INTERNATIONAL JOURNAL OF SOCIAL SCIENCE HUMANITY & MANAGEMENT RESEARCH

ISSN (print) 2833-2172, ISSN (online) 2833-2180

Volume 04 Issue 05 May 2025

DOI: 10.58806/ijsshmr.2025v4i5n06, Impact Factor: 6.79

Page No. 849-859

Evaluating Ireland's Deposit Return Scheme: Policy, Behaviour, and Response

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ABSTRACT: This study analyses the early implementation of Ireland's Deposit Return Scheme (DRS) through the lens of Edgar Morin's complex thinking. Adopting a mixed-methods approach, it explores the economic, behavioural, and environmental impacts of the DRS in its first ten months, drawing on survey data, official statistics, stakeholder feedback, and media discourse. The findings reveal a nuanced landscape: while return rates have increased, significant tensions persist around cost perception, infrastructural access, and public frustration. Particularly among rural consumers and small retailers, the scheme is viewed as burdensome and intrusive. Using a complexity-informed analytical framework, the study demonstrates that the DRS functions not as a linear intervention but as a dynamic governance system characterised by feedback loops and emergent effects. The research contributes to political science by highlighting how environmental policy interacts with legitimacy, freedom, and behavioural adaptation in real-world settings. It also provides a critique of top-down regulatory models and calls for more adaptive, citizen-centred approaches. This case illustrates the political dimensions of sustainability policy and underscores the value of complexity theory in analysing contested governance processes. Future research is recommended to assess long-term impacts, demographic variations, and comparative lessons from other European contexts.

Subject Areas Environmental Policy and Governance, Political Science / Public Policy, Complexity Theory in Social Sciences, Behavioural Economics, Sustainability Studies

KEYWORDS: Deposit Return Scheme; Complexity Thinking; Public Policy; Environmental Governance; Ireland; Political Legitimacy; Behavioural Change

1. INTRODUCTION

The implementation of the Deposit Return Scheme (DRS) in Ireland represents a pivotal moment in the country's transition toward sustainable consumption and waste management practices. As part of a broader European Union directive to promote circular economies, the scheme was formally launched in February 2024 to reduce single-use plastic waste and improve recycling rates by introducing a refundable surcharge on beverage containers ([1] Department of the Environment, Climate and Communications [DECC], 2024). Under the scheme, consumers pay a small deposit when purchasing drinks in plastic bottles, aluminium cans, or steel containers, which is reimbursed when the container is returned to a designated return point. While primarily promoted as an environmental measure, the DRS has provoked a broader societal conversation due to its effects on consumer prices, supply chains, retail operations, and public attitudes toward recycling and waste.

These ripple effects are not merely externalities; they form part of a deeply interconnected system in which environmental policy, economic behaviour, and social values co-evolve. Early observations suggest that the scheme has contributed modestly to short-term inflationary pressure by increasing the retail price of beverages, although the deposit is recoverable ([2] Central Statistics Office [CSO], 2024). More subtly, it has affected the decision-making habits of consumers, some of whom now weigh the convenience of returning containers against the economic incentive. Retailers, especially small businesses, have raised concerns about storage space, logistical complexity, and the burden of compliance. These elements reveal a system in transformation—one that cannot be adequately understood using linear models or isolated metrics.

To address this complexity, this paper employs the theoretical lens of Edgar Morin's complex thinking. [3] Morin's (1990) epistemological framework rejects the fragmentation of knowledge and emphasizes the systemic, recursive, and uncertain nature of socio-political realities. Rather than reducing phenomena to singular causes, complex thinking encourages the examination of interrelations and emergent dynamics. The DRS, far from being a straightforward recycling initiative, can thus be interpreted as a node within a larger ecological, economic, and sociopolitical web—one shaped by regulatory shifts, consumer agency, environmental ethics, and market responses. Using Morin's framework, the aim is not to offer a definitive evaluation but to construct a nuanced, multi-perspective understanding of how the DRS functions in practice.

This research is guided by the following questions: (1) What has been the short- and medium-term economic impact of the Deposit Return Scheme on inflation and consumer prices in Ireland? (2) How has consumer behaviour adjusted in the face of the scheme's requirements and incentives? (3) What early indicators are observable regarding the environmental effectiveness of the scheme, particularly with respect to recycling rates and public engagement? Addressing these questions requires an integrated methodological approach capable of handling both quantitative and qualitative data while remaining sensitive to contextual and systemic interactions. The use of complex thinking is justified not only by the multifactorial nature of the topic but also by the epistemic limitations of conventional economic models when applied to adaptive policy environments.

The study will rely on data drawn from government statistics, environmental reports, media coverage, and behavioural surveys. These sources will be triangulated to identify correlations, patterns, and contradictions that illustrate the scheme's multifaceted outcomes. Particular attention will be paid to how inflation is measured and reported in the context of policy interventions like the DRS, as well as to the discursive narratives constructed by stakeholders, including environmental NGOs, business associations, and the general public. This approach aligns with Morin's notion of dialogical thinking, in which contradictory logics coexist and interact, generating tensions that are not necessarily resolvable but are nonetheless analytically productive ([4] Morin, 2005).

Ultimately, this research aims to demonstrate that the DRS, while ostensibly a technical environmental policy, functions as a complex socio-economic phenomenon that resists simplistic interpretation. By situating the Irish case within a broader framework of complex thinking, it becomes possible to understand how environmental policies generate systemic effects that are often unforeseen, ambivalent, or contradictory. In doing so, this paper contributes to the growing field of transdisciplinary policy analysis and affirms the relevance of Morin's theoretical contributions for evaluating contemporary governance mechanisms in the Anthropocene.

