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PB403

*Psychology of Economic Life
Summative Essay*

Save Money, Save the Planet: How UK supermarkets can influence shoppers to reduce food waste

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1. Background

A third of all produced foods is either wasted or lost each year (FAO, 2013). Food waste, generally understood as the failure to use edible food for human purposes, has been difficult to measure and trace, keeping its true impact hidden until recently (Forbes et al., 2021; Alexander et al., 2013). Recent research indicates that up to half of total greenhouse gas emissions from food systems come from food waste (Zhu et al., 2023b). To put this into perspective, if food waste were a country, it would be the third-largest global producer of carbon dioxide, following the US and China (WFP USA, 2023). In the United Kingdom alone, a quarter of the food that manufacturing and retail industries send to landfills is edible, and 19% of purchased foods are wasted (WRAP, 2009; Green & Johnston, 2004).

Food waste has drawn the attention of governments, policy makers, and businesses in recent years due to its dual nature as both a problem and a solution to other socioeconomic issues (Eriksson, 2015). Its complexity can be attributed to three parts of sustainable development: environmental, social, and economic impact (Eriksson, 2015). The resources required for food production are becoming increasingly scarce, rendering food waste a waste of environmental resources. In the UK, 6.2 billion cubic metres of water per year, the equivalent of 243 litres of water per person per day, is wasted producing food that is disposed of prematurely (Chapagain and James, 2011). Food waste also has the potential to alleviate world hunger, with the 1.3 billion metric tonnes of food wasted every year having the potential of sustaining two billion people (Quinton, 2023; WFP USA, 2023). Finally, the direct financial costs of food waste add up to US \$1 trillion a year, increasing to US \$2.6 trillion when accounting for indirect environmental and social costs (FAO 2017a).

Food waste represents a complex and pervasive problem that occurs at every stage of the food supply chain (Eriksson, 2015), with Figure 1 representing the various inputs that contribute to wastage throughout the food journey. At the farm, food waste often happens in field due to food aesthetic standards and can go unaccounted for as it never reaches a harvestable state (WWF & Tesco, 2022). In the UK and in Europe, in-field waste accounts for 41% of total food waste lost (WWF & Tesco, 2022). During transportation, poor cooling technology, food storage, and packaging lead to high levels of food spoilage (FAO, 2011). Once it reaches its destination, retailers may overorder to ensure food availability, even if some food is never sold, and may also engage in additional food aesthetic selection.

Figure 1*Summary points of food wasted along the supply chain*

Farm	Transportation	Retailer	Consumer	Disposal
Never selected for harvest because of incorrect size, food aesthetics, disease, etc.	Falls from containers during handling Broken, spoiled, contaminated during transport Lack of cooling technology Poor climate conditions	Last minute order cancellation Overstocking or over purchasing Selling more product to customer than needed	Buying more than needed Poor food storage techniques Overpreparation Failure to consume leftovers Discarding edible food	Thrown in garbage; failure to compost

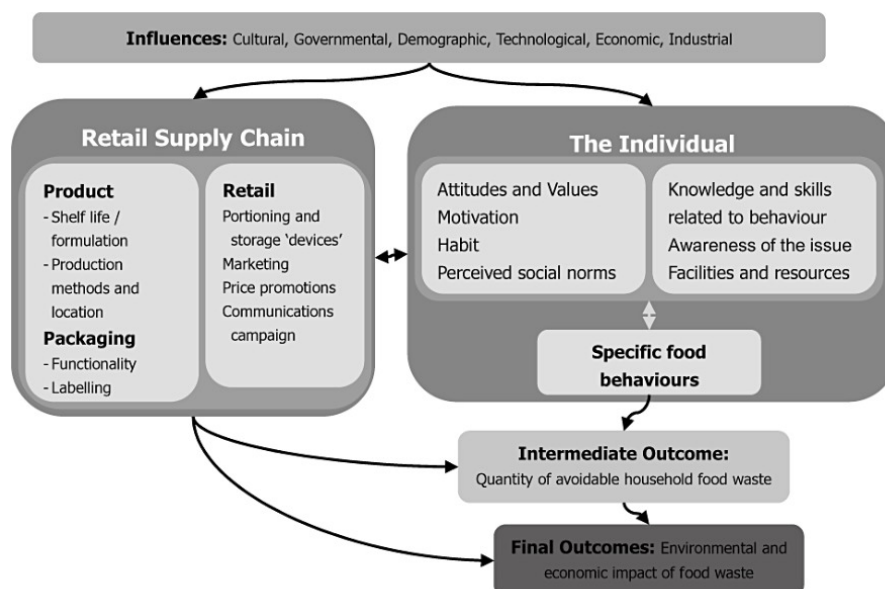
In high-income countries such as the UK, individuals have been identified as the most substantial contributors to food waste, with the majority of household-generated waste being classified as avoidable (Graham-Rowe et al., 2014; Quested et al., 2011; Roodhuyzen et al., 2017). A plethora of research efforts have been dedicated to investigating consumer-level socio-demographic, attitudinal, and behavioural influences on household food waste, as well as to developing interventions for consumer-generated food waste reduction (Koivupuro et al., 2012; Lyndhurst et al., 2007). The issue of food waste, particularly within the household, is inherently psychological in nature, with interventions proving “unlikely to be effective unless they target the key psychological mechanisms that underpin motivations and/or barriers to household food waste reduction” (Graham-Rowe et al., 2015). However, the perspective of consumers as independent and self-governed actors might provide an overly reductionist narrative of responsibility (Aschemann-Witzel et al., 2023).

Rather than being attributed to individual thoughtlessness, household food waste represents a consequence of the social and material conditions surrounding the provision of food (Evans, 2011). Indeed, qualitative analyses of responsibility for food waste following practices such as retail price promotions have revealed that both consumers and institutional actors acknowledge consumers’ temptations and expectations that arise from institutionally shaped contexts, revealing an expansion of responsibility of consumer and retailer agents into each other's domains (Aschemann-Witzel et al., 2023). This view calls for a systems-think approach to explaining the interdependent dimensions that contribute to the generation of food waste, including the bidirectional relationship between the supply chain and the individual, within overarching socio-economic, cultural, and technological frameworks (Quested et al.,

2011; shown in Figure 2). Perceiving food waste as a linear and mechanistic process would thus neglect the dynamic influences between retailers and consumers. Even at the level of the individual, food waste should not be regarded as a behaviour in itself, but rather as the outcome of an interaction of behaviours pertaining to lifestyle considerations, planning, shopping, consumption, preparation and storage, which are inherently linked to product specifications (e.g., shelf life), packaging (e.g., labelling), and retail decision-making (e.g., portioning, price promotions; Quested et al., 2011).

Figure 2

Food waste dynamics



Although retailers present a relatively small food waste footprint, their role in influencing household-related food waste behaviours has been acknowledged (Eriksson, 2015). As a critical facilitator between stakeholders along the food supply chain (e.g., producer-consumer interface), supermarkets represent a powerful leverage point for food waste management, exerting an influence that extends both upstream and downstream (De Moraes et al., 2020). For example, retailers' assumptions regarding consumers' aesthetic preferences for produce are translated into order specifications for suppliers, potentially leading to large-scale food rejections (Gustavsson et al., 2011). Additionally, retailers are situated at a prime location to communicate aspects such as environmental awareness and food standards to consumers, by presenting the most interaction with and influence over shoppers via the marketing mix and habitual purchasing behaviour (Eriksson, 2015; Sanlier & Seren Karakus, 2010).

Therefore, this essay aims to understand the influence of supermarkets on consumers' waste-related activities. In the following sections, we will summarise food waste literature surrounding key psychological habits and behaviours, map high impact stakeholders, use Multilayered Installation Theory including Activity Theory to understand interventions at points of action, and propose a holistic solution that will align food waste behaviours with shopper motives and goals.

