

Adopting food waste reduction strategies in the hospitality sector of Amsterdam

The Role of Socio-Technical Dynamics and Absorptive Capacity

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Abstract

In the hospitality sector, food waste remains a persistent challenge, despite the growing availability of strategies to reduce it. So, rather than being solely a matter of available solutions, the adoption of these strategies is also shaped by the organisational and systemic context in which hospitality businesses operate. This research investigates to what extent independent hospitality businesses in Amsterdam have adopted food waste reduction strategies and what factors influence their integration into everyday practices. The Multi-Level Perspective (MLP) and absorptive capacity theory are combined to examine how food waste reduction strategies, approached as niches, interact with wider system dynamics and organisational capacity to implement change. A qualitative approach was used, which consisted of a document analysis and 13 semi-structured interviews with representatives of independent hospitality businesses. Four categories of niche strategies were identified: managerial practices, behavioural changes, technological services, and social networks. The results further show that adoption remains uneven, with internally driven strategies more widely embedded in everyday operations than externally oriented ones. Furthermore, financial pressures encouraged more cost-conscious behaviour, which also reduced waste, while existing routines, supplier relationships, food safety requirements, and limited infrastructure constrained further change. Although operators possessed a general awareness about certain strategies, practical barriers such as effort and cost involved, as well as established routines and attitudes towards food waste, often made it difficult to implement these strategies. In addition, a waste-aware organisational culture and active individuals within businesses generally supported further food waste reduction. The findings indicate that reducing food waste is not only a matter of developing effective strategies, but also of understanding how these strategies are absorbed into existing organisational and sectoral structures. For Amsterdam, this research provides insight into where sustainability initiatives are successfully integrated into hospitality practices and where further support may be needed to enable broader adoption.

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1. Introduction

In 2023, the city of Amsterdam published its food strategy for the coming years. In this, the Municipality stated they want to align themselves with the Sustainable Development Goals (SDGs) and thus minimize food waste by 50% by 2030 (Gemeente Amsterdam, 2023). In line with this broader effort, in 2025 the municipality introduced increasing waste regulations for businesses in the city centre, making it more difficult for hospitality businesses specifically to deal with excess waste (Strijbosch, 2025). These regulatory pressures could incentivize businesses to reduce their total amount of waste generated. However, despite previous efforts, such as the 2024 ‘‘No Waste Challenge 020’’ (Samen Tegen Voedselverspilling, 2024b), wider adoption of strategies aimed at reducing food waste across the sector appears to be limited. The hesitation of this sector to adopt these kinds of strategies will be the focus of this thesis.

Globally, it is estimated that almost a third of all food produced worldwide is either lost or wasted (Bozdağ, 2025). In response, this problem is addressed in SDG 12.3, which aims to ‘‘halve global food waste and reduce food losses by 2030’’ (United Nations, 2017). It is of note that in this goal, and in scientific literature in general, a distinction is made between food loss and food waste (Bozdağ, 2025; Comis et al., 2025; Munir, 2022). Food loss occurs during the earlier stages of the supply chain, such as production, storage, and processing, whereas food waste happens further in the supply chain, particularly during retail and consumption (FAO, 2011). Since this research focuses on hospitality businesses, it is concerned primarily with food waste.

Furthermore, the hospitality and food service industry (HaFS), which is defined as all establishments where food and drinks are made for immediate consumption outside the home, such as restaurants, hotels, catering services, and institutional food providers, represents a significant source of food waste production (Munir, 2021). In recent research, it is estimated that it accounts for 28% of global food waste, making it the second largest contributor, coming only after household consumers (UNEP, 2024; Bozdağ, 2025). This waste in HaFS typically arises in one of three operational phases: kitchen waste (during storage and preparation), service waste (during plating and buffet operations), and customer waste (uneaten food) (Comis et al., 2025). These losses are caused by both operational and behavioural factors, such as inaccurate demand forecasting, oversized portions, menu complexity, and aesthetic standards for ingredients (Gładysz et al., 2020).

Although food waste in the HaFS sector is widely recognized as an important issue, studying it in practice presents several challenges. Nand et al. (2025) highlight that many food service businesses still operate according to conventional methods and thus often regard food waste as inevitable within their operations and don’t recognize the many social practices that shape how and why waste occurs. This limited recognition also contributes to methodological challenges identified in other studies, such as inconsistent data collection and the absence of a universally accepted approach to quantifying food waste (Filimonau & Ermolaev, 2021; Corrado & Sala, 2018).

