
Beyond the Attitude–Behaviour Gap: Systemic Alignment and the Structural Reproduction of Bread Waste

Bread waste remains a persistent sustainability challenge in industrialised food systems despite increasing environmental awareness, technological optimisation, and policy attention. Existing research has generated substantial insights into food waste from behavioural, retail, and manufacturing perspectives; however, these perspectives remain largely fragmented. Consumer research typically focuses on the attitude–behaviour gap, habitual routines, and bounded rationality in decision-making (Vermeir et al., 2020; White et al., 2019). Retail research emphasises pricing architectures, promotional intensity, service-level expectations, and tensions between sustainability commitments and competitive pressures (Bălan, 2021; Sheth and Parvatiyar, 2021). Manufacturing and supply chain research highlights forecasting constraints, operational efficiency, uncertainty, and fragmented data-sharing (Jouzdani and Govindan, 2021; Lehtokunnas et al., 2022). While each perspective provides valuable insights, their analytical separation obscures how bread waste is reproduced across interdependent actors. This limitation is particularly evident in the German bread sector, where high production volumes, short shelf life, and strong cultural embeddedness intersect with industrialised supply chains and high retail availability expectations. Bread waste should therefore not be understood solely as a consumer problem or a production inefficiency, but as a systemic coordination issue emerging at the retail–consumer interface.

This study addresses that gap by reconceptualising bread waste as a cross-level coordination problem and by developing the Systemic Alignment Framework. Rather than asking which actor fails, the study examines how consumers, retailers, and manufacturers act rationally within their respective environments while collectively reproducing surplus. The study is guided by the research question: how can behavioural, strategic, and communicative alignment between consumers, retailers, and manufacturers reduce bread waste at the retail–consumer interface in Germany? The aim is to move beyond actor-specific deficit explanations and to identify the structural conditions under which more effective and durable alignment becomes possible.

The theoretical foundation integrates three complementary perspectives. At the consumer level, the Theory of Planned Behaviour (Ajzen, 1991) provides a baseline framework for understanding behaviour through attitudes, subjective norms, and perceived behavioural control. However, bread consumption is typically routinised, low-involvement, and shaped by time pressure, price salience, and convenience. Disposal decisions are often guided by heuristics such as expiration dates and precautionary reasoning (Barone and Aschemann-Witzel, 2022; Thøgersen, 2021). To capture this context, the study extends TPB by incorporating trust, perceived responsibility, and perceived effectiveness as mechanisms that condition whether pro-sustainability attitudes translate into behaviour. At the retail level, Institutional Theory (DiMaggio and Powell, 1983; Scott, 1995) explains how organisations operate under competing logics. A dominant market-efficiency logic prioritises sales, turnover, promotional effectiveness, and constant availability, while a legitimacy logic

emphasises sustainability, transparency, and responsibility. These logics are not necessarily aligned, resulting in structural tensions in which sustainability initiatives coexist with promotional practices that stimulate demand volatility and over-purchasing. At the manufacturer level, Information Processing Theory (Galbraith, 1973) explains how organisations respond to uncertainty. Bread manufacturers operate under narrow margins, short product life cycles, and high service-level expectations. Volatile demand signals, limited real-time visibility, and fragmented data-sharing increase uncertainty, leading to conservative forecasting, safety stocks, and buffer production. These responses reduce the risk of stock-outs but also institutionalise surplus. Overproduction is therefore not interpreted as inefficiency alone, but as a rational response to a fragmented coordination environment.

The Systemic Alignment Framework integrates these perspectives and argues that bread waste is structurally reproduced when behavioural, institutional, and informational logics remain unsynchronised. Consumer decision-making under bounded rationality interacts with retail promotional architectures that amplify demand volatility. This volatility is transmitted upstream, where manufacturers respond through buffering and conservative production planning. High levels of product availability then reinforce consumer expectations of abundance and freshness, which in turn influence purchasing and disposal behaviour. Waste emerges as an emergent property of these interactions rather than as the result of isolated failure. The retail–consumer interface is therefore conceptualised as the critical coordination arena where these logics intersect and where alignment must occur for durable waste reduction.

To empirically examine this framework, the study adopts an explanatory sequential mixed-methods design (Creswell and Plano Clark, 2018). In the first phase, a representative survey of German consumers operationalises the extended TPB model, measuring attitudes, subjective norms, perceived behavioural control, trust in retailer and manufacturer initiatives, perceived responsibility, perceived effectiveness, and bread-related purchasing and disposal behaviour. This phase identifies behavioural alignment gaps and examines how contextual perceptions influence behavioural intention and enactment. In the second phase, semi-structured interviews with retailers and manufacturers explore pricing architectures, promotional cycles, sustainability communication, service-level expectations, forecasting routines, and perceived coordination constraints. This phase provides insight into how organisational actors interpret volatility and how their practices contribute to surplus formation. A third integrative phase synthesises findings across levels, potentially incorporating insights from associations or NGOs to enrich system-level interpretation. Integration is structured around behavioural, strategic, and communicative alignment, enabling a comprehensive analysis of cross-level misalignment.

The study makes three key contributions. First, it reconceptualises bread waste as a cross-level coordination problem rather than an actor-specific deficit, shifting the analytical focus from blame attribution to systemic interaction. Second, it extends behavioural research by embedding consumer decision-making within system-conditioned choice architectures, demonstrating that the attitude–behaviour gap is not purely psychological but structurally produced. Third, it introduces systemic alignment as a governance construct for sustainable

supply chain coordination, defined as the synchronisation of behavioural activation, retail incentive systems, and manufacturing information-processing structures. The practical implications are significant. Behavioural interventions, retail discounting strategies, and technological forecasting tools may each generate local improvements, but they remain limited when underlying incentives and information flows are misaligned. Durable waste reduction requires coordinated changes across consumer environments, retail practices, and production systems.

The study is directly relevant to contemporary debates on sustainable consumption, supply chain coordination, and engaged scholarship. It addresses a real-world sustainability problem and provides a theoretically integrated and empirically grounded framework with actionable implications. This aligns closely with the EMS focus on rigorous and practice-oriented research and with the conference theme “Bright Ideas, Lasting Impact,” by offering a systemic perspective on how lasting waste reduction can be achieved through alignment rather than isolated intervention.

Selected References

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