears to result from consistent monthly reuse. Based on this experience, most companies plan to maintain current usage (75.0%) or gradually expand (25.0%). This indicates that initial concerns regarding user acceptance (37.5%) and hygiene and cleanliness (25.0%) have largely been resolved through actual operation.

<Barriers and Future Outlook>

Expected Barriers		Benefits of reusable container adoption		Adoption Plans	
User discomfort concerns	37.5%	Waste reduction	42.9%	Maintain current level	75.0%
Initial adoption cost	25.0%	Improved user awareness	28.6%	Gradual expansion	25.0%
Hygiene / cleaning concern	25.0%	Higher ESG evaluation scores	14.3%		
Operational complexity	12.5%	Enhanced brand image	14.3%		

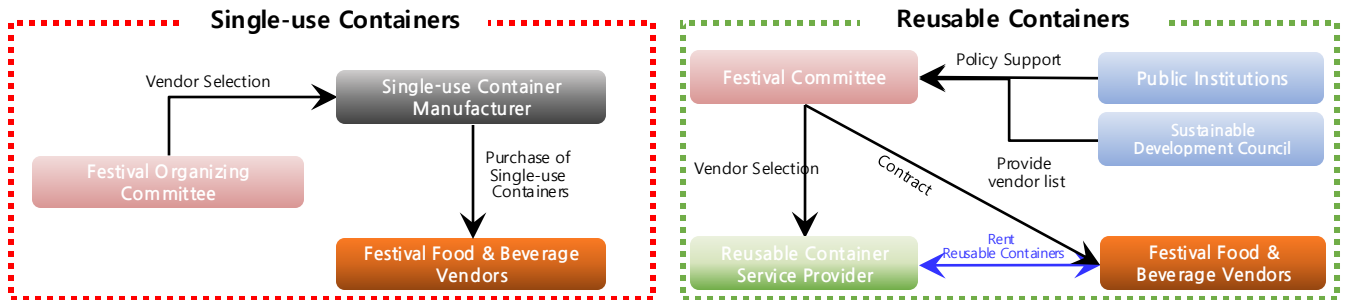
Large enterprises show high awareness of reusable containers, and positive evaluations from adopters—along with increased employee environmental awareness and user satisfaction—indicate that initial concerns about acceptance have been resolved, suggesting rapid expansion across the sector.



4. Field Survey & Findings

Festivals

The festival sector shows higher awareness and more active use of reusable containers compared to other industries. This is largely due to well-established government support programs and service-linked infrastructure, which have enabled smoother adoption and operation.



The festival sector shows very high awareness of reusable containers, with 90.0% recognizing them through public-sector promotion. 60.0% are actively planning adoption, and 70.0% prefer using external service providers. Currently, 55.5% of festivals use reusable containers either fully or in part, with key benefits cited in enhancing environmental impact and eco-friendly festival identity.

<Awareness and Adoption Drivers>

Awareness of reusable container systems	
Highly aware	44.4%
Neutral	33.3%
Some awareness	11.1%
Not aware	11.1%

Awareness channel	
Public institutions / local government promotion	90.0%
Media coverage	10.0%

Adoption status	
Reviewing and planning adoption	60.0%
Already adopted	30.0%
Considered but no current plan	10.0%

Benefits of reusable container adoption	
Reduced waste and measurable environmental impact	50.0%
ESG contribution and alignment with environmental reporting	35.7%
Enhanced eco-friendly festival image	14.3%

Reusable containers are used in all or part of festivals (55.5%). The main barrier is initial cost, with service cost considerations and consumer acceptance concerns (14.3%) also noted. Other challenges include return rates, hygiene management, container standardization, and vendor participation. For the next five years, 40.0% plan gradual expansion, 25.0% plan to maintain current use, and 25.0% plan larger expansion, meaning 90.0% show a positive outlook for continued adoption.