2. Introduction

As opposed to post-harvesting and processing, the majority of food waste in developed countries occurs further downstream the food supply chain - with suggestions for preventing wastage centred around consumer power, improved planning of purchase and consumption, the retail industry, and enhanced communication throughout the supply chain (Gustavsson et al., 2011).

Consumer-level influences on food waste include household composition and socio-economic status, awareness and competences regarding food- and waste-related behaviours attitudes and preferences (e.g., concern about food waste, price awareness, desire for healthiness), or lifestyle and time availability (Parfitt et al., 2010; Roodhuyzen et al., 2017). Depending on their motivations and capabilities, consumers might also differ in how they handle trade-offs between various food-related priorities – all of which are influenced by the food choice environment, and retailer practices and dissemination of information (Aschemann-Witzel et al., 2015; 2016). Notably, consumer-level influences both include and are rooted within overarching socioeconomic institutional contexts, such as perceived social norms, increasing consumption trends toward perishable products and choice abundance, demands for high standards of quality, or consumerism culture (Roodhuyzen et al., 2017).

Within the retail sector, most empirical efforts have focused on wastage of short shelf-life foods, with a majority of wastage being linked to method, measurement, and material causal categories (De Moraes et al., 2020). Notably, many of the identified causes pertain to logistical and technological domains, such as inaccurate demand forecasting, inadequate storage and inventory, cold chain breaking, lack of operational control and integrated IT systems, or issues with transport equipment (De Moraes et al., 2020). While acknowledging the importance of such influences, this report will focus on the factors that inherently leverage psychological and behavioural motivations underpinning the retailer-consumer interface.

2.1 Aesthetic Standards

One of the most prominent method-related causes concerns overly stringent aesthetic standards, with appearance representing consumers' foremost sensory impression and factor of influence in evaluating food quality (Garrone et al., 2014). The inference of expectations from such attributes might be particularly relevant for fresh products, which exhibit fewer extrinsic quality cues (e.g., labels). Moreover, fluctuations in seasonality and market conditions can lead to inconsistent cosmetic standards, which in turn affect consumer acceptance and result in

edible but visually imperfect products being removed from the market, especially in socioeconomic climates whereby supply exceeds demand (Göbel et al., 2015). Research indicates that consumers' preference for a narrower aesthetic range in food purchase intentions due to perceptions of normality stems from and is reinforced by institutional norms and inter-generational socialisation practices (Loebnitz et al., 2015; Makhal et al., 2020). The influence of such cosmetic imperfections is particularly enhanced for organic products and may be moderated by individual differences such as environmental concerns, although to varying degrees of empirical consensus (Loebnitz et al., 2015; Yue et al., 2009).

2.2. Date Labelling

The most cited material-related cause of wastage concerns inadequate packaging, with an emphasis on confusion surrounding date labelling (De Moraes et al., 2020). Variation in labelling terms can lead to misunderstandings between manufacturers, retailers, and consumers regarding differences between indicators of food quality (e.g., 'best-before') and food safety (e.g., 'use-by'), with flexible interpretations according to the food type in question (Van Boxstael et al., 2014; Verghese et al., 2015). For example, many consumers misinterpret 'best-before' dates as signifying the last day of use (Williams et al., 2012), with date labels representing a crucial means of judging edibility by consumers (Aschemann-Witzel et al., 2015; Van Boxstael et al., 2014). The effect of labelling on food evaluation has been linked to its influence over consumer perceptions of freshness and healthfulness, with retailer and marketing communications potentially stimulating exaggerated health and safety concerns (Graham-Rowe et al., 2014; Wansink & Wright, 2006). The disposal of edible products due to perceived, rather than informed, health risk levels can be framed within the context of trade-offs that consumers make in driving food-related behaviours (Aschemann-Witzel et al., 2015).

2.3. Packaging Attributes

Packaging aspects such as large sizes and difficulty emptying have been linked to 20-25% of purchased foods being wasted, particularly within households lacking environmental awareness (Williams et al., 2012). In the UK, consumers tend to overestimate their ability to preserve food at home, neglecting the potential for protection and optimisation via packaging functions and information (WRAP, 2020). Given the 'scripting role of designed goods', with product attributes enabling or restricting individual action, packaging represents an important lever in designing 'moralised products' that funnel desirable consumer behaviour (Jelsma,

2006). For example, food waste could be reduced by packaging that allows for proper resealing and adequate portion control (Wikström et al., 2014; Williams et al. 2012). By focusing on the functions that products serve (e.g., satisfy nutritional need) and what product attributes enable, the interaction between consumers and products can be understood as dependent on product design, consumer experiences and preferences, and contextual factors (Löfgren, 2006). Important packaging attributes for food waste reduction encompass mechanical protection, resealability, accessibility attributes (e.g., easy to dose or empty), containing the correct quantity, and clear information on safety and freshness (Williams et al., 2008).

2.4. Pricing Strategies

Pricing mechanisms can aid in increasing consumer preferences for suboptimal products (De Hooze et al., 2017). However, in high-income countries, low food prices, coupled with a culture of deal-seeking and undervaluing food, contribute to over-purchasing of discounted items and a disregard for the resources used in food production (e.g., Aschemann-Witzel et al., 2015; Jensen & Bech-Larsen, 2017). The relationship between pricing mechanisms and food waste is multifaceted, with evidence suggesting that pricing promotions can both exacerbate and mitigate the problem (Quested et al., 2013; Tsalis et al., 2021). While promotions may encourage impulsive and excessive purchasing due to frivolousness, financial incentives or norms of abundance (Delley & Brunner, 2017; Farr-Wharton et al., 2016; Porpino et al., 2016), they can also promote conscious waste-averse attitudes (Aschemann-Witzel, et al., 2017; Jörissen et al., 2014). Factors such as price consciousness, personal values and individual capabilities in food management can influence the extent of waste associated with discounted products, highlighting the importance of considering diverse consumer motivations and competencies in addressing food waste (Tsalis et al., 2021). Crucially, research indicating a causal relationship emphasises the importance of addressing such in-store factors characterising the purchasing moment (Mondéjar-Jiménez et al., 2016; Ponis et al., 2017).

2.5. Motivations

Food waste often occurs unconsciously due to the gap between activities causing wastage and their consequences, rendering food waste largely inconspicuous and less impacted by social signalling compared to other behaviours (Quested et al, 2013).

Waste concerns, particularly regarding financial resources, represent a predominant motivation to minimising food waste (Graham-Rowe et al., 2014). Individuals experiencing

budget constraints or adverse attitudes toward financial wastage could thus be motivated to behave less frivolously with food, even at the expense of compromising on other influences, such as norms of appearance and abundance (Graham-Rowe et al., 2014). However, financial motivations could also negatively interact with retail dimensions in promoting food waste behaviour, given consumers' sensitivity to strategies like size enlargements and bonus packs (Carlson et al., 2015).

Similarly, individuals' motivation toward minimising food waste has been linked to the desire to 'do the right thing', with food waste holding negative public perceptions and inducing the experience of guilt (Graham-Rowe et al., 2014; WRAP, 2007). Given reports of relatively low levels of awareness of the extent of household food waste and its environmental impact (Quested et al., 2011; WRAP, 2008), this desire provides a valuable avenue for potential interventions. For example, anticipated food waste can mediate the relationship between increased package sizes and reduced purchase intentions for perishable products, even when associated with price promotions (Petit et al., 2020). Moreover, whereas pro-environmental self-identities alone are insufficient determinants, individuals with both strong pro-environmental identities and awareness of the problem have shown increased intentions for purchasing abnormally shaped produce (Loebnitz et al., 2015). Retailers represent a prime candidate that could therefore educate consumers and enable a more accurate anticipation of waste (Petit et al., 2020).