However, the sector can also offer a valuable context for studying food waste. The professional kitchen can be seen as a somewhat controlled micro-food system where all stages of food, from procurement to consumption, take place within a single organisational environment. This can make the sector particularly suitable as a ‘‘living lab’’, where food waste reduction strategies can be developed and tested in practice (Ramos et al., 2025). Furthermore, over the past decade, the academic interest in food waste

within the hospitality sector has grown considerably, especially following the introduction of SDG 12.3 (Bozdağ, 2025). Studies have, for instance, examined the potential of technological innovations, such as fully automated AI-based waste tracking systems (Sigala et al., 2025), analyzed management strategies (Munir, 2021), and focused on consumer attitude and behaviour (Ni-Ying et al., 2025). These examples show that numerous strategies do exist to reduce food waste, however, much of this research focuses on individual interventions rather than the broader system in which these strategies are implemented. In addition, relatively little attention has been paid to why many of these innovations remain only partially adopted in day-to-day hospitality practices.

This implies that the persistence of food waste cannot be solely explained by the absence or presence of effective solutions. Instead, it highlights a broader organisational and systemic challenge in which the adoption of innovations is shaped by established routines, institutional structures, and a businesses' capacity to identify, assimilate, and implement new information. To address this challenge, it is therefore necessary to move beyond the study of individual interventions and towards understanding how innovations interact with the wider system in which hospitality businesses operate.

This research addresses this gap by adopting a systemic perspective on food waste reduction in Amsterdam's hospitality sector. Specifically, it looks at how food waste reduction strategies interact with the current structures, routines, and organisational practices of independent restaurants and cafes. Multi-Level Perspective (MLP) on socio-technical transitions is combined with absorptive capacity theory to analyse these interactions. While MLP provides a framework for understanding how innovations interact with broader institutional and societal structures, absorptive capacity helps explain how organisations recognize, internalize, and apply external knowledge. When combined, these perspectives make it possible to not only examine which food waste reduction strategies exist, but also why some become embedded in everyday practices, while others stay niche initiatives.

As stated previously, the research will be conducted in Amsterdam. The focus of this study will furthermore be on independent restaurants and cafes, i.e., not parts of big chains. These were selected since their relatively short decision-making structures allow greater flexibility in implementing organisational change, and hotels were excluded since buffet-style operations involve different food waste dynamics than regular restaurant service. Throughout the remainder of this thesis, these independent restaurants and cafes will be collectively referred to as hospitality businesses.

1.1 Research aim

This research aims to understand what organizational factors enable or hinder the adoption and implementation of food waste reduction strategies in independent hospitality businesses in Amsterdam. It examines both the range of strategies available to the sector and the extent to which these strategies have been adopted in practice, using the Multi-Level Perspective (MLP) and absorptive capacity theory to explore how these strategies, in the framework seen as niche innovations, interact with established sector practices, routines, and organizational learning processes. In doing this, the research contributes to the literature on food waste reduction in the hospitality sector by providing insight into the challenges of implementing reduction strategies in a real-life setting and contributes to broader discussions on the diffusion of sustainability innovations within the hospitality and food services (HaFS) sector. At the same time, understanding how such initiatives are taken up within the sector is relevant for Amsterdam,

where hospitality businesses are frequently targeted by food waste reduction policies and initiatives. By identifying the factors that influence how sustainability initiatives are absorbed and translated into everyday business practices, this research can provide the municipality with a better understanding of where implementation succeeds, where barriers remain, and how future initiatives could better support change within the sector.

1.2 Main research questions

This research addresses the following research questions:

1. *What strategies aimed at reducing food waste are currently implemented in the Amsterdam hospitality sector, and to what extent have individual hospitality businesses adopted these strategies?*
2. *What internal and external factors enable or hinder the adoption of these strategies?*

1.3 Reading guide

The remainder of this thesis is structured as follows. In Chapter 2, the theoretical framework is explained by introducing MLP and absorptive capacity theory, along with how these two are integrated and combined in the conceptual framework. The research methodology, which includes semi-structured interviews and a document analysis, is described in Chapter 3. The empirical results from these two approaches are synthesised and presented in Chapter 4. These results are then discussed and related to existing literature and the theoretical framework in Chapter 5. And finally, Chapter 6 concludes the research by answering the research questions.