<Barriers and Future Outlook>

Overview of reusable Container use	
Using reusable containers throughout the festival	44.4%
Mostly using single-use containers	33.3%
Partially using reusable containers at festival areas	11.1%
Mostly using regular containers	11.1%

Reasons for Using Single-Use or Reusable Containers	
Familiarity and convenience of existing container use	50.0%
Operational and spatial efficiency for the business	37.5%
Customer preference	12.5%

Key Barriers to Using Reusable Containers	
Initial introduction cost	42.9%
Consumer acceptance and inconvenience concerns	14.3%
Lack of industry information	7.1%
Low return rate	7.1%
Concerns over hygiene and quality management	7.1%
Container standardization issues	7.1%
Difficulty building logistics systems	7.1%
Difficulty engaging vendors	7.1%

Plans for Expansion of Reusable Containers	
Gradual expansion from current level	40.0%
Maintain current level	20.0%
Expand significantly beyond current level	20.0%
Not using, but plan to adopt	10.0%
Not using, and no plans to adopt	10.0%

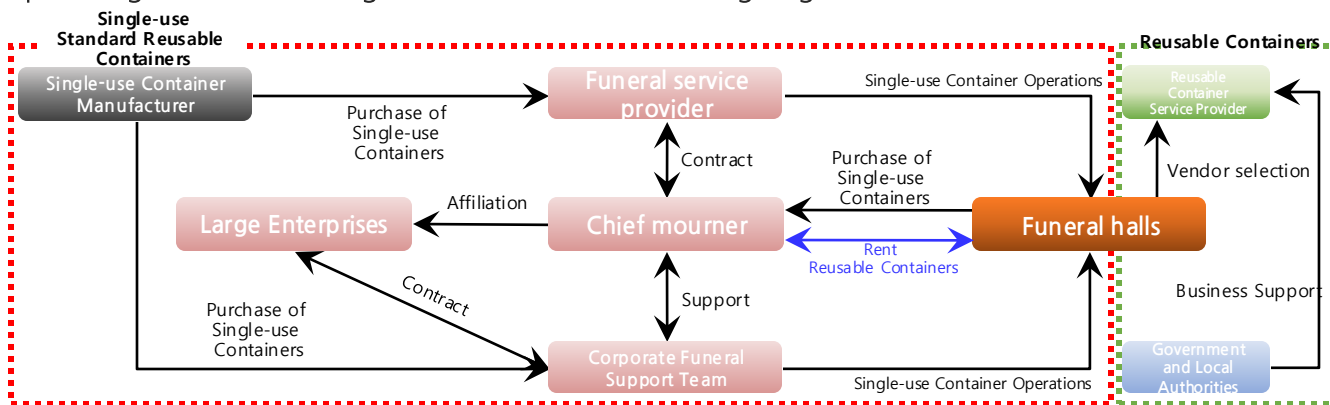
The festival sector shows high awareness and strong willingness to adopt reusable containers. With policy support to alleviate initial cost burdens and information gaps, it has high potential to evolve into a leading success model.



4. Field Survey & Findings

Funeral Halls

In funeral halls, containers are usually supplied through contracted funeral service companies or purchased directly. While single-use containers are still common due to convenience, some funeral halls have begun adopting reusable containers through municipal pilot programs or internal policies, providing rental and management services and restricting single-use container use.



80.0% are aware of reusable container systems, mainly through public institutions or media (75.0%). Adoption is driven by environmental concerns (75.0%) and ESG initiatives (25.0%). Reported effects include waste reduction (66.7%), management convenience (22.2%), and brand image improvement (11.1%).

<Awareness & Adoption Drivers>

Awareness of reusable container systems	
Neutral	50.0%
Aware	20.0%
Highly Aware	10.0%
Not aware	10.0%
Not aware at all	10.0%

Awareness channel	
Public institutions promotion	50.0%
Media coverage	25.0%
Sales visits	12.5%
Referrals	12.5%

Primary reasons for adoption	
Rising environmental concerns	75.0%
Alignment with ESG policy	25.0%

Benefits of reusable container adoption	
Waste reduction & environmental impact	66.7%
Convenience in washing/management	22.2%
Brand image improvement	11.1%

20% of respondents currently use reusable containers. The main reasons for continuing current container use were familiarity and convenience (52.6%) and preference for self-management (36.8%). The key barriers to adopting reusable containers were cost and operational burden and customer convenience concerns. For future plans, 66.7% intend to continue using reusable containers, while 87.5% have no plans for full transition, and 12.5% plan to fully switch.