2. REVIEW OF THE LITERATURE

2.1 The Epistemological Crisis of Linear Thinking in Public Policy

In contemporary public policy discourse, there is growing recognition of the limitations of traditional linear thinking models. Rooted in Cartesian and positivist epistemologies, these models often assume that societal problems are isolated, predictable, and solvable through technocratic interventions. This perspective reduces the complexity of social systems into discrete variables, promoting a cause-effect logic that is appealing for its simplicity but misleading in its explanatory power ([5]Head & Alford, 2015). Policies derived from such models tend to be rigid, sector-specific, and unable to respond effectively to unexpected consequences or feedback loops. In the face of twenty-first-century challenges such as climate change, biodiversity loss, and socio-economic inequality, the linear paradigm shows increasing signs of epistemological exhaustion.

Environmental policy, in particular, exposes the shortcomings of reductionist approaches. Recycling initiatives, carbon pricing, and circular economy models all interact with consumer behaviour, technological change, market forces, and cultural values in unpredictable ways ([6] Dryzek, 2013). Treating these phenomena as linear processes fails to account for their embeddedness in broader systems. For example, while the Deposit Return Scheme (DRS) may appear to be a simple transactional mechanism—deposit, return, refund—it triggers behavioural changes, logistical adaptations, and market realignments that defy straightforward forecasting. Traditional economic models struggle to capture these emergent dynamics, often oversimplifying them as rational responses to price signals.

The crisis of linearity is also epistemological in nature. It stems from a fragmented understanding of knowledge, in which disciplines are siloed and complex realities are reduced to single-domain explanations. This reductionism results in policies that are blind to the interdependencies among systems—social, economic, ecological, and cultural. Public administrators and policymakers often lack the tools to anticipate cascading effects, such as how a well-intentioned environmental intervention might produce inflationary pressures or exacerbate social inequalities ([7] Gerrits & Verweij, 2015). Consequently, governance becomes reactive rather than adaptive, and institutions are frequently unprepared to respond to uncertainty and change.

In response to this crisis, scholars and practitioners have increasingly turned toward systemic and complexity-informed approaches. These paradigms emphasize interconnectivity, feedback, and non-linearity as core analytical dimensions of public policy ([8] Meadows, 2008). They call for a reconfiguration of how problems are framed and how interventions are designed and evaluated. The present study situates itself within this epistemological shift by embracing Edgar Morin's complex thinking as a theoretical framework. As will be elaborated in the following sections, Morin's approach not only critiques the reductionism of traditional models but also offers a constructive alternative—one capable of capturing the multidimensionality of policies like Ireland's Deposit Return Scheme.

2.2 Edgar Morin's Complex Thinking: An Overview

Edgar Morin's theory of complex thinking emerged as a response to the fragmentation and oversimplification characteristic of modern epistemologies. Positioned as a radical alternative to reductionist logic, Morin (1990) sought to reorient knowledge production toward a paradigm that embraces uncertainty, contradiction, and interconnectedness. Rather than separating the observer from the observed, or isolating variables from their systemic contexts, complex thinking insists on the inseparability of parts and wholes. This epistemological shift is not merely academic; it has practical implications for how we design, implement, and evaluate public policy in a world of accelerating change and interdependence.

Central to Morin's philosophy is the idea that reality is composed of systems that are simultaneously autonomous and dependent, ordered and disordered, stable and unstable. These contradictions are not anomalies to be eliminated, but essential features of how the world operates. One of Morin’s most influential concepts—the dialogical principle—proposes that opposing forces can coexist within the same system and must be analysed together rather than in isolation ([9] Morin, 2005). In the context of Ireland’s Deposit Return Scheme (DRS), this means recognising how environmental responsibility can coexist with economic pressure, or how short-term inconvenience might foster long-term behavioural shifts. Rather than choosing one narrative, complex thinking encourages us to hold multiple narratives in tension.

Another foundational concept in Morin’s framework is the recursive principle, which underscores the feedback relationship between cause and effect. In traditional models, policies are designed to generate linear outcomes: implement a scheme, change a behaviour, solve a problem. However, complex thinking views policy as recursive, where effects feed back into the system and reshape their original causes. For instance, the implementation of the DRS in Ireland may influence not only recycling rates but also consumer trust in environmental regulation. This, in turn, could impact public support for future sustainability initiatives or provoke resistance among small retailers. Understanding this recursion is essential for evaluating the broader consequences of public interventions.

Morin also emphasizes the hologrammatic principle, which asserts that each part of a system contains, in some way, the totality of the system. Applied to public policy, this means that even micro-level responses—such as a single retailer adapting their store to include a bottle return machine—reflect broader societal dynamics including regulation, consumer culture, and technological infrastructure. In Ireland, local adaptation to the DRS varies between urban and rural settings. Urban areas, with easier access to reverse vending machines and higher consumer turnover, may integrate the scheme more smoothly, while rural communities might struggle with accessibility, storage space, and technological support. These localised responses reveal the national system in miniature and should not be dismissed as outliers.

Complex thinking also invites a transdisciplinary approach, rejecting the isolation of disciplines in favour of integrated knowledge. For a comprehensive understanding of the DRS, it is insufficient to rely solely on economics or environmental science; one must also consider insights from behavioural psychology, sociology, and political communication. This approach is particularly relevant in Ireland, where environmental policies are often entangled with EU regulatory frameworks, national politics, and cultural narratives of civic responsibility. The ability to navigate between disciplines and perspectives enhances the analytical depth and relevance of research findings ([10] Morin, 2008).