2.6. Proposed Case Study and Aims

Tesco, as the UK's retail titan, has firmly positioned itself at the vanguard of sustainability and food waste reduction, leveraging its widespread influence for national transformation (Tesco, 2024). Situated within the medium-cost bracket, Tesco's clientele reflects the average British consumer, thus serving as a quintessential model for the nation's shopping behaviours (Lim et al., 2018). Tesco's commitment to halving its food waste by 2025 is evidenced by its launch of proactive initiatives, such as the removal of 'Best before' dates on selected products, the inception of 'Reduced in Price, Just as Nice' sections, and the redistribution of surplus food to community needs (see Appendix A; Tesco, 2024).

However, in 2024, discrepancies within Tesco's reported food waste statistics prompted a public amendment of figures and strategy revision. The misclassification of food waste, erroneously reported as animal feed, was instead processed through the unfavourable method of anaerobic digestion (Eriksson, 2015). This issue starkly contrasted with CEO Ken Murphy's

insistence on meticulous food waste tracking and transparent data management, prompting a critical reassessment of Tesco's processes and a push for enhanced initiatives (Quinn, 2024; Kakkad, 2024).

Our project targets Tesco, which mirrors the average shopping experience, against a backdrop of both ambition and error, and exhibits a clear readiness to enact change. We aim to build on Tesco's initiatives by employing a combination of Activity Theory and Installation Theory (Lahlou, 2017) to devise robust interventions (see Appendix D), ensuring the resilience of solutions through a layered approach inspired by the *Swiss Cheese Model* – whereby the redundancy of layers is designed to prevent systemic failures (Wiegmann et al., 2021). This multifaceted strategy aims to not just assist Tesco in rebounding from recent setbacks, but to empower them to exceed their waste reduction aspirations, thus setting a precedent for the retail sector at large.

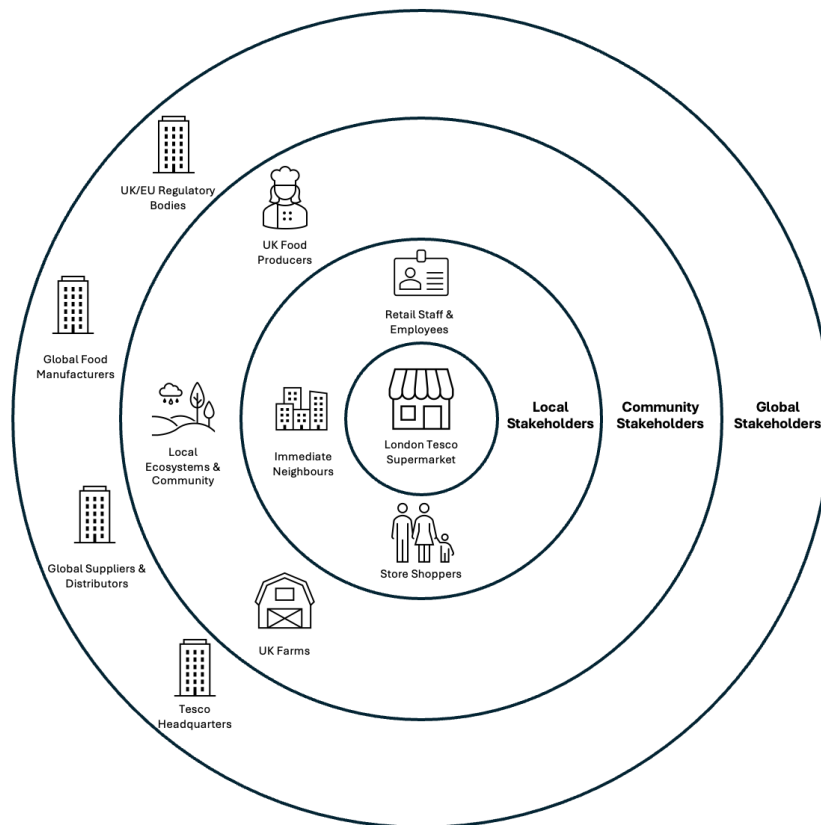
3. Multilayered Installation Theory Analysis

3.1 Stakeholder Holder Analysis

The complexity of food waste is partly rooted in the complexity of the broader food system (Lang, 1999; Mesiranta et al., 2022). Every local Tesco store is a unique microeconomy, connecting suppliers and manufacturers to buyers and local community members to employment. With over 2,200 Tesco stores across the UK, and 94 within London (Tesco, 2024), individual context of each store can differ.

To create a new behavioural pathway for a given activity (i.e., food waste reduction), we must understand each stakeholder's perspective, key influencers of current policies and behaviours (Lahlou, 2024). Figure 3 presents the mapping of stakeholders in three rings based on their proximity to a theoretical London-based Tesco store (local, community, and global stakeholders) to better understand pertinent activity within an installation. We then introduce Activity Theory to understand the motives and goals of two key parties involved in our most immediate ring: Retail Staff and Store Shoppers (Lahlou, 2024).

This project excludes some stakeholders and Tesco installations, namely digital communities, NGO advocacy groups, global Tesco shareholders and investors, and market competitors, due to limited relevance to the identified food waste activities and solutions.

Figure 3*Stakeholder Map representing a London-based Tesco Store***3.1.1. Ring 1: Local Stakeholders**

Local stakeholders are those situated within a close proximity and those interacting regularly with the store. Although the Tesco corporate team handles store location, design, and layout, Retail Staff and Employees have moderate control over in-store practices, seasonal events, and community activities. Immediate Neighbours may be affected by environmental factors like light, noise, and waste pollution. Finally, Store Shoppers are arguably the most crucial stakeholder. They regularly shop at a given location and may be asked directly by Tesco for feedback on needs satisfaction.

3.1.2. Ring 2: Community Stakeholders

Community stakeholders refer to UK Food Producers, Farmers and Community Members in London more broadly. Natural Ecosystems in the area represent an additional non-human stakeholder that's impacted by Tesco's physical landscape and supply chain. Particularly given the 2016 Brexit referendum, food producers and farmers are important

stakeholders in this ring. Local supply chains have become increasingly vital due to an increase in food security concerns, environmental disruption to global supply chains, and higher import costs for European goods (Hendry et. al, 2019). This has led to greater demand for UK-based products and local food systems, as well as increased competition amongst producers and farms, putting stress on a fragile and limited supply chain (Hendry et. al, 2019).

3.1.3. Ring 3: Global Stakeholders

Lastly, key global stakeholders include UK and EU Regulatory Bodies, Global Food Manufacturers, and Global Suppliers and Distributors. Over the past two decades, western societies have replaced top-down regulation models with “market-like” configurations, whereby government actors facilitate rather than regulate (Mesiranta et al., 2022). Retailers are thus anticipated to self-regulate and voluntarily uphold environmental and social responsibility (Mesiranta et al., 2022). This “responsibilisation” often manifests in loose moral guidelines, nonbinding rules, and self-defined codes of conduct of varying severity (Giesler & Veresiu, 2014). Further, retailers often shift the responsibility for behaviour change onto customers, expecting them to voluntarily adopt healthy or sustainable lifestyles at their own discretion (Giesler & Veresiu, 2014). As such, Tesco sets their own food waste goals and engages in self-reporting, exposing them to reputational risk and public scrutiny (Morgan, 2024; Quinn, 2024). Global manufacturers and food corporations also heavily influence key packaging and design features for food waste (e.g., portioning, resealability).

3.2. Activity Theory

Activity Theory provides a comprehensive framework for understanding human behaviour, particularly in how individuals interact with their environments in pursuing various objectives (Lahlou, 2017). It posits that human activities are driven by motives aimed at reaching specific goals within given conditions, which transform the focus of activity. Activity Theory offers an anthropocentric view, focusing on the relationship between subjects and the objects encountered during activities. Its utility extends to describing behaviour in any setting, underscoring the adaptability and competence of subjects in navigating their environment to satisfy their motives.