<Barriers and Future Outlook>

Container types in use	
Single-use containers	70.0%
Reusable containers	20.0%
Regular containers	10.0%

Reasons for using single-use or reusable containers	
Convenience of current container	42.9%
Customer preference	21.4%
In-house management	14.3%
Lack of service details	7.1%
Space / Operational efficiency	7.1%
Environmental value	7.1%

Plan to continue using reusable containers	
Strongly Agree	66.7%
Agree	33.3%

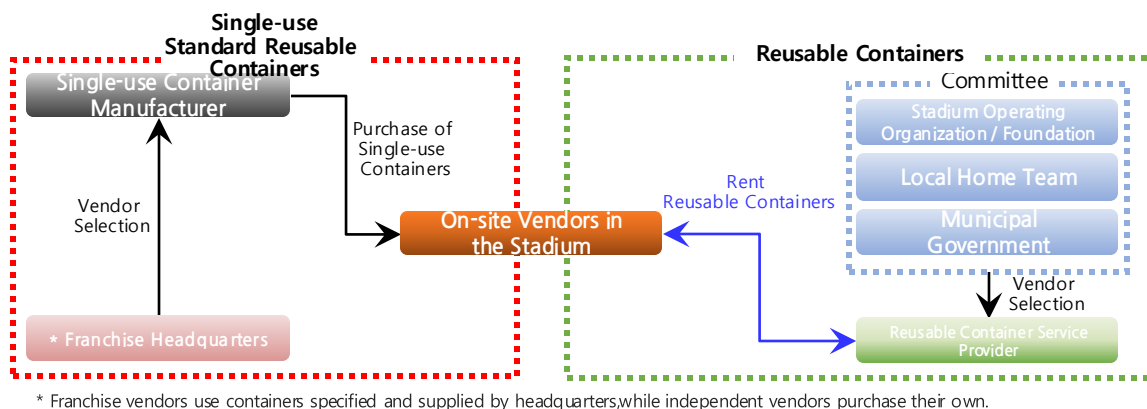
Plans to switch to reusable containers	
No plans	87.5%
Plans to entirely switch	12.5%

Funeral halls are adopting reusable containers primarily to support ESG management and enhance their eco-friendly brand image. They utilize reusable containers as a marketing and branding tool, and since all respondents indicated plans to continue using the service, further market growth is expected.

4. Field Survey & Findings

Multipurpose Facilities

Reusable containers in sports facilities are introduced through coordination among local governments, home teams, and stadium management. Cost savings compared to disposables serve as the main incentive, with vendors encouraged through cost-sharing rather than strict regulation. Adoption cases show that food service management companies lead promotion, highlighting the public sector's key role in supporting system expansion.



Most respondents are aware of reusable systems, with 67% informed through local government promotion. Cost reduction (75%) is the primary adoption driver. Key benefits cited are cost savings (50%), environmental impact reduction (38%), and convenience in cleaning and management (13%).

<Awareness & Adoption Drivers>

Awareness of reusable container systems	
Aware	55.6%
Highly Aware	33.3%
Neutral	11.1%

Awareness Channel	
Public institutions promotion	66.7%
Media coverage	22.2%
Referrals	11.1%

Primary Reasons for Adoption	
Cost reduction	75.0%
Convenient use	25.0%

Benefits of reusable container adoption	
Cost reduction	50.0%
Environmental protection and waste reduction	37.5%
Convenient use	12.5%

Most sports facilities currently use single-use containers (56.3%) or general reusable ware (0.57%), while 37.5% use reusable containers. Convenience of existing containers (50.0%) is the main reason for not switching. All facilities currently using reusable containers indicated that they plan to continue using them.

<Barriers and Future Outlook>

Current Container Type in Use	
Single-use containers	56.3%
Reusable containers	37.5%
Regular containers	6.3%

Reasons for using Single-use or Reusable Containers	
Convenience of current container	50.0%
Space / Operational efficiency	37.5%
Customer preference	12.5%

Key Barriers to Using Reusable Containers	
Not required due to product characteristics	66.7%
Uncertainty about customer acceptance	33.3%