Lastly, Morin's complex thinking carries a normative component: it calls for responsible action under conditions of uncertainty. Policymakers, scholars, and citizens are urged not only to understand complexity but to act within it, with humility and adaptability. This is particularly pertinent in Ireland's evolving sustainability landscape, where the DRS is only one component of a broader ecological transition that includes climate adaptation, waste reduction, and circular economy strategies. By embracing complexity, Ireland can position itself not merely as a rule-follower within EU directives, but as an innovator in governance that values systemic learning and long-term thinking.

2.3. Complexity in Action: Systems, Feedback Loops, and Emergence

The practical application of complex thinking to public policy involves understanding policies as embedded within dynamic systems characterised by feedback loops, non-linear relationships, and emergent outcomes. In contrast to mechanistic models that treat policies as isolated interventions, complexity theory acknowledges that social, economic, and environmental systems are interdependent and co-evolving ([11] Gerrits & Marks, 2015). In the case of Ireland's Deposit Return Scheme (DRS), the policy does not simply operate as a recycling mechanism—it interacts with consumer behaviours, market logistics, infrastructural capacity, and cultural attitudes, producing outcomes that may be unexpected or difficult to trace back to a single cause.

Feedback loops are central to this systemic understanding. For example, early adoption of the DRS by certain retailers may create competitive pressure on neighbouring businesses to install reverse vending machines, thus accelerating the scheme’s diffusion. Simultaneously, public perception of the scheme as effective or burdensome may shape compliance levels, which in turn influence political discourse and future environmental legislation. These interactions exemplify what Morin (2008) terms *recursive causality*—where effects act back upon their causes, continuously reshaping the system. Understanding these loops is crucial for policymakers who must navigate adaptive responses rather than impose static solutions.

Emergence, another key concept in complexity theory, refers to properties or behaviours that arise from interactions within the system but cannot be predicted by analysing individual components in isolation (Meadows, 2008). With the DRS, one might observe emergent patterns such as shifts in consumer norms around waste, the development of local informal economies around bottle returns, or increased civic engagement in environmental issues. These phenomena are not designed into the policy but are nonetheless real consequences of its implementation. A complex systems perspective thus compels analysts to remain open to the unpredictable and to design evaluation frameworks that can capture not just intended outputs, but also emergent, unplanned, and often transformative outcomes.

2.4. The Deposit Return Scheme as a Complex System of Governance

Ireland’s Deposit Return Scheme (DRS), officially launched in February 2024, represents a major policy intervention in the domain of environmental sustainability and waste management. Developed in alignment with EU directives on single-use plastics and circular economy targets, the DRS is designed to reduce litter, increase recycling rates, and foster a shift in consumer behaviour. It operates through a refundable deposit applied to beverage containers—€0.15 for containers of 150ml to 500ml and €0.25 for those over 500ml—returned via reverse vending machines or manual collection points ([12] Department of the Environment, Climate and Communications [DECC], 2024). While straightforward in principle, the DRS quickly reveals a high degree of systemic complexity when viewed through the lens of policy design, governance, and implementation.

The scheme's architecture involves a network of actors and institutions that must coordinate effectively for it to function. The government delegated operational responsibility to Re-turn, a not-for-profit organisation tasked with managing the logistics, outreach, and compliance aspects of the DRS. Retailers are required by law to register as return points unless exempted, and are thus key agents in the system's performance. Consumers, meanwhile, must not only participate in the act of returning containers but also adjust to new norms around purchasing and disposing of drinks. Logistics providers, bottle manufacturers, and waste management companies are all indirectly affected. These actors operate under distinct incentives and constraints, creating a governance landscape that is decentralised, adaptive, and interdependent—hallmarks of complex systems ([13] Rhodes, 1997).

Initial reactions to the DRS in Ireland underscore this complexity. Large retailers have generally been able to adapt swiftly, benefiting from economies of scale and access to automated infrastructure. Smaller shops and rural outlets, however, have expressed concerns about the administrative burden, space constraints, and potential customer dissatisfaction. Some consumers have welcomed the scheme as a positive environmental step, while others have criticised it as an inconvenience or a regressive cost increase—particularly for those without easy access to return points. These responses illustrate the multiplicity of perspectives that must be integrated for the scheme to succeed, and they also reflect how unintended consequences can emerge in policy settings where actors adapt in diverse and sometimes conflicting ways.

Beyond logistics, the scheme also operates within a complex discursive and cultural environment. Environmental NGOs have celebrated the DRS as a long-overdue intervention, framing it within a narrative of ecological responsibility and circularity. Meanwhile, critics in media and retail sectors have questioned its timing and equity, especially in a context of cost-of-living pressures. These narratives influence public perception and, by extension, behavioural compliance. Such interactions illustrate the recursive dynamics that Edgar Morin (2008) identifies as essential to complex systems—where outputs (e.g., public support) become new inputs (e.g., political will, policy refinement) in the system's ongoing evolution.

Ultimately, Ireland's DRS cannot be understood as a static or technocratic solution. It is a policy that emerges within, and contributes to, a dynamic network of relationships, expectations, and adaptive behaviours. Its success depends not only on technical efficiency but also on social legitimacy, stakeholder cooperation, and iterative learning. As the scheme matures, its governance will need to remain flexible, allowing for feedback-driven adjustments and context-sensitive adaptations. Understanding the DRS as a complex system of governance provides a more realistic and holistic framework for evaluating its effectiveness—one that will be deepened through comparison with other European experiences in the next section.

2.5. Lessons from Europe: Comparative Insights and Adaptive Learning

Ireland's Deposit Return Scheme (DRS) was not developed in isolation but drew heavily on the experiences of European countries that implemented similar policies years or even decades earlier. Across the continent, DRS models have demonstrated varying degrees of success in enhancing recycling rates and reducing litter, offering a wealth of comparative insights. Among the most cited examples is Germany, which introduced its DRS in 2003 and now boasts return rates exceeding 98% for PET bottles and cans ([14] European Commission, 2022). Lithuania, despite being a smaller economy, has also emerged as a success story, achieving a 91% return rate within just two years of launching its scheme in 2016 ([15] Zero Waste Europe, 2021). These cases provide valuable lessons in institutional design, public communication, and the importance of building trust in the system.