2. Theoretical framework

The following chapter introduces and explains the theoretical foundations of this research. First, the Multi-Level Perspective and absorptive capacity theory will be explained separately, outlining the core theory and relevance to this research. After this, the two theories are integrated to construct the conceptual framework that guides the analysis.

2.1 The Multi-Level Perspective

Around the turn of the century, the Multi-Level Perspective (MLP) emerged as a framework for analysing socio-technical transitions to sustainability (Geels, 2002; Geels, 2011). Originally developed to elaborate on historical, concluded transitions, the MLP is increasingly used to study ongoing socio-technical transitions (Köhler et al., 2019). Socio-technical systems comprise, as the name would suggest, both societal and technological elements (Geels, 2004). Furthermore, the framework reflects the complicated nature of these transitions, as they often require the overall transformation of systems such as transport, energy, and agri-food and require technology, policy, markets, consumer practices, infrastructure, cultural meaning, and scientific knowledge (Geels, 2011). The MLP views these transitions as the result of interactions between three different analytical levels: niches, socio-technical regimes, and the socio-technical landscape (Geels, 2002).

In literature, niches, or technological niches, are understood as ‘‘protected spaces’’ such as research and development (R&D) laboratories, subsidized demonstration projects, or small market niches (Geels, 2011). They provide learning spaces and possibilities to deviate from incumbent regime rules. While traditionally niches were defined to be more technological in nature (Geels, 2002; Geels, 2011), other literature has defined the term more broadly, with Loorbach (2007) stating niches can refer to ‘‘new technologies, new rules and legislation, new organizations or even new projects, concepts or ideas’’. Seyfang & Haxeltine (2012), for instance, approach grassroots innovation as civil society niches that involve ‘‘innovative networks of activists and organisations that lead bottom-up solutions for sustainable development.’’ Niche actors develop radical innovations that deviate from existing regimes, with the expectation that these novelties may eventually be adopted within or even replace the regime (Geels, 2011). Theory identifies three main mechanisms through which niches can influence regimes: by enabling the replication of projects within the niche, leading to aggregative change through many small initiatives; by supporting the scaling up of individual projects and attracting more participants; and by facilitating the translation of niche ideas into mainstream settings (Seyfang & Haxeltine, 2012).

The socio-technical regime comprises the semi-coherent, prevailing rule-set that coordinates and structures social groups (Elsner et al., 2023). It encompasses the network of actors and social groups, the formal and informal rules they maintain, and the established technologies, infrastructures, institutions, and user practices that stabilize the system (Geels, 2011; Bilali, 2019). Its main characteristics are purpose, coherence, autonomy, and stability (Bilali, 2019). Because of this stability, regimes tend to be resistant to radical change and instead evolve incrementally over time. However, regimes can be destabilized by internal tensions, such as inefficiencies or rising costs, or by external pressures originating from the niche and landscape levels (Geels, 2002). The regime is structured by a set of rules that guide and coordinate the activities of actors. These include cognitive routines and shared beliefs, capabilities and competences, lifestyles and user practices, institutional arrangements and regulations, and legally binding contracts (Geels, 2011).

Finally, the socio-technical landscape represents the broader external context in which both regimes and niches are embedded. It captures the background conditions that neither niche nor regime actors can easily influence in the short run, like physical geography, long-term demographic shifts, political ideologies, cultural and societal values, and macro-economic patterns (Geels, 2011). In literature, three types of landscape dynamics are present: first, dynamics are very slow-moving or fully stable (e.g., physical climate); second, are trend-like patterns that cause change in the long term (e.g., globalization); third, are rapid shocks (e.g., wars or pandemics) (Elsner et al., 2023; Geels, 2011). In the short run, niche or regime actors do not influence landscape developments, however, through multiple systems and actions, in the long run, these factors can spill over and change the landscape. Moreover, the landscape can either support or constrain change within the lower levels: landscape pressures can create tensions within the regime, and can open windows of opportunity for niche innovations to break through and scale up.