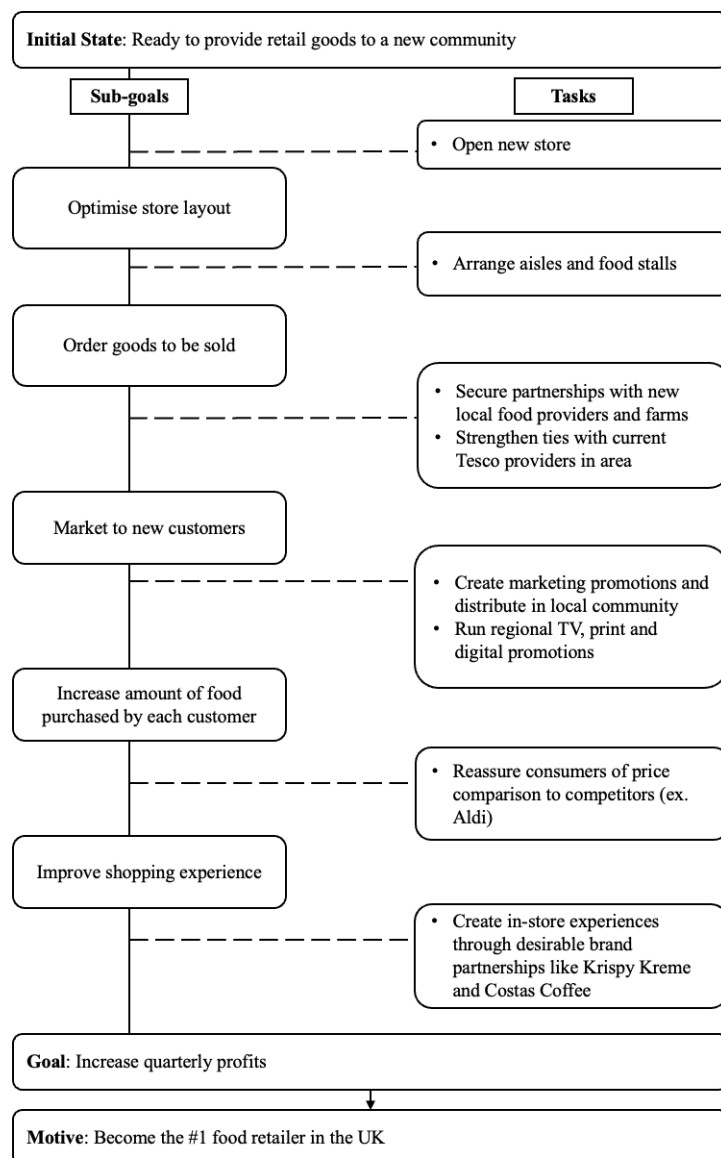
The present analyses examine shoppers and retailers as key actors in the food waste landscape, journeying their respective motives and goals. This nuanced approach illuminates the dynamic interactions between these high-impact stakeholders within the commercial retail

environment, from both perspectives. We focus on these groups due to their significant influence on food waste prevention and our ability to directly engage them through behavioural interventions.

3.2.1. Activity Theory: Retailers

Figure 4

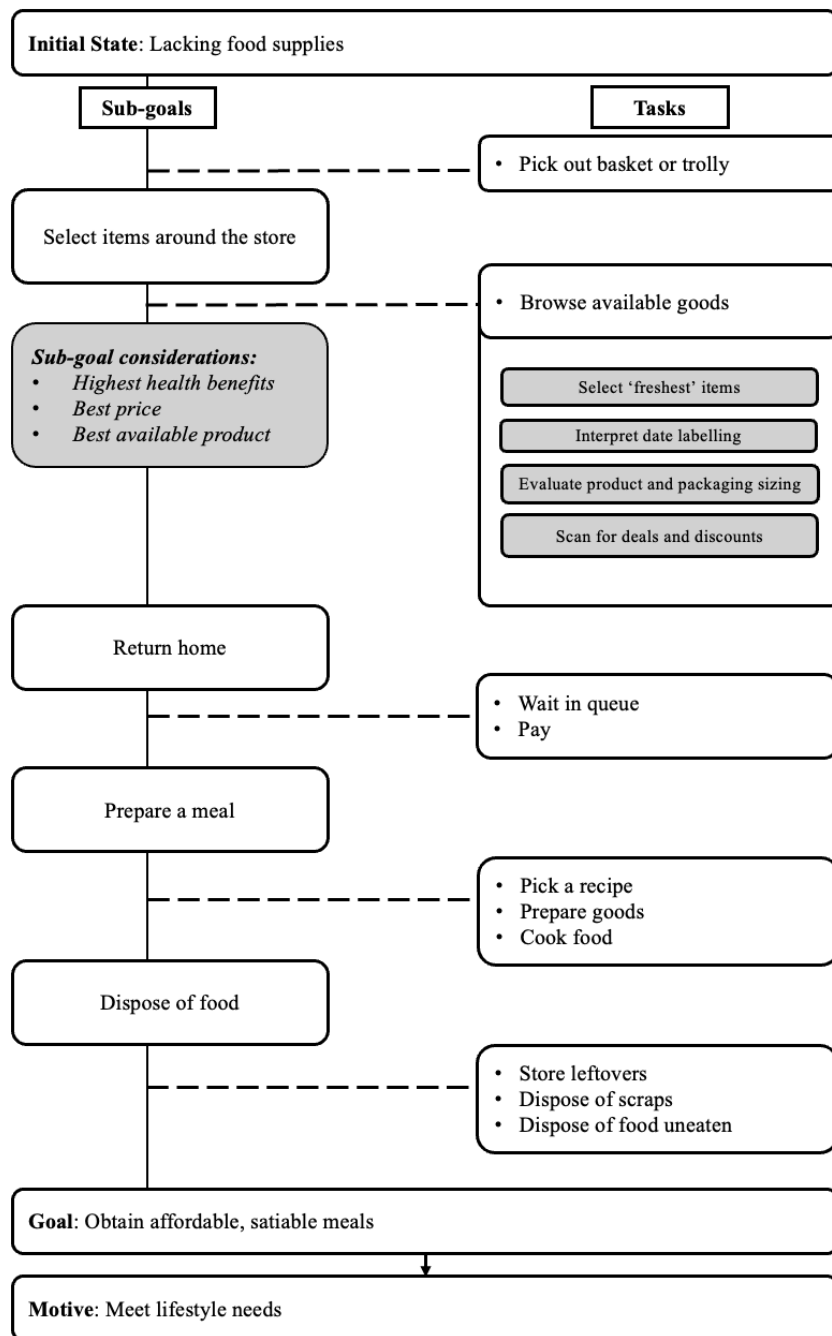
Activity Theory Analysis for Retailers



3.2.2. Activity Theory: Shoppers

Figure 5

Activity Theory Analysis for Shoppers



The motive and goals of the retailer are not seemingly focused on avoiding food waste, but rather on prioritising business growth. Similarly, shoppers' motives concern lifestyle needs, with direct economic influences. Thus, it is imperative that behavioural interventions and installations closely align with these motivations and potentially enhance them, facilitating the additional goal of reducing food waste.

3.3 Installation Theory & Problem Analysis

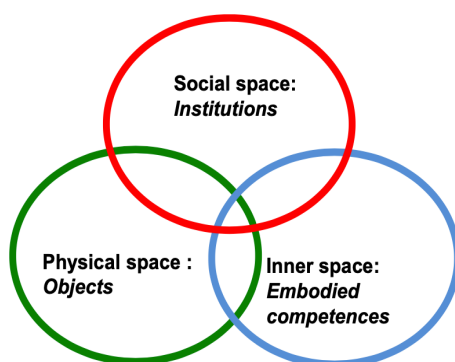
This project applies the combination of Activity Theory and Installation Theory (Lahlou, 2017) to better understand the present issue and recommend targeted interventions. Activity Theory has enabled us to map out the trajectories of both shoppers and retailers, identifying motives, goals, and tasks that drive activity and are critical for ensuring success of behavioural interventions. Building upon this, Installation Theory provides a more granular analysis, allowing us to pinpoint precise moments within these trajectories where supermarkets exert significant influence over customer behaviour.