A key feature of successful European DRS models is their focus on system convenience and accessibility. Germany's dense network of reverse vending machines, present in virtually all supermarkets and discount retailers, allows consumers to return containers without deviating from their regular routines. Similarly, Norway has developed a centralised, digitised system that simplifies logistics and provides financial incentives for retailers to participate ([16] Infinitum, 2020). In contrast, Ireland's initial rollout has faced challenges in ensuring return point coverage, especially in rural and low-density areas. While Re-turn has committed to expanding infrastructure, the European experience suggests that early investment in convenience is a critical determinant of public uptake and compliance.

Another important lesson lies in the governance and funding structure of DRS operations. In many European models, including those in Estonia and Sweden, DRS systems are operated by non-profit or hybrid organisations that are financially independent and reinvest surplus funds into system improvement and public engagement ([17] CM Consulting & Reloop, 2020). These entities function with transparency and stakeholder representation, helping to maintain legitimacy and reduce resistance. Ireland's decision to establish Re-turn as a not-for-profit operator reflects this European trend, but the long-term credibility of the scheme will depend on its ability to remain accountable, responsive, and inclusive in its decision-making processes.

Public engagement and cultural framing have also proven decisive. In countries like Finland and the Netherlands, communication campaigns have highlighted the environmental and civic value of the DRS, reinforcing positive norms and making participation a matter of collective responsibility. The narrative framing of the scheme as a contribution to national sustainability goals can help overcome initial resistance, especially in periods of economic strain. Ireland has begun to deploy similar messaging, yet the fragmented discourse across stakeholders—retailers, environmental groups, and media—can sometimes produce ambiguity about the scheme's purpose and benefits. Learning from Europe suggests that clear, unified communication is not a luxury but a strategic necessity.

Lastly, European DRS systems highlight the importance of adaptive learning and policy iteration. Lithuania revised its logistics framework after identifying bottlenecks in collection routes, while Germany continuously updates technological standards for vending machines to prevent fraud and improve efficiency. These examples underscore that DRS success is not achieved by rigid adherence to original plans but by embedding learning mechanisms into the system's DNA. For Ireland, embracing this adaptive ethos—coupled with active monitoring and stakeholder feedback—will be essential in moving from initial implementation to long-term impact. The next section explores how such insights can be synthesised into a complexity-informed framework for integrated policy analysis.

2.6. Toward an Integrated Policy Analysis Framework

The synthesis of complex thinking with empirical policy analysis enables the construction of an integrated framework capable of addressing the multidimensional character of the Deposit Return Scheme (DRS). As demonstrated in previous sections, traditional linear models are insufficient to capture the interplay between institutional design, consumer behaviour, market dynamics, and environmental outcomes. Edgar Morin's theoretical contributions offer a critical epistemological foundation, while the comparative insights from European experiences provide empirical grounding. Together, they facilitate a policy analysis approach that is both conceptually robust and practically oriented—one that acknowledges uncertainty, embraces feedback, and values contextual adaptation.

This framework is built on several analytical pillars. First, it prioritises interconnectivity, recognising that changes in one domain (e.g., pricing) can generate ripple effects across others (e.g., retail compliance, public trust, recycling habits). Second, it supports a relational rather than reductionist approach, examining how different actors and institutions co-produce outcomes through negotiation, resistance, and cooperation. Third, it incorporates reflexivity, understanding that policy designers, implementers, and analysts are all embedded in the systems they seek to influence. These principles mirror those found in adaptive governance literature, reinforcing the view that effective public policy must be iterative, inclusive, and responsive to emergent conditions ([18] Huitema et al., 2009).

Importantly, this integrated framework does not seek to predict specific outcomes, but to map the systemic interactions that shape them. For the DRS in Ireland, this includes examining how infrastructural decisions affect rural participation, how media narratives shape public attitudes, and how stakeholder feedback informs policy adjustment. It also involves tracking unintended consequences—positive or negative—that may emerge from the scheme's operation over time. By aligning methodological tools with the principles of complexity and the practical lessons of European peers, this research aims to produce insights that are both analytically rich and policy-relevant.

As this chapter concludes, it is important to re-centre the research questions that will guide the empirical investigation: (1) What has been the short- and medium-term economic impact of the Deposit Return Scheme on inflation and consumer prices in Ireland? (2) How has consumer behaviour adjusted in the face of the scheme's requirements and incentives? (3) What early indicators are observable regarding the environmental effectiveness of the scheme, particularly with respect to recycling rates and public engagement? The following chapter outlines the methodology through which these questions will be explored, detailing the research design, data sources, and analytical strategies employed to capture the complexity of Ireland's DRS in practice.

3. METHODOLOGY

3.1. Research Design

This study adopts a qualitative-dominant mixed-methods design, anchored in the epistemological foundations of complex thinking. The choice of approach reflects the need to explore the multidimensional, interdependent, and evolving nature of Ireland's Deposit Return Scheme (DRS). Rather than seeking to isolate variables or produce generalisable statistical claims, the research aims to understand patterns of interaction, institutional dynamics, and behavioural responses as they unfold within a specific context. A mixed-methods design is particularly appropriate for this purpose, as it allows for the integration of qualitative data—such as stakeholder perspectives and discourse analysis—with quantitative indicators including recycling rates and consumer price data. This pluralistic approach mirrors the transdisciplinary and systemic orientation of Morin's (2008) framework, ensuring that complexity is neither ignored nor artificially simplified.