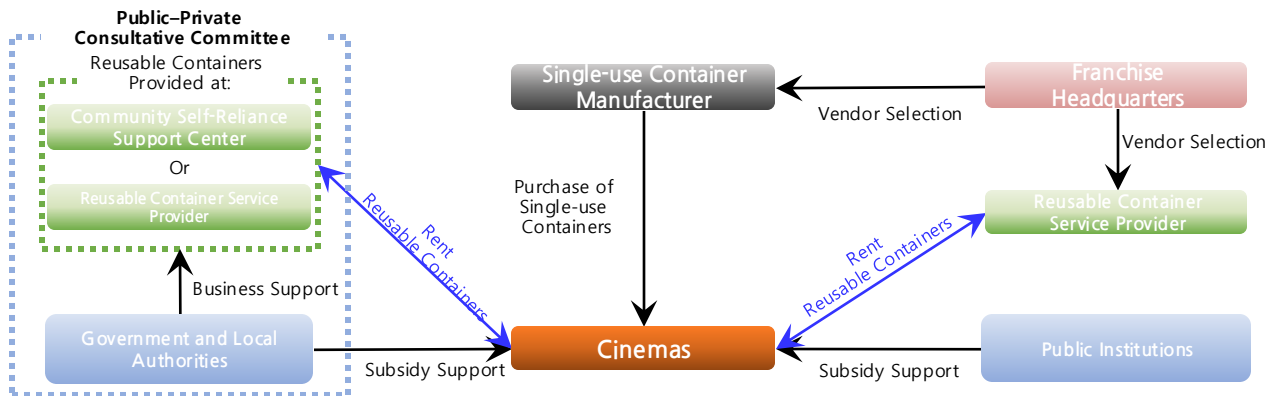
Plan to continue using reusable containers	
Neutral	60.0%
Agree	40.0%

Sports facilities have established successful adoption models with support from local governments and teams, but the sustainability of cost subsidies remains a concern. A key task is developing a self-sustaining operating model with flexible container options.

4. Field Survey & Findings

Cinemas

In cinemas, reusable and single-use containers are used together. Franchise adoption is driven by headquarters' ESG policies or agreements with local governments, with partial financial support provided. Reusable containers are offered as an option to consumers for convenience reasons, resulting in higher reliance on single-use containers overall.



75.0% are aware of reusable container systems, with 88.8% having learned through self-search and media exposure. Adoption is driven by growing environmental concerns and ESG policies established at the corporate or facility level. Expected benefits include waste reduction and enhanced brand image. As adoption drivers, 53.3% cited environmental issues, and 46.7% cited corporate policy.

<Awareness & Adoption Drivers>

Awareness of reusable container systems		Awareness Channel		Primary Reasons for Adoption		Benefits of reusable container adoption	
Highly aware	58.3%	Media coverage	44.4%	Environmental issues	53.3%	Waste reduction	52.4%
Not aware at all	25.0%	Search	44.4%	Compliance with ESG regulation	46.7%	Improve brand image	42.9%
Aware	16.7%	Referrals	11.1%			Cost reduction	4.8%

Most sites primarily use single-use containers, with only limited use of reusable containers. Familiarity and convenience with existing containers (52.6%) is the main reason for not switching. 58.4% do not track container usage, and 91.6% reported using single-use containers, with 58.3% using them partially and only 8.3% having fully transitioned to reusable containers. However, all respondents using reusable containers plan to continue their use.

<Barriers and Future Outlook>

Reasons for Using Single-use or Reusable Containers		Container Type in Use		Container Use Ratio		Plan to Continue Using Reusable Containers	
Convenience of current container	52.6%	Single-use Container	52.6%	Single-use Container (80%)	58.3%	Agree	87.5%
In-house management	36.8%	Reusable Container	42.1%	Single-use Container (100%)	33.3%	Strongly Agree	12.5%
Lack of service details	5.3%	Single-use Straw	5.3%	Reusable Container	8.3%		
Business scale below reusable service threshold	5.3%						

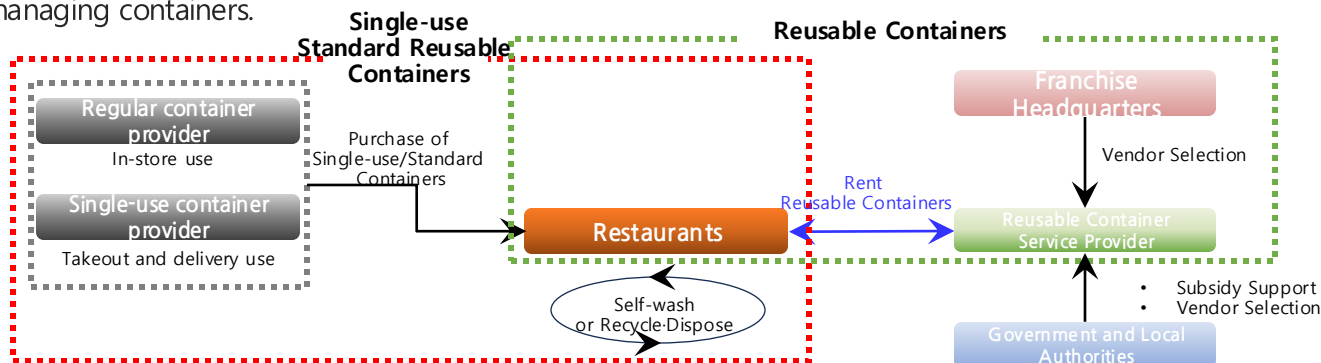
Because reusable container adoption in cinemas remains optional and limited, a phased transition strategy—such as gradual mandates and stronger incentives—is needed to increase usage.