Installation Theory (Lahlou, 2017) provides a framework for understanding and analysing how human behaviour is shaped and regulated within various settings (i.e., 'installations'). These installations are socio-technical systems (Figure 6) that combine physical space, social norms, and embodied cognitive processes to guide and standardise human behaviour in a predictable way. The theory posits that our interactions with the environment are influenced by three main layers:

1. **Physical Affordances:** The tangible aspects of the environment (e.g., space layout and design) which facilitate or limit certain actions.
2. **Social Regulation:** The societal norms, rules, and cues that govern behaviour, providing social motivation and control.
3. **Embodied Competencies:** The internal factors such as skills, knowledge, attitudes, and previous experiences that individuals bring to an interaction.

Figure 6

Installation Theory Diagram (Lahlou, 2017)



A thorough analysis (Table 1, see Appendix B for detailed version) guided our multi-layered supermarket food waste strategy. Our interventions, initially crafted from first-hand

observations of industry leaders such as Tesco and Sainsbury's (see Appendix C), intentionally leverage physical, social, and cognitive elements of consumer behaviour, ensuring our approach leads to substantial and lasting reductions in food waste.

Table 1

Problem Analysis through Installation Theory

Behavioural Lever	Installation: Affordance	Installation: Competency	Installation: Regulation
Price Promotion	Multi-item Offers and Price Reductions: Large, bold text; bright colour labels. Placed at eye level. More noticeable and attracts attention to deals.	Price Consciousness and Budget Constraints: Thrifty mindset or budget constraints make promotions attractive. Internalised value system overriding considerations of actual consumption rates.	Culture of Abundance and Deal Chasing: Societal norm of economic optimisation. Customers seek out deals and purchase more to save money. Narrative that equates buying on promotion with being responsible or smart.
Food Perfection	Supermarket Strategic Placement: Bright lighting and prominent placement make produce appear fresher and more vibrant.	Safety Concerns: (Mis)perception that 'perfect' looking food is safer, higher-quality, and more nutritious. Preference for 'flawless' foods may be linked to deeper psychological needs for control and self-worth.	Societal Norms: Exclusive display of the best-looking fruits and vegetables. Perpetuates unrealistic expectation and standard of typical foods. Advertising discourses that suggest purchasing perfect foods can enhance one's self-image and personal brand ('you are what you eat').
Packaging Attributes	Exaggerated Portion Sizes, Inadequate Packaging: Products are often pre-packaged in large	Inability to Estimate Meal Portion Sizes and Optimise Preservation:	Norms of Abundance and Hospitality: Abundance of food is culturally associated

	portions that exceed consumption needs. Bundling allows suppliers to sell and move more product. Inaccessible packaging (e.g. resealing). Unclear information on food preservation.	Struggles to estimate correct portion sizes for meals. Convenience-driven decisions ("shopping what's available"). Portion sizes may appear to offer better value for money. Overestimation of handling and storing competences.	with hospitality and generosity. Pressures to buy more.
Food Labelling	Food Labels: Numerous labels (e.g., 'Best before', 'Use by', 'Display until') signal informative dates to the customer. Pictures on packaging depicting freshness of product.	Misplaced Perception: Confusion and misinterpretation of safety and quality indicators. Exaggerated health and safety concerns.	Norms and Behaviour: Customers discouraged from physically interacting with the food before purchase. Reduced ability to assess quality outside of the provided labels.

To summarise, our problem analysis confirms much of the documented findings in the literature, indicating that the behavioural levers leading to food waste are multi-faceted and interconnected.

Price promotions and multi-buy offers that appeal to cost-conscious consumers can encourage overbuying, a prime waste contributor. This underscores the need to refine such strategies to promote sustainable consumption rather than mere cost-saving. Further, the widespread pursuit of aesthetically flawless food has led supermarkets to implement strategic displays and marketing techniques that accentuate the appeal of produce, fostering a culture that discards nutritious but cosmetically imperfect items. This highlights the need for a paradigm shift in societal standards of food beauty - one that embraces variety and natural imperfection as part of a broader sustainable ethos, while appealing to embodied competencies, such as consumer knowledge and price-orientation.

Another significant driver of waste is packaging (e.g., portion size), as consumers are often presented with more than they need due to a culture that values larger sizes. An informed approach to consumer education on food storage and handling, portion control, and the

availability of varied portion options could be instrumental in realigning purchase habits with actual consumption requirements. Additionally, the confusion caused by food labelling conventions contributes to the premature disposal of still-edible food, with 'Best before' dates frequently misinterpreted as indicative of food safety rather than quality. Enhancing the clarity of food labels and intensifying consumer education on their proper interpretation can thus help mitigate wastage.

Our strategies aim to resonate with consumers' intrinsic motivations and societal expectations in a multi-layered intervention. It will encompass redefining the narrative around food perfection, scaling consumer understanding of packaging attributes, and demystifying food labelling - all while ensuring that sustainable options remain economically viable for the average shopper. Through this, we seek to engender a cultural transformation that not only reduces food waste but also fosters a collective commitment to sustainability in the retail food sector.

4. Solutions Proposal

4.1. Campaign Strategy

Given the identified problem areas and Multilayered Installation Theory analysis, we propose the implementation of a holistic behavioural intervention: The *Save Money, Save the Planet* food waste campaign. This 360 degree in-store experience (see Appendix E) would be a permanent behavioural installation simultaneously targeting multiple layers, and employing diverse intervention techniques (e.g., nudging, boosting) and food waste communication tactics. We have designed this behavioural installation to align with Tesco's interests and current initiatives, ensuring that the intervention tactics are practical, realistic, and well-received (refer back to Appendix D).

Tesco shoppers face a trade-off between morality and frugality (Haws et al., 2014; Lastovicka, 1999). This campaign is designed to satisfy their identified motives and goals, while leveraging pro-environmental desires and providing rewards to ensure enduring behavioural changes. Ultimately, by 1) making the food waste issue more visible and 2) providing concrete education on how to achieve this, we aim to convince consumers that they can do so without compromising more salient goals (e.g., finances, health).

4.1.1. The Food Waste Bunch

The proposed food waste campaign incorporates four food “characters” as its spokespeople - the *Food Waste Bunch* (Figure 7; All Animation created by Canva Generative AI) - with previous employment of similar slogans dramatically increasing Tesco's branding success (Kirby & Kent, 2010). Although the campaign targets food waste influences across the shopping experience, our anthropomorphised imperfect produce symbolise societal and commercial aesthetic standards, embodying “ugly foods” that are perceived as undesirable. Each character reflects a shopper subgoal within the Activity Theory trajectory (health, best available product, financial and etc...), collectively challenging food waste-inducing conventions and promoting a narrative that values imperfect foods.

Figure 7*The Food Waste Bunch*

4.1.2. Anthropomorphisation & Creating A Narrative

Anthropomorphic cues represent visual rhetorical figures that portray non-living entities as living beings, frequently used in advertising to influence, and promote specific behaviours (Karpinska-Krakowiak et al, 2020). Anthropomorphising objects can lead to higher guilt over environmental degradation, and prompt engagement in pro-environmental behaviour (Tam, 2019). Such effectiveness is attributed to a process of familiarising, clarifying the unclear, and bringing things into perspective, rendering anthropomorphised objects more reachable, attainable, and understandable (Karpinska-Krakowiak et al, 2020).