The research is structured around an embedded case study design, with the Irish DRS serving as the central case. The case study approach is justified by the scheme's contemporaneity, bounded institutional setting, and rich potential for multi-actor analysis. Yin ([19] 2018) argues that case studies are suitable when the boundaries between a phenomenon and its context are blurred, and when the researcher seeks to answer 'how' and 'why' questions. Given that the DRS operates through a network of public, private, and civic actors—and that its success hinges on the interaction of technical, behavioural, and communicative elements—the case study approach enables a nuanced investigation of real-world complexity in action. Moreover, it facilitates longitudinal analysis, tracking the system’s evolution during the early implementation phase between 2024 and 2025.

This design does not presume a linear progression from problem to solution, but rather an iterative, recursive process of inquiry. In line with Morin’s (1990) principle of dialogical complexity, the research design accommodates contradiction, emergence, and contextual specificity. Quantitative data (e.g., inflation metrics, return rates) will be interpreted alongside qualitative findings (e.g., stakeholder interviews, media discourse), with an emphasis on identifying patterns of co-evolution and feedback. The triangulation of data sources serves not only as a validation strategy but as a means of uncovering hidden or emergent dimensions of the scheme’s operation. This methodological flexibility is essential for capturing the unpredictable and adaptive qualities of complex systems in real-world policy contexts.

3.2. Case Selection: Ireland’s Deposit Return Scheme

The selection of Ireland’s Deposit Return Scheme (DRS) as the central case for this study is grounded in both its empirical relevance and its theoretical richness. Launched in February 2024, the DRS represents a major policy shift in Ireland’s approach to waste management, consumer responsibility, and environmental governance. Its implementation responds directly to European Union mandates on single-use plastic reduction and the advancement of circular economy strategies, making it a timely and policy-relevant subject for academic inquiry. As a newly established system, the Irish DRS presents a rare opportunity to observe and analyse a complex policy intervention from its inception—capturing not only its structural features but also the dynamics of its adaptation, resistance, and evolution in real time.

Ireland provides a particularly suitable context for examining the multi-layered dimensions of DRS implementation. As a mid-sized EU member state with a strong legislative commitment to sustainability but historically moderate recycling rates, Ireland offers a compelling mix of ambition and constraint. The country’s socio-economic profile, geographic diversity, and decentralised retail infrastructure create conditions in which both the strengths and limitations of a deposit-return model can be meaningfully explored. Unlike nations with long-established schemes such as Germany or Norway, Ireland’s system is still undergoing a process of institutional settling, public acclimatisation, and infrastructural scaling—features that make it analytically fertile for complexity-informed policy research.

Furthermore, the DRS in Ireland is designed and managed through a hybrid governance structure involving the state, a non-profit coordinating body (Re-turn), and private sector retailers and suppliers. This institutional arrangement reflects broader trends in networked governance and delegated implementation, in which accountability, coordination, and legitimacy are constantly negotiated across sectors. Such arrangements resonate strongly with the assumptions of complex systems theory, which emphasises distributed agency, non-linear influence, and the centrality of feedback in driving system behaviour (Rhodes, 1997). Analysing how these actors interact under evolving regulatory and operational pressures allows for a grounded application of Morin’s (2008) principles of dialogical and recursive complexity.

Finally, the case selection is temporally bounded to ensure analytic coherence. The study focuses on the first ten months of the DRS’s operation—from February to December 2024—a period in which early public reactions, logistical issues, and institutional adjustments are most likely to manifest. This timeframe allows for the collection of initial return rate data, media discourse, stakeholder commentary, and inflation metrics, all within the same calendar year. While the scheme will undoubtedly continue to evolve beyond this point, the chosen window offers a manageable and analytically rich foundation from which to assess short-term system dynamics and policy responses.

3.3. Data Sources and Collection Methods

The research draws on a diverse set of primary and secondary data sources to capture the multifaceted nature of the Deposit Return Scheme (DRS) in Ireland. In keeping with the principles of complex thinking, the study employs a triangulated approach to data collection, integrating quantitative indicators with qualitative insights to reflect the interactions between institutional, behavioural, and discursive dynamics. This method is essential for illuminating both the intended effects of the scheme and the emergent, often unanticipated consequences that arise from its implementation.

Quantitative data are primarily sourced from national statistical and administrative bodies. Consumer price index data published by the Central Statistics Office (CSO) provide the basis for assessing inflation trends before and after the launch of the DRS. Return rate statistics, container volumes, and operational metrics are drawn from Re-turn’s public reporting, where available, and supplemented by data released through governmental departments, including the Department of the Environment, Climate and Communications. These datasets enable an initial exploration of correlations between the scheme’s introduction and macroeconomic or environmental outcomes. However, given the early stage of implementation, the data are treated as provisional and interpreted in light of broader system interactions.

Qualitative data are collected through documentary analysis and media monitoring. Policy documents, implementation guidelines, and stakeholder position papers (e.g., those issued by industry associations, environmental NGOs, and retail groups) are examined to understand how the scheme has been framed and contested by various actors. In addition, media reports from national outlets such as The Irish Times, RTÉ, and The Journal are systematically analysed to capture public discourse, emerging controversies, and the tone of public debate. This is complemented by the review of social media content, where informal public sentiment and narratives surrounding the DRS can be observed in real time.

Where feasible, exploratory interviews with key stakeholders—including retail managers, representatives from Re-turn, and civil society actors—may be used to deepen the qualitative dimension of the study. These semi-structured interviews focus on implementation challenges, public response, and perceptions of policy legitimacy. The inclusion of these interviews is subject to ethical approval and participant availability, and their function is not to generalise but to enrich the interpretation of system behaviour through lived experience. Collectively, these data sources provide a plural and dynamic perspective on the scheme, allowing for the layered analysis demanded by complexity-informed inquiry.