4. Field Survey & Findings

Restaurants

Most food service businesses already use in-house reusable dishware due to single-use regulations. Restaurants rarely require take-out containers, while cafés use reusable dishware for dine-in and single-use containers for take-out. Most establishments have their own systems for purchasing, washing, and managing containers.



Awareness of reusable containers is low at 27.3%, with 72.7% indicating no awareness. Most learned about them through personal referrals (75.0%), indicating a lack of structured information channels. The main perceived benefit is convenience in washing and management (80.0%), while environmental benefits (20.0%) are less recognized.

<Awareness & Adoption Drivers>

Awareness of Reusable Container	
Not aware	72.7%
Neutral	18.2%
Highly aware	9.1%

Awareness of Reusable Container Systems	
No understanding	72.7%
General understanding	18.2%
Aware of the service, but not familiar with details	9.1%

Awareness Channel	
Referrals	75.0%
Media coverage	25.0%

Benefits of reusable container adoption	
Convenient use	80.0%
Waste reduction	20.0%

75.0% continue using their current containers due to familiarity and convenience, while 25.0% prefer self-managed systems or are unaware of external services. All respondents stated they have no plans to switch, indicating high satisfaction with existing in-house management and low perceived need for reusable container services.

<Barriers and Future Outlook>

Container Type in Use	
More than 90% use standard containers	60.0%
Used in combination	30.0%
More than 90% use single-use containers	10.0%

Reasons for Using Single-use or Reusable Containers	
Convenience of current container	75.0%
In-house management	16.7%
Lack of service details	8.3%

Key Barriers to Using Reusable Containers	
Operational transition difficulty	41.7%
Initial introduction cost	25.0%
Uncertainty about customer acceptance	16.7%
Staff training and adaptation	8.3%
Difficulty securing space	8.3%

Plans to Switch to Reusable Containers	
No plans	100.0%

In the food service sector, efficient in-house container systems reduce the incentive to adopt reusable containers. Stronger regulations, incentives, or clear cost and efficiency benefits are needed to drive adoption.



4. Field Survey & Findings

3 Implications and Insights

The suitability of reusable container adoption depends on the characteristics of the usage space and the corresponding support model. Space characteristics influence container management and user behavior, while the support approach determines economic feasibility and the pace of adoption.

— Strategies for Different Space Environment

Open, high-mobility spaces require flexible and adaptive systems due to unpredictable user behavior. In cafés and delivery environments, the wide service radius increases container loss risk, making real-time tracking and a dense return network essential. Because users vary widely, simple, intuitive usage and easy access to return points across regions are critical.

Closed spaces allow more controlled and efficient container management. With a fixed user group and predictable usage patterns, standardized operations and gradual habit formation are feasible, and integration with existing infrastructure can improve efficiency. However, venues with high peak exit volumes such as stadiums and cinemas require high-capacity, rapid return systems to handle large crowds within short timeframes.

— Economic Support Models

Direct support for operators through pilot programs in festivals, cinemas, and funeral halls has proven effective. When financial support is provided directly to operating entities such as companies and organizations, they experience tangible cost savings and face fewer concerns about customer inconvenience, producing both positive outcomes and reduced risks. This has been sufficient to drive broader adoption of reusable containers in the market. In these sectors, collaboration and participation are active, and voluntary adoption is spreading beyond pilot programs.

Support for consumers, such as through the Carbon Neutral Points Program, shows different levels of utilization depending on age groups due to differences in process familiarity and accessibility. While younger users are more accustomed to digital payments and refund systems, older groups may find such processes complex. In the foodservice sector, large franchise cafés have begun integrating the program by linking user payment accounts in their apps with the carbon-neutral point system. Meanwhile, reusable container service apps offer convenient use but currently lack sufficient public awareness. Strengthening public-sector promotion and support for these systems is expected to improve recognition and drive broader adoption of reusable containers.