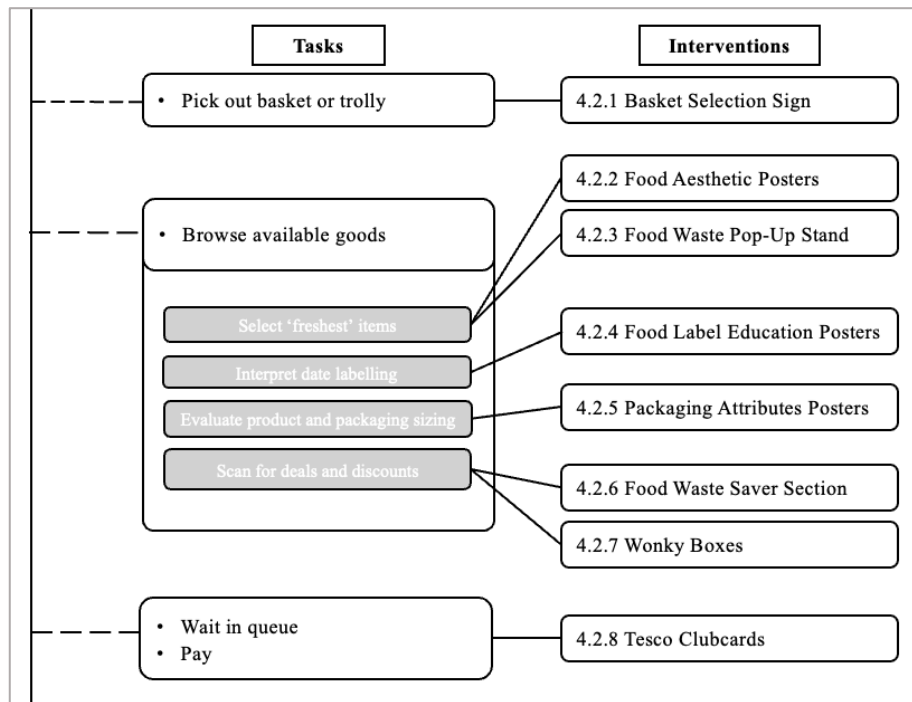
The campaign's holistic approach frames behavioural interventions within one seamless, cohesive narrative for shoppers. It represents an opportunity to reframe the overarching food waste narrative of scarcity and undesirability into an experience that makes eliminating food waste desirable, fun, and positive. Framing messages within narratives enhances their effectiveness by making them more engaging, which can improve memory retention and increase receptiveness to behavioural change (Shaffer et al., 2018).

4.2. Behavioural Interventions

Figure 8 outlines our proposed behavioural interventions, at critical points of action, within which our intervention will be most targeted to influencing sustainable choices.

Figure 8

Interventions mapped to Shopper Activity Theory Tasks



4.2.1. Basket Selection Sign

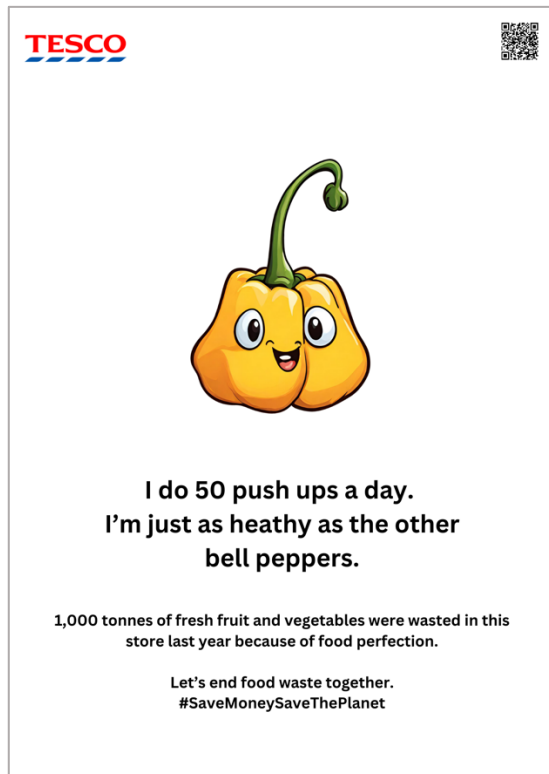
The first intervention in the shopper's journey begins at basket selection. Given that the size of a shopper's basket can influence the number of purchased items, smaller baskets can nudge shoppers towards selecting fewer items, potentially reducing impulse purchases (Desai & Talukdar, 2003).

Addressing the challenge of carrying heavy baskets (Bichard, 2008), Tesco could introduce lightweight, wheeled baskets with extended handles, that can accommodate shoppers purchasing for larger households or engaging in infrequent, larger shopping trips (See Figure 9). Compared to hand baskets, the similar design to traditional rolling baskets habitually employed by shoppers might facilitate the ease of implementing the desired behavioural change. This intervention is strategically positioned at the store's physical layer, subtly guiding shoppers towards smaller, more manageable basket choices.

Figure 9*Basket Selection Sign***4.2.2. Food Aesthetic Posters**

The produce section, typically the initial point of engagement due to its strategic near-entrance placement, is pivotal in influencing consumer purchasing habits, particularly since fruits and vegetables constitute a significant portion of consumer food waste (Ramirez et al., 2020). Our campaign will spotlight the inherent worth of ‘ugly’ fruits and vegetables being just as flavourful and nutritious, to dispel socially entrenched beliefs that only ‘perfect’ produce is valuable.

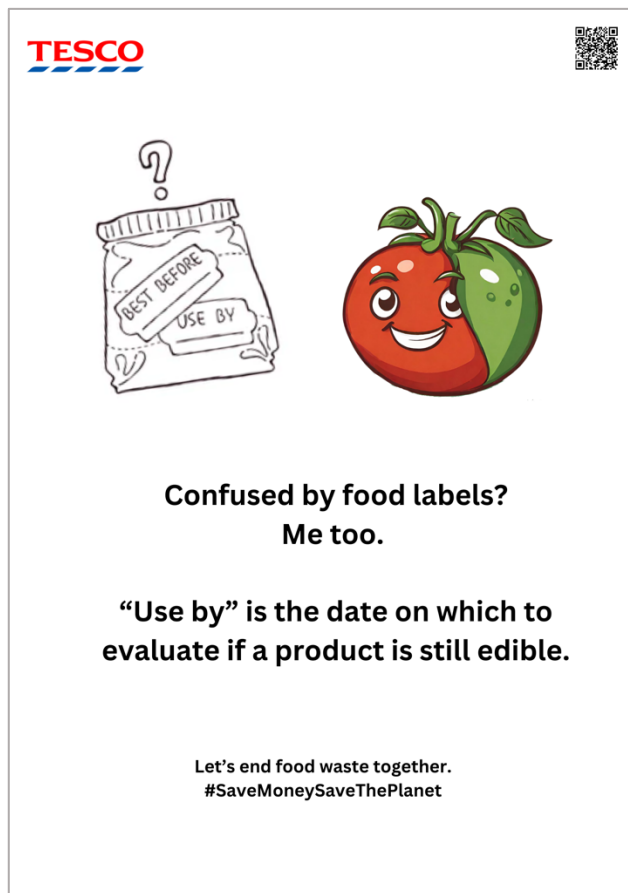
While Tesco is committed to their *Perfectly Imperfect* Range (Appendix A), its reach is minimal and fails to shift consumer beliefs. Our reframe intervention intends to adorn the produce section with *Food Waste Bunch* posters (Figure 10), that also displays QR codes to direct consumers to Tesco’s existing online platform on food waste information, tips, and recipes. This intervention successfully addresses all layers through physical signage, dissemination of knowledge, and advocacy of social norms that appreciate diversity in food cosmetic standards.