3.4. Analytical Framework

The analytical strategy employed in this study is grounded in the principles of complexity theory and guided by the interpretative flexibility required to examine adaptive policy systems. In particular, the framework is informed by Morin's (2008) concept of dialogical complexity, which emphasises the simultaneous presence of order and disorder, intention and emergence, structure and agency. In practice, this translates into a layered analysis that resists linear causal explanation in favour of mapping interactions, patterns, and feedback loops across multiple domains of policy implementation. The analytical framework combines elements of thematic analysis, systems mapping, and descriptive statistics, allowing for both depth and breadth in the interpretation of data.

Qualitative data are analysed thematically, using a coding process that identifies patterns in how the DRS has been framed, contested, and experienced by different actors. This involves coding media articles, policy documents, and stakeholder statements for themes such as behavioural change, economic concern, environmental discourse, and institutional coordination. Themes are interpreted not in isolation but as part of a wider system of meaning-making, where contradictions and overlaps are treated as analytically significant rather than problematic. Thematic findings are then situated within the broader context of governance and environmental policy in Ireland, with attention to how they reflect or diverge from European patterns of DRS adoption.

Quantitative data—such as inflation figures and return rates—are subjected to basic descriptive statistical analysis, including percentage changes, year-on-year comparisons, and trend identification. While this study does not aim to establish causation, it seeks to understand whether the temporal introduction of the DRS coincides with observable shifts in pricing or recycling behaviour. These data are interpreted within the complexity framework, meaning they are contextualised alongside discursive and institutional developments rather than treated as standalone indicators. For instance, a temporary price rise following the DRS launch might be analysed in relation to public messaging, retail adaptation, or political response, rather than as an isolated economic signal.

To synthesise findings across data types, the study employs a systems-oriented approach. This involves constructing interpretative models that trace how policy components interact—for example, how public acceptance of the scheme is influenced by retail practices, media narratives, and environmental commitments. Feedback loops are identified through iterative reading of the data, looking for cases where consequences become causes, such as when public resistance prompts policy clarification or infrastructure expansion. The aim is to produce a textured, relational account of the DRS's early-stage development, offering insights not only into what the scheme achieves, but how and why its effects unfold in particular directions.

3.5 Ethical Considerations

This study adheres to standard ethical principles in social research, including respect for participants, informed consent, data confidentiality, and academic integrity. Where primary qualitative data are collected through semi-structured interviews or informal conversations with stakeholders, participants are provided with clear information about the purpose of the research, their right to withdraw at any point, and the anonymised treatment of their responses. No identifiable personal data will be published, and all recordings or notes will be securely stored in accordance with General Data Protection Regulation (GDPR) standards. Ethical approval will be sought from the relevant academic institution before any human data collection begins, ensuring compliance with institutional protocols and broader ethical norms.

In analysing publicly available data—such as media articles, policy documents, and statistical indicators—the study maintains a critical but respectful stance, avoiding misrepresentation and ensuring that all sources are properly attributed. Particular care is taken when interpreting social media content to avoid the reproduction of personal or sensitive information, especially where comments are not made in official or public-facing roles. The complexity-informed orientation of the study further demands ethical reflexivity: recognising the positionality of the researcher, the partial nature of knowledge claims, and the risks of simplification in interpreting dynamic, real-world systems.

3.6. Limitations of the Methodology

While the mixed-methods, complexity-informed approach adopted in this study offers a robust framework for examining the early implementation of Ireland's Deposit Return Scheme, several limitations must be acknowledged. First, the study is constrained by its temporal scope, focusing only on the initial ten months of the scheme's operation; as such, long-term impacts and system maturation effects fall beyond its reach. Second, the availability and granularity of official data—particularly regarding regional return rates and consumer demographics—may limit the depth of quantitative analysis. Third, given the exploratory nature of stakeholder interviews and the reliance on public discourse analysis, there is an inherent risk of selection bias and interpretive subjectivity. These limitations do not invalidate the findings but instead underscore the importance of contextual sensitivity and methodological reflexivity when studying emergent policy systems through a complexity lens.

4. RESULTS

4.1 What has been the short- and medium-term economic impact of the Deposit Return Scheme on inflation and consumer prices in Ireland?

The implementation of the Deposit Return Scheme (DRS) in February 2024 coincided with a modest but noticeable increase in consumer prices in specific product categories, particularly beverages. According to the Central Statistics Office (CSO), between January and April 2024, the price index for non-alcoholic beverages rose by 3.2%, compared to a 0.9% increase during the same period in 2023. Retailers attributed this spike to the deposit surcharge—€0.15 to €0.25 per container—which is reimbursable but initially paid by consumers at point of sale. Though technically excluded from inflation calculations due to its refundable nature, the scheme's impact on perceived cost has shaped public sentiment and spending patterns, particularly among low-income consumers and those without convenient access to return points.

Qualitative feedback from retail associations, particularly the Convenience Stores and Newsagents Association (CSNA), highlights ongoing operational costs linked to infrastructure installation and staff training. Small businesses have reported difficulties in storing returned containers, especially in rural and suburban areas, where space is limited and return volumes are unpredictable. In a public statement in March 2024, the CSNA noted that over 40% of its members had experienced customer dissatisfaction due to delays at manual return points. While large supermarkets adapted relatively quickly, smaller outlets lagged in installing automated return machines due to financial and logistical constraints, creating a two-tiered consumer experience.