5. Policy Recommendations

1 Recommendations by Sector

— Development Directions

The reusable container industry should be approached as an integrated service system covering collection, washing, distribution, and management. Clear legal definitions, standardized washing and logistics systems, and phased expansion starting with large users are essential. Consumer-friendly incentives and practical, locally suited operating models will enable wider adoption and support the transition to a sustainable circular resource economy.

Category	Item	Issues	Directions
Policy Development	Legal Definition	Ambiguous definition and standards for reusable containers	<ul style="list-style-type: none"> Clarify legal definition of reusable containers Strengthen certification standards for durability and hygiene Establish regulatory basis for rental-washing platform operations
	Market Design	Unclear mechanisms for market operation	<ul style="list-style-type: none"> Design cost-responsibility and cost-sharing models Introduce incentive/penalty scheme for participation Establish subsidy and support policy for early adoption
	Application of Precedents	Mechanical adoption of overseas models	<ul style="list-style-type: none"> Develop standards tailored to Korean market conditions Pilot locally optimized operational model Use overseas best practices selectively, based on evaluation
	Regulatory Framework	Lack of practical regulations on single-use products	<ul style="list-style-type: none"> Strengthen enforcement of single-use reduction policies Introduce deposit/refund obligations by usage context Establish full-cycle regulation framework (production → collection → washing → reuse)
Economic Development	Business Model	Low economic feasibility of B2C models	<ul style="list-style-type: none"> Expand B2B and institutional adoption centered on large anchor clients Promote efficiency through shared logistics and washing hubs Design hybrid models integrating public and private operation
	Stepwise Expansion	Inefficiencies due to fragmentary and scattered adoption	<ul style="list-style-type: none"> Scale deployment through city-level cluster expansion Secure consumer convenience and stable return experience Introduce industry-level integrated platform
	Logistic Efficiency	Fragmented and duplicated logistics chains	<ul style="list-style-type: none"> Build integrated circulation system across companies Develop shared washing and collection infrastructure Establish measures to prevent container loss and leakage
	Cost Structure	Unstable cost-revenue model	<ul style="list-style-type: none"> Secure initial public support and scale economies Introduce environmental cost internalization mechanisms Design standardized models that enable long-term operation
Social & Cultural Development	Consumer Behavior	Convenience-oriented consumption patterns	<ul style="list-style-type: none"> Strengthen consumer awareness campaigns Develop systems that minimize friction in use and return Provide incentives and user-friendly interfaces
	Role of Platform	Limited participation of digital platforms	<ul style="list-style-type: none"> Encourage participation from delivery and mobility platforms Support platform-based return and tracking systems Link membership benefits and behavioral rewards
	Social Transition	Resistance and adaptation burden during transition	<ul style="list-style-type: none"> Introduce phased transition roadmap Encourage industry and citizen co-participation Provide training and guidance for stakeholders
Technological Development	Container Standardization	Varied specifications among companies	<ul style="list-style-type: none"> Standardize container specifications and material guidelines Strengthen safety, durability, and hygiene standards
	Return Infrastructure	Low recovery rate due to inconvenient return processes	<ul style="list-style-type: none"> Expand return stations across high-traffic locations Deploy smart return kiosks and building-integrated drop-off points Incentivize high-frequency return behaviors
	Washing Technology	Insufficient washing convenience and reliability	<ul style="list-style-type: none"> Develop high-efficiency, low-waste washing and drying systems Use detergents specialized for plastic reuse and hygiene Apply AI inspection and sterilization verification technology
	Digital Technology	Fragmented and incompatible digital systems	<ul style="list-style-type: none"> Develop integrated QR-based circulation tracking Standardize container IDs and data protocols Implement data-based forecasting and optimization systems

5. Policy Recommendations

2 Comprehensive Policy Recommendations

A coordinated and systematic strategy is needed to successfully scale the reusable packaging industry in Korea. Based on policy, economic, social, and technological analysis and stakeholder needs, the following development directions are proposed.