Figure 10*Food Aesthetic Posters***4.2.3. Food Waste Pop-Up Stand**

The pop-up intervention (Figure 11), an extension of Tesco's *Perfectly Imperfect* Range, prepares taste-forward and affordable products (e.g., smoothies) with suboptimal, discounted, and nearly expired foods, while dispelling preconceived notions regarding food waste items. This pop-up would be strategically located in sections with particularly high food wastage (e.g., fruit, vegetable, dairy bread; Figure 8). By making the purchase of these foods easily accessible through pre-preparation and direct engagement, the pop-up encourages the repurposing of foods otherwise discarded within the market, while embedding a more waste-conscious mindset in shoppers and appealing to their economic incentives.

Figure 11*Food Waste Pop-Up Stand***4.2.4. Food Label Education Posters**

Tesco's removal of "best by" dates from selected products has not addressed shoppers' purchasing habits or their understanding of the role of date labels in household food waste. To tackle this, our intervention involves placing in-aisle educational signs, particularly near frequently wasted items (e.g., dairy, produce, and bread; Figure 12), to impart crucial information at points of action, enhancing its salience and memory retention. This approach seeks to reform ingrained shopping behaviours and deepen consumer awareness about minimising food waste through better interpretation of food expiry information.

Figure 12*Food Label Education Posters***4.2.5. Packaging Attributes Posters**

Tesco's commitment to reducing portions and optimising food preservation is showcased by their offer of split packages of chicken and resealable salad bags. However, these do not address consumers' embodied beliefs that larger portions provide better value or their tendency to disregard food preservation guidance. Therefore, this intervention aims to increase consumer awareness of appropriate portion sizing mechanisms, and provide advice on optimising the food preservation process, per the packaging's purpose – with QR codes directing shoppers to additional food waste tips and recipes for decision-making at the point of action (Figure 13). High-impact intervention strategies would additionally seek to target packaging design to further facilitate user accessibility (e.g., resealability).

Figure 13*Packaging Attributes Posters*

4.2.6. Food Waste Saver Section

Retail outlets commonly feature a designated area for items close to expiration, with discounted prices to expedite sale. For the consumer, this clearly addresses cost-saving goals but does not necessarily align with personal waste-reduction goals. Transforming this area into a 'Food Waste Saver Section' (Figure 14) reaffirms the sustainability ethos with their inclination to save money. This strategic reframing taps into dual motivations - economic and environmental - overcoming potential intrinsic conflicts and encouraging a more conscious and gratifying shopping experience.

Figure 14*Food Waste Saver Section***4.2.7. Wonky Boxes**

CSA (community-supported agriculture) boxes have become increasingly popular alternatives to mainstream retailers in Western countries. Direct farmer economies shorten the food journey from farm to households, support farmers directly via increased returns, and reduce wasted food on farms. However, CSA's can be expensive and inaccessible, decreasing availability of fresh foods for low-income urban areas. Tesco can encourage similar benefits by offering an instore price-conscious pallet (Figure 15) featuring non-aesthetic, seasonal produce, lesser-known fruits and vegetables, local goods, and available protein within 100 miles of the store. While catering to economic consumer incentives, this would represent a more sustainable means of satisfying norms of variety and abundance.

Figure 15*Wonky Boxes*

4.2.8. Tesco Clubcards

Lastly, we aim to reinforce behaviours that have occurred throughout the store, to enable long-lasting change that extends beyond single shopping experiences. Through the Tesco club cards (Figure 16), we can showcase shoppers' monetary savings from food waste reduction-related purchases, while reinforcing the environmental impact of their prevented wastage (e.g., avoided carbon). At checkout, the shopper will be thanked for participating in Tesco's sustainability goals, providing a sense of immediate gratification that motivates them to maintain the desired behaviour.

Figure 16*Tesco Clubcards*

4.3. UK Regulation

For the greatest impact and genuine change, in-store initiatives must be complemented by government regulations.

Current retail food waste targets in the UK are voluntary, allowing retailers considerable autonomy in their approach and reporting. The UK's Department for Environment, Food & Rural Affairs (Defra) has proposed mandatory disclosure of food waste data for medium and large enterprises, with a prospective implementation date now postponed to 2026, despite public endorsement for earlier action (George, 2023). Tesco should continue to exert pressure on policymakers to accelerate a stringent mandate for all retailers in the UK and across Europe.

Furthermore, Tesco's initiative to simplify date labelling on food products should be promoted as a national standard. The objective would be to phase out ambiguous "best by" labels, minimising shopper confusion and reducing the premature discarding of food. Clear, consistent, and conspicuous date labels should become a norm, facilitating better understanding and decision-making by consumers.

With these suggestions for interventions and regulatory change in mind, it's imperative to reflect on the feasibility of implementation.

5. Discussion

5.1. Retailer Benefits

We argue that undertaking this campaign aligns with Tesco's already-expressed food waste reduction initiatives, and serves their long-term profit goals, particularly within a social responsibility framework (Carroll, 1999).

The financial costs of our proposed recommendations seem minimal compared to the benefits. Additionally, several would directly generate revenue via repurposing and increasing sales of products otherwise withdrawn from the sales channel. Cost-revenue analyses of previous supermarket food waste recovery projects have revealed a return of over four times the investment cost of implementation, arguably involving larger financial and logistical commitments than hereby proposed (e.g., meal prepping and distribution to soup kitchens; Cicatiello et al., 2016).

Moreover, economic payoff can be promoted via increased reputational capital, leading to greater customer trust, loyalty, and satisfaction (Manning, 2013). This is supported by case studies analysing similar strategies for combating consumer-level food waste within market-dominant franchise retailers (Aschemann-Witzel et al., *n.d.*). Implementing individual food packs, in-store kitchens, and campaigns that promote aesthetically suboptimal produce have led to both direct and indirect benefits, including competitive market advantages (e.g., ICA Sweden, 2015; Rema1000, 2015). Our campaign's focus on consumer engagement and awareness might be a particularly appealing strategy, given the importance of congruence between corporate social responsibility and consumer social responsibility (Manning, 2013).

Suboptimal produce is often rejected by the retailer or discarded by suppliers due to consumers' actual or anticipated food-related perceptions and behaviours (Stuart, 2009). Increasing uptake of imperfect produce could maximise the amount of sold produce, improve stakeholder relations, and build on local ecosystems, in line with Tesco's expressed desire for mutually beneficial cooperation with suppliers (Tesco, 2024).

5.2. Limitations

Our project confronts several limitations. The regulatory environment, particularly concerning food aesthetics, limits the scope for selling produce that deviates from deeply entrenched conventional commercial standards (De Moraes et al., 2020). Such restrictions

necessitate creative approaches to encourage the acceptance of 'imperfect' produce among consumers - involving the risk for decreased trust in brand quality and substantial time investments to alter deep-seated societal perceptions and behaviours. Similarly, restrictive laws regarding food safety standards would require legislative changes to simplify food repurposing strategies without endangering consumer health (Gruber et al., 2015). However, by following international examples that created positive ripple effects and successfully shifted the established institutional narrative, Tesco may not only retain its market position, but catalyse industry-wide changes towards overall food waste reduction and a more sustainable food system.

Additionally, our proposed campaign is not a one-size-fits-all solution, with varying degrees of engagement across target demographics. For example, consumers prioritise food-related goals and motivations differently according to their respective embodied competences, with shoppers from higher socio-economic households potentially unwilling to compromise on perceived quality characteristics over economic incentives such as discounts.

Furthermore, we acknowledge our position as student researchers and our lack of direct dialogue with Tesco, the target of our campaign. Nevertheless, our inquiry and solution proposal were executed with the utmost diligence, grounded in a well-informed understanding of the subject matter.

Overall, we believe that our project has devised interventions that are resilient to these complexities, fostering an environment where progressive change is not just initiated but embraced across the board, setting a precedent for other retailers to follow.