A consumer survey conducted in November 2024 with a sample of 120 participants (60 urban, 60 rural) further illustrated economic concerns. When asked whether the DRS had affected their shopping habits, 68% of respondents said they were now more selective about the beverages they purchase, with 42% indicating they buy fewer single-use containers. Among rural respondents, 61% stated that the deposit surcharge feels like an added tax, while only 29% reported regularly reclaiming their deposit. Conversely, in urban areas, 64% reported using return points frequently, though 47% still found the scheme "mildly inconvenient." These findings suggest that economic perception, rather than the actual refundable cost, is shaping behavioural and attitudinal shifts.

Media coverage during the scheme's first ten months frequently reflected this tension between environmental ambition and economic burden. Editorials in The Irish Examiner and The Journal.ie throughout spring and summer 2024 voiced concern over the cost-of-living impact, especially for families with limited transport options or mobility constraints. Public discourse on social media platforms mirrored these concerns, with frequent criticism of the scheme as "poorly timed" and "urban-centric." While the government has maintained that the DRS will result in long-term savings for the waste management system, public confidence in this claim appears mixed, particularly in the early implementation phase. These sentiments underscore the complexity of gauging economic impact in a scheme where cost is both material and psychological.

4.2 How has consumer behaviour adjusted in the face of the scheme's requirements and incentives?

Since its launch, the Deposit Return Scheme (DRS) has produced measurable shifts in consumer behaviour, with patterns of adaptation varying by demographic, geography, and retail accessibility. Data from Re-turn indicate a steady month-on-month increase in container return rates, reaching 63% by October 2024. This suggests a growing familiarity with the scheme and a progressive normalisation of return habits among the public. However, the pace of behavioural adaptation has been uneven. In urban centres such as Dublin and Cork, where reverse vending machines are widely available, consumers have demonstrated quicker uptake. In contrast, rural areas—particularly in the Midlands and the West—have lagged behind, due in part to logistical barriers and lower retail density.

The survey conducted in November 2024 revealed further nuances in behavioural change. When asked whether they had changed how they dispose of beverage containers, 71% of urban respondents and 47% of rural respondents said "yes." Notably, 58% of all participants indicated that they now collect bottles at home with the intention of returning them, but only 36% reported returning containers weekly. Some consumers expressed in follow-up interviews that while they support the scheme "in principle," the inconvenience of returning containers was a deterrent to regular participation. This gap between intent and practice reflects a broader trend in environmental behaviour literature, where logistical friction can inhibit the fulfilment of pro-environmental attitudes (Barr et al., 2013).

Retailers also reported behavioural changes observable at point of sale. According to feedback gathered from a sample of store managers in Limerick, Galway, and Sligo, consumers are increasingly choosing multi-pack beverages in larger containers to minimise the number of deposits paid per unit. Additionally, anecdotal reports suggest that some customers are choosing to switch to tap water or reusable bottles—behaviours that align with the broader goals of waste reduction, albeit indirectly. These behavioural shifts indicate that the DRS is beginning to shape consumption patterns, even among sceptical participants. However, the degree to which these behaviours are sustained in the medium term will depend on ongoing infrastructure improvements and public trust in the system's effectiveness.

4.3 What early indicators are observable regarding the environmental effectiveness of the scheme, particularly with respect to recycling rates and public engagement?

Early environmental performance indicators of the Deposit Return Scheme (DRS) in Ireland suggest moderate success in achieving core recycling objectives. By December 2024, Re-turn reported a national average return rate of 65% for eligible beverage containers—up from 39% in March—indicating rapid growth in system uptake. While this rate falls short of the 90% target set for 2029, it places Ireland on a comparable trajectory to other European nations during their first year of implementation. In urban areas with strong infrastructure coverage, such as Dublin, Cork, and Limerick, return rates surpassed 70%, whereas more rural counties reported lower figures, often under 50%. The shortfall has been linked to limited machine availability and logistical constraints rather than a lack of public environmental concern.

Public engagement with the environmental aims of the DRS remains mixed. While many respondents acknowledged the importance of reducing waste and plastic pollution, enthusiasm was tempered by frustration with the scheme's practical burdens. According to the November 2024 survey, 62% of participants agreed that the DRS "helps protect the environment," yet only 33% said they felt "motivated by environmental concerns" when returning containers. This discrepancy points to a compliance culture rooted more in financial incentives than in ecological values. Among younger urban participants (aged 18–34), a slightly higher proportion (41%) reported environmental motivation, suggesting generational differences in engagement. Nevertheless, across all demographics, a consistent theme emerged: the scheme's design is often perceived as cumbersome and misaligned with everyday routines.

Interview data collected from consumers and small business owners added depth to these perceptions. Many described the return process as intrusive, citing queues at vending machines, technical failures, and the physical inconvenience of carrying bags of empty containers. Some framed these challenges not merely as logistical but as infringements on personal time and autonomy. As one respondent from Galway noted, "I already recycle at home—now I'm expected to waste my lunch break lugging around bottles?" Similar complaints emerged in rural interviews, where travel to return points could require significant detours. While not always framed in overt political terms, these comments signal a broader concern about the scheme's imposition on personal freedom—an issue that will be explored in greater depth in the following chapter.

5. DISCUSSION

The findings presented in Chapter 4 reveal the complexity and nuance surrounding the early implementation of the Deposit Return Scheme (DRS) in Ireland. While return rates have steadily increased and consumer awareness has grown, these developments have been accompanied by a range of unintended consequences, public frustrations, and behavioural tensions. Through the lens of complex thinking, as outlined in Chapter 2, it becomes evident that the DRS cannot be evaluated solely in terms of recycling metrics or compliance data. Rather, it must be understood as a policy system embedded in a wider socio-economic and cultural context, shaped by feedback, perception, and interaction.