— Establish a Legal and Institutional Foundation

The reusable packaging industry should be defined as an integrated service sector covering collection, washing, distribution, and management—not just container manufacturing. Clear legal definitions and regulatory standards must be established, with service providers required to meet food-grade safety and hygiene criteria. In addition, mandatory return and reuse obligations should be introduced, including phased requirements for large vendors to adopt reusable packaging once usage thresholds are reached.

— Expand National Infrastructure to Ensure Accessibility

To make reusable packaging a part of everyday behavior, infrastructure must be easily accessible across major consumption spaces. Shared return stations, storage hubs, and washing centers should be deployed in commercial areas, campuses, transit hubs, cultural venues, and residential zones. An integrated logistics system enabling returns anywhere will reduce user friction, lower operational costs, and support efficient scaling from local to national levels.

— Adopt a Phased Expansion Strategy to Improve Economic Efficiency

To secure economic viability, the industry should expand gradually, starting with large public and institutional settings and then scaling to general consumer markets. Regional shared logistics and washing centers should be established to achieve economies of scale and improve nationwide accessibility, reducing operational burdens and enhancing user convenience to drive broader adoption.

— Promote Consumer-Centric Cultural Adoption

To expand reusable packaging, systems must prioritize consumer convenience. One-stop return processes using QR, NFC, or RFID and a broad network of return points should be established to minimize user friction. Delivery platforms should increase visibility of reusable options by enhancing selection prompts and adding search filters and badges. For cafés, a deposit-and-refund system linked to mobile apps should be implemented to enable easy takeout use and return. These measures, combined with phased policy rollout and strengthened public awareness, will reduce resistance and support wider adoption.

— Strengthen System Efficiency Through Technological Innovation

Korea should leverage its advanced digital infrastructure to improve the efficiency, convenience, and reliability of reusable packaging systems. Standardized specifications and durability and safety criteria must be established, along with QR, NFC, or RFID-based tracking and mobile-enabled return systems. Smart return stations and automated collection devices should be expanded, while washing technologies should be upgraded and automated to ensure consistent hygiene quality. Data-driven operational optimization will further enhance the competitiveness of the Korean reusable packaging model.

1 Best Practices in Reusable Container Technologies

Companies in the reusable packaging industry are advancing the circular economy through technological innovation. Digital rental and return systems improve accessibility, while IoT-based tracking maximizes circulation efficiency. Enhanced washing and sterilization ensure hygiene and trust, and automation enables high-volume, accurate processing across operations.

Technology Area	Leading Companies	Key Best Practices
Rental-Return System	<ul style="list-style-type: none"> The GREET ItGreen Syntrovalley Circular Labs 	<ul style="list-style-type: none"> QR / NFC / RFID-enabled reusable containers for quick scanning and IoT-based return validation - Improved user convenience through seamless rental and return experience Simplified refund and deposit process through mobile app integration
Tracking-Monitoring	<ul style="list-style-type: none"> The GREET Happy Bridge 	<ul style="list-style-type: none"> QR laser-marking or NFC/RFID tagging for each container - Real-time monitoring of container circulation and return status - Enhanced lifecycle management and loss prevention
Washing-Sanitization	<ul style="list-style-type: none"> The GREET 	<ul style="list-style-type: none"> Network of large-scale regional washing and sterilization centers to improve service coverage and return recovery rates - In-house facility development to ensure hygiene stability and maintain high-quality reusable containers - AI-based visual inspection and automated packaging to reduce defects and achieve consistent washing quality and operational precision
Container sorting	<ul style="list-style-type: none"> Bbodek PRAIM 	<ul style="list-style-type: none"> (Bbodek) Robotic container sorting facilities specialized in pre-wash handling (PRAAIM)'s automated sorting and inspection system separates lids and bases for improved processing efficiency

— Rental & Return System

The reusable packaging rental and return system combines laser marking, mobile apps, and IoT to improve efficiency and convenience. Durable laser marking prevents QR damage, and IoT return stations allow automatic processing through simple scanning. Streamlined deposit refunds enable immediate returns without app linkage, greatly improving accessibility. Together, these technologies support a sustainable and systematic reuse management system.