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7. Appendices

Appendix A

Tesco Food Waste Initiatives

A summary of Tesco's food waste initiatives is presented below (Tesco, 2024):

Suppliers	Tesco Stores	Customer Homes	Wider Community
'Tesco Exchange' online marketplace that connects farmers, suppliers and manufactures to cut production costs.	Use of sophisticated technology to predict and order the amount of food that customers are expected to buy.	'Tesco Real Food' website dedicated for customers to learn about food waste and tips for reducing it.	Colleague Shop' offers colleagues free, nearly-expired food to its colleagues at the end of their shift.
'Perfectly Imperfect' range offering 'wonky' produce to use as much crop from farmers/ suppliers.	'Reduced in Price, Just as Nice' offering discounted prices for products approaching their expiry date.	Website also offers mealtime recipe inspiration to make the most of everyday ingredients.	'Community Food Connection' scheme' supporting 5,500 charities.
Send potatoes inappropriate for selling to supplier Branston, who turn it into foods like cottage pie instead.	Removed 'best before' dates from a range of fresh produce to prevent edible food being discarded.	Helping customers adopt a 'Use Up Day' so that customers can let food leftovers last longer.	FoodCloud technology to track surplus food and alert local charities at the end of the day.
Working closely with growers to manage and make use of unexpected, bumper crops, such as offering discounted prices.	Removed 'Buy One Get One Free' promotions off fresh produce to encourage appropriate amounts being purchased.	Encouraging customers to take a look at their stock and plan ahead of shopping.	'Surplus Food Donations Programme' which distributes meals to people living in food insecurity.

Appendix B

Detailed Problem Analysis

Table of Supermarket Problem Analysis through the lens of Installation Theory:

Behavioural Lever	Installation: Affordance	Installation: Competency	Installation: Regulation
Price Promotion	Multi-item Offers and Price Reductions: The supermarket uses bold and large text, along with bright colour labels to attract attention to deals. This influences customer behaviour by making these items more noticeable, which can lead to impulse buying or purchasing larger quantities than needed, potentially leading to food waste. Visual Cues: The placement and presentation of discounted items are designed to catch the shopper's eye. This can lead to the purchase of items that might not be consumed before they spoil.	Price Consciousness and Budget Constraints: Individual shoppers may have a thrifty mindset or actual budget constraints, leading them to be drawn to promotions. This internalized value system can sometimes override the practical consideration of how much food they can actually consume. Values Toward Food Waste: The individual's values and attitudes towards food waste will influence their response to promotions. If they have a strong aversion to waste, they might resist buying in bulk despite the savings.	Culture of Abundance and Deal Chasing: There is a societal norm of seeking economic optimization, leading customers to seek out deals and purchase more to save money. This behaviour is supported by a narrative that equates buying on promotion with being responsible or smart, even when it may lead to excess and waste.
Food Perfection	Strategic Placement: Supermarkets strategically design their physical space to showcase food in the most appealing manner. Bright lighting and prominent placement not only make produce like oranges appear more vibrant but also create a first impression that influences consumer choice. This well-lit, front-and-centre positioning can lead consumers to overvalue aesthetic perfection,	Safety Concerns: Consumers' concerns about food safety and their self-esteem are sometimes tied to the quality and condition of the food they purchase. There is a perception that 'perfect' looking food is safer and more nutritious, which is not always the case. This perception can be linked to deeper psychological needs for control and self-worth that are manifested through the choice of	Standards & Norms: The societal norm for 'perfect' food is perpetuated by high market standards where only the best-looking fruits and vegetables are displayed. This creates an unrealistic standard and expectation among consumers that all produce should look flawless, leading to the rejection of perfectly good but cosmetically imperfect items.

	often overlooking perfectly edible, less visually appealing produce.	food that appears flawless.	Advertising promotes the idea that 'you are what you eat,' suggesting that purchasing perfect foods can enhance one's self-image and personal brand. This is especially pertinent in consumer cultures that equate the quality of purchased goods with personal success and self-worth.
Portion Sizing	Exaggerated Portion Sizes: Products are often packaged in large portions that exceed individual or household needs. These portions are visually appealing and may appear to offer better value, but can lead to customers purchasing more food than they can consume.	Inability to Estimate Meal Portion Sizes: Consumers often struggle to estimate the correct portion sizes for meals. This, combined with convenience-driven decisions ("shopping what's available"), results in buying pre-packaged quantities that may not match actual consumption needs.	Norms of Abundance and Hospitality: Cultural norms may dictate that having an abundance of food is associated with hospitality and generosity. This can pressure individuals into buying more to align with these social expectations, potentially leading to overstocking and subsequent food waste.
Food Labelling	Food Labels: Labels include 'Best before' and 'Use by' dates that signal the quality and safety of the product. Additionally, the packaging might have pictures depicting the freshness of the product, such as images of fresh bread or pastoral scenes for dairy products, which can enhance the product's visual appeal.	Consumer Perception: There is often confusion between food safety and quality indicators; consumers might misinterpret 'Best before' dates as safety cut-offs rather than quality indicators. This confusion can lead to perfectly edible food being discarded. Additionally, there is a bias towards purchasing fresh items based on these dates, influenced by health and safety concerns.	Norms and Behaviours: Social norms may discourage customers from physically interacting with the food before purchase, such as touching, trying, or smelling the food. This reduces the ability to assess quality outside of the provided labels and could lead to overreliance on the dates printed on the packaging.

Appendix C

First-Hand Observations of Supermarkets

Pictures from observing practices of Tesco and Sainsbury to inform our Problem Analysis:

Behavioural Lever	Images
Price Promotion	
Food Perfection	
Portion Sizing & Packaging Attributes	
Food Labelling	

Appendix D

Enhancing Food Waste Management

Summary of Insights, Interventions and Future Strategies for the 4 Key Problems:

	Academic Literature	Current Tesco Initiatives	Suggestions to Improve
1) Food Aesthetics	Consumers prefer a narrow aesthetic range in food purchase intentions due to perceptions of normality. Stems from and is reinforced by institutional norms and intergenerational socialisation practices.	Launched Perfectly Imperfect Range, saving over 68 million packs of fruits and vegetables since 2016.	Make shoppers aware of imperfect foods' ability to satisfy shopper goals and motives. Dispel myths in taste testing. Offer in-store wonky boxes to diversify aesthetic options in store.
2) Date Labelling	Causes of wastage concern inadequate packaging, with an emphasis on confusion surrounding date labelling. Variation in labelling terms can lead to misunderstandings regarding differences between indicators of food quality (e.g., 'best-before') and food safety (e.g., 'use-by').	Removed use-by dates from 100 fruit/veg items since 2018 and 30 of Tesco branded dairy products since 2023.	Educate consumers on the difference between food quality and food safety for all other packaging. Advocate for removal of 'best before' date as a national standard on all food products.
3) Packaging Attributes	Large sizes and difficulty emptying have been linked to 20-25% of purchased foods being wasted, particularly within households lacking environmental awareness.	New ordering system determines appropriate ranges and product sizes are matched to each type of store.	Make consumers aware of intent/ purpose of portion size changes. Educate consumers on better food storage techniques by driving traffic to Tesco Real Food Website.

4) Pricing Strategies	In high-income countries, low food prices, coupled with a culture of deal-seeking and undervaluing food, contribute to over-purchasing of discounted items and a disregard for the resources used in food production.	Removed <i>Buy One, Get One Free</i> offers from the most perishable fruit & veg items since 2014.	Highlight economic benefit (money saved) with intrinsic benefit (food waste avoided) in the same action. Relabel <i>Reduce to Clear</i> sections as Food Waste Saver sections.
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Appendix E

Mapping of Interventions

Ideal Placement of Supermarket Interventions to Target Behaviour at Points of Action