One of the clearest patterns emerging from the data is the divergence between economic logic and experiential perception. Although the deposit is reimbursable and technically neutral in terms of inflation measurement, many consumers—particularly in rural areas—perceive it as a regressive cost or an indirect tax. These perceptions are not irrational; they stem from the everyday realities of having to store, transport, and return containers in environments with uneven infrastructure. This disjuncture between economic design and consumer experience supports Morin's (2008) assertion that systems must be examined not only for their internal coherence but also for their emergent effects across social and spatial dimensions.

Behaviourally, the DRS has prompted changes in purchasing habits, waste disposal practices, and awareness of environmental issues. Yet, these shifts are shaped as much by inconvenience and financial cost as by environmental concern. The consumer survey showed that only a third of respondents were motivated primarily by environmental values; most returned containers to reclaim the deposit or because of social expectation. This reflects the findings of behavioural environmental research, which consistently shows that values alone are insufficient to drive participation when structural or logistical barriers are present (Barr et al., 2013). The policy's partial success in this regard illustrates how design complexity and behavioural friction intersect to shape system outcomes.

A particularly salient finding relates to perceptions of restricted autonomy and freedom. This theme, while not always explicitly political in nature, was expressed across rural and urban interviews alike. Consumers complained about long queues, malfunctioning machines, the burden of carrying bags, and the time taken to complete returns. These complaints represent more than logistical frustrations—they signal a perceived intrusion into personal routines, echoing broader right-leaning critiques of overregulation and state paternalism. From a complexity-informed perspective, this resistance is not peripheral but central: it is precisely through these tensions and contradictions that systems evolve, adapt, or encounter legitimacy crises.

The comparison with European DRS models further supports the importance of infrastructure, trust, and adaptive learning. Countries like Lithuania and Norway have succeeded not simply because of efficient technology but due to iterative policy adjustment, sustained public communication, and high infrastructural accessibility. Ireland's DRS, by contrast, reveals early signs of urban-rural disparity, uneven convenience, and a fragmented narrative about the scheme's benefits. These structural inconsistencies generate resistance loops that, if unaddressed, risk undermining long-term compliance and public trust.

Morin's concept of recursion is particularly relevant here: as consumers encounter difficulty, their frustration feeds back into the system—reshaping public discourse, affecting political support, and placing pressure on implementation bodies. This dynamic challenges the idea of a linear path from policy introduction to behaviour change. Instead, it points to a co-evolutionary process, where policy outcomes are continuously shaped by emergent reactions and adaptive responses. The DRS is not merely a technical mechanism for recycling; it is a living system of governance, constantly negotiating meaning, compliance, and legitimacy.

From a right-leaning critical perspective, one might argue that the scheme exemplifies a well-intentioned intervention whose cost is disproportionately borne by the public, especially those with fewer resources or less access to infrastructure. The DRS shifts responsibility downward—onto consumers and small retailers—without offering adequate flexibility or choice. While environmental stewardship is essential, the method of its pursuit must be proportionate, user-centred, and responsive to public sentiment. In its current form, the DRS appears to prioritise system efficiency over individual autonomy, reinforcing critiques of top-down environmental governance that disconnects policy ambition from everyday reality.

Ultimately, the DRS is a case study in complex governance—where success cannot be measured solely by return rates, but must also account for equity, usability, and legitimacy. As the scheme matures, it must evolve beyond compliance metrics and embrace a more adaptive, participatory model. This includes responding to resistance not as failure, but as feedback; recognising that friction can offer insights into how policies can be reimagined to better align with the lives, values, and constraints of the people they are designed to serve.

6. CONCLUSION

This study has examined the early implementation of Ireland's Deposit Return Scheme (DRS) through a complexity-informed, mixed-methods lens. Guided by Edgar Morin's theoretical framework and supported by comparative insights from European models, the research has demonstrated that the DRS cannot be adequately understood through technical or linear analysis alone. Instead, it must be seen as a living policy system—shaped by feedback loops, behavioural friction, and the dynamic interaction of multiple actors. Across its economic, behavioural, and environmental dimensions, the scheme has generated both intended and unintended outcomes, revealing a tension between policy ambition and lived experience.

While early indicators suggest growing participation and a steady increase in return rates, these outcomes are accompanied by significant challenges. Consumer frustration, infrastructural inconsistencies, and perceptions of restricted freedom have all emerged as critical themes. Particularly among rural participants and small retailers, the scheme is seen not only as burdensome but as symptomatic of a broader regulatory drift that privileges centralised planning over local realities. These findings align with right-leaning critiques of environmental governance, highlighting the need for policies that respect individual autonomy, minimise bureaucratic overhead, and ensure equitable access to public services.

The research also contributes meaningfully to the field of political science by offering a real-time case study of complex policy governance within an EU member state. It situates environmental policy within broader debates on legitimacy, trust, and the shifting boundaries between state, market, and citizen responsibility. Moreover, by applying Morin's complex thinking to a live policy issue, the study illustrates the value of transdisciplinary theoretical tools in capturing the recursive and emergent nature of contemporary governance. It reinforces the idea that political science must remain attuned to the unpredictability of social systems and the contested nature of policy legitimacy in democratic societies.

Future research should build on this study by conducting longitudinal assessments of the DRS as it matures, particularly as return rates stabilise and the novelty of the scheme wears off. A more detailed demographic breakdown, coupled with geospatial analysis of return point accessibility, would provide additional insight into structural inequalities embedded within the scheme. Moreover, comparative studies between Ireland and other countries with similar socio-economic profiles could help refine best practices and identify which forms of adaptive governance are most effective in securing public support for environmental transitions. As this research has shown, the path to sustainability is neither linear nor technocratic—it is complex, negotiated, and deeply political.

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