<QR Scan and Return>



<Deposit Refund via Mobile Platform>



Category	Technical Features & Description
Rental Process	<ul style="list-style-type: none"> Containers are registered with laser-printed QR codes - Durable laser marking prevents wear and scanning errors
Return System	<ul style="list-style-type: none"> Users return containers by scanning the QR code at IoT-enabled return stations installed across regions
User Convenience	<ul style="list-style-type: none"> Simplified deposit refund process for easy and immediate reimbursement
Core Technologies	<ul style="list-style-type: none"> Laser printing · Mobile app integration · IoT connectivity

Appendix

Tracking & Monitoring

The tracking and monitoring system enables systematic lifecycle management of reusable containers. By assigning each container a unique QR-based ID, the entire process—including distribution, return, and washing—can be monitored with high operational transparency and precise data control. Next-generation PLM (Product Lifecycle Management) systems track usage history and estimate container lifespan based on rental frequency. This allows operators to determine continued reuse suitability and quickly process recycling or end-of-life actions, supporting both resource circularity and system sustainability.

<Register Container ID at Dispatch Line>



<Container ID & System Status Monitoring>

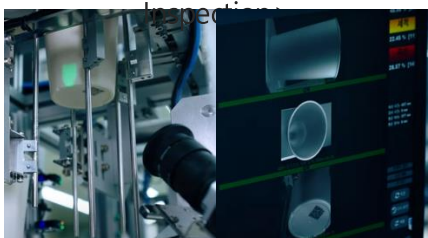


Category	Technical Features & Description
Tracking-Monitoring	<ul style="list-style-type: none"> Tracks each container's unique ID through QR during distribution, return, and washing processes
Container Lifecycle Management	<ul style="list-style-type: none"> PLM (Product Lifecycle Management) system monitors containers registered with unique IDs Calculates usage based on rental frequency to evaluate remaining lifespan and determine reuse, recycling, or end-of-life processing

Washing & Sanitization

High-temperature, high-pressure automated washing removes all residue, supported by eco-friendly detergents for safe and effective cleaning. UV and ozone sterilization eliminate contaminants while preventing discoloration or deformation. Hygiene is maintained through full inspection and ATP testing, with leading operators using AI-based vision systems to ensure consistent quality and prevent defective containers from circulating. These capabilities are integrated into a one-stop automated line for washing, sterilization, inspection, and dispatch, strengthening overall hygiene management.

<AI-powered Vision Inspection Line>



<Automated Washing and Sterilization Line>



Category	Technical Features & Description
Washing Technology	<ul style="list-style-type: none"> High-temperature, high-pressure automated washing removes all residue Eco-friendly, proprietary detergents ensure washing performance and environmental safety
Sterilization Technology	<ul style="list-style-type: none"> UV and ozone sterilization prevent deformation and discoloration while eliminating contaminants
Quality Control	<ul style="list-style-type: none"> Full inspection and ATP testing maintain high hygiene standards AI-based vision inspection prevents substandard containers from circulating - ensures consistent accuracy in critical quality checks
Core Technology	<ul style="list-style-type: none"> (더그리트) One-stop automated line integrating washing, sterilization, inspection, and dispatch - End-to-end automation reduces labor requirements and minimizes downtime and maintenance costs within washing facilities

Appendix

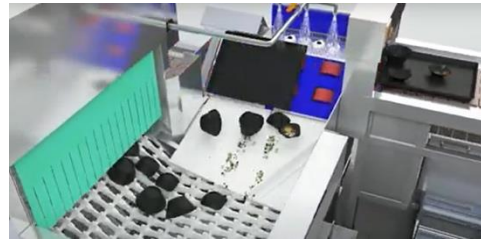
Container Sorting

Companies apply different approaches to sorting and automation. Some use robotic arms in dedicated magazine systems to separate and handle cutlery, while others apply inclined surfaces in washing equipment to enable automatic separation of trays and utensils. Two main automation models are observed: (1) manual sorting at the initial stage followed by automated processes downstream, and (2) full automation from the start, using a tilting system that automatically separates items and enables fully unmanned washing lines.

<Cutlery Automation Unit>



<Tilting-Based Automated Dish Sorting Line>



Category	Technical Features & Description
Sorting System	<ul style="list-style-type: none">• (Bbodek) Uses a robotic arm with a dedicated magazine to separate and transfer cutlery• (PRAAIM) Applies inclined surfaces in washing equipment to automatically separate trays and other dishware
Automation Method	<ul style="list-style-type: none">• (Bbodek) Initial sorting is manual, followed by automated washing and sterilization in later stages• (PRAAIM) Fully automated line that performs sorting from the first stage and washes trays and dishware together for unmanned operation



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