2.2 Absorptive capacity

Absorptive capacity is located between the fields of organizational learning, knowledge management, and dynamic capabilities, and is widely seen as an organizational construct (Duchek, 2013). The concept was first introduced by Cohen and Levinthal (1990), who defined it as “an ability to recognize the value of new information, assimilate it, and apply it to commercial ends.” It is used to explain how organizations take in and handle external knowledge, and highlights that innovation within an organization does not just depend on internal research and development (R&D) alone, but also on the ability of firms to learn from external sources (Cohen & Levinthal, 1990). Since its conception, the term has been used more liberally, but the overall consensus is that absorptive capacity is a multidimensional set of abilities to manage (external) knowledge. More specifically, the term has been used to indicate a firm's receptivity to technological change (Kedia & Bhagat, 1988), to gauge the ability of a firm to use outside knowledge (Koza & Lewin, 1998), or a firm's capability to learn and solve problems (Kim, 1998). In this research, however, the reconceptualization by Zahra and George (2002) will be used, who suggest that four organizational capabilities are needed to each build on one another to yield absorptive capacity. These capabilities are knowledge acquisition, assimilation, transformation, and exploitation, and are needed for accomplishing organizational change. Below, each capability will be shortly explained as they are defined by Zahra and George (2002):

- *Acquisition* refers to a firm's capability to identify and obtain external knowledge that is critical to the firm's operations. This effort is shaped by three dimensions: intensity, speed, and direction. Intensity and speed can accelerate capacity building, however, learning cycle constraints and resource limitations can create limits to these efforts. The direction of external knowledge can influence the developmental pathways of the firm. These activities thus require a diverse internal expertise to be successfully absorbed.
- *Assimilation* refers to the firm's routines and processes that allow it to understand the external information. This ability can be constrained by its existing knowledge boundaries; concepts outside of its search zone are overlooked, and, furthermore, a lack of complementary resources, different mechanisms, and context-specificity can delay or prevent comprehension. However, when comprehension is achieved, it promotes the firm's capacity to process and internalize external knowledge.

- *Transformation* refers to the firm's capability to develop routines that allow the combining of existing knowledge with the newly acquired and assimilated knowledge. This is accomplished by adding, removing, or reinterpreting new or existing knowledge. Also highlighted in this is bisociation, which is the capability to combine two seemingly incompatible ideas into something new. Furthermore, transformation shapes the entrepreneurial mindset, and thus yields new insights, facilitates the recognition of opportunities, and, at the same time, alters the way the firm sees itself and its competitive landscape.
- *Exploitation* refers to a firm's ability to refine, extend, and leverage competencies, existing or new, by applying acquired knowledge. While it may be possible for firms to exploit knowledge opportunistically, consistent exploitation requires structured routines to create sustainable mechanisms. The outcomes of these routines could include the persistent creation of new products, processes, and organizational forms, which enable both new ventures and established firms to continuously strengthen and expand their competitive capabilities.

Besides clarifying these four dimensions within absorptive capacity, Zahra and George (2002) suggest that there is a critical distinction between the capacity to acquire and assimilate knowledge and the more complex capability to transform and exploit this knowledge effectively. Herein, they differentiate the potential absorptive capacity (PACAP) and the realized absorptive capacity (RACAP). PACAP and RACAP have separate but complementary roles, and to realise absorptive capacity, the subsets need to coexist at all times. For example, firms cannot exploit knowledge without first acquiring it, and, similarly, firms can acquire and assimilate knowledge but might not have the capacity to exploit the knowledge for profit. Therefore, a high PACAP does not necessarily mean an improved performance. Ultimately, whether the external knowledge results in a sustainable competitive advantage depends on the firm's capacity to bridge PACAP and RACAP and transform potential into realized capacity.

2.3 Conceptual framework

Within the context of this research, broader developments such as the climate crisis, global economic dynamics, and sustainability agendas such as the SDGs, can be treated as the landscape-level pressures that shape the overall system. The municipality of Amsterdam, its Food Strategy, and the hospitality sector can be treated as a localized regime that is experiencing this pressure that is put onto them by the landscape. However, the regime is resistant to change, and is still shaped by its established routines, practices, cost considerations, and organizational norms. The different strategies for food waste reduction are considered at the niche level, as these aim to alter existing food management practices within hospitality settings. Furthermore, the successful integration of these niches into business practices relies on the absorptive capacity of individual businesses. Specifically, the potential absorptive capacity (acquisition and assimilation) allows companies to identify and understand external innovations, whereas realized absorptive capacity (transformation and exploitation) determines if these innovations are translated into effective operational practices to reduce food waste. These schematics are transformed into the conceptual framework, shown in Figure 1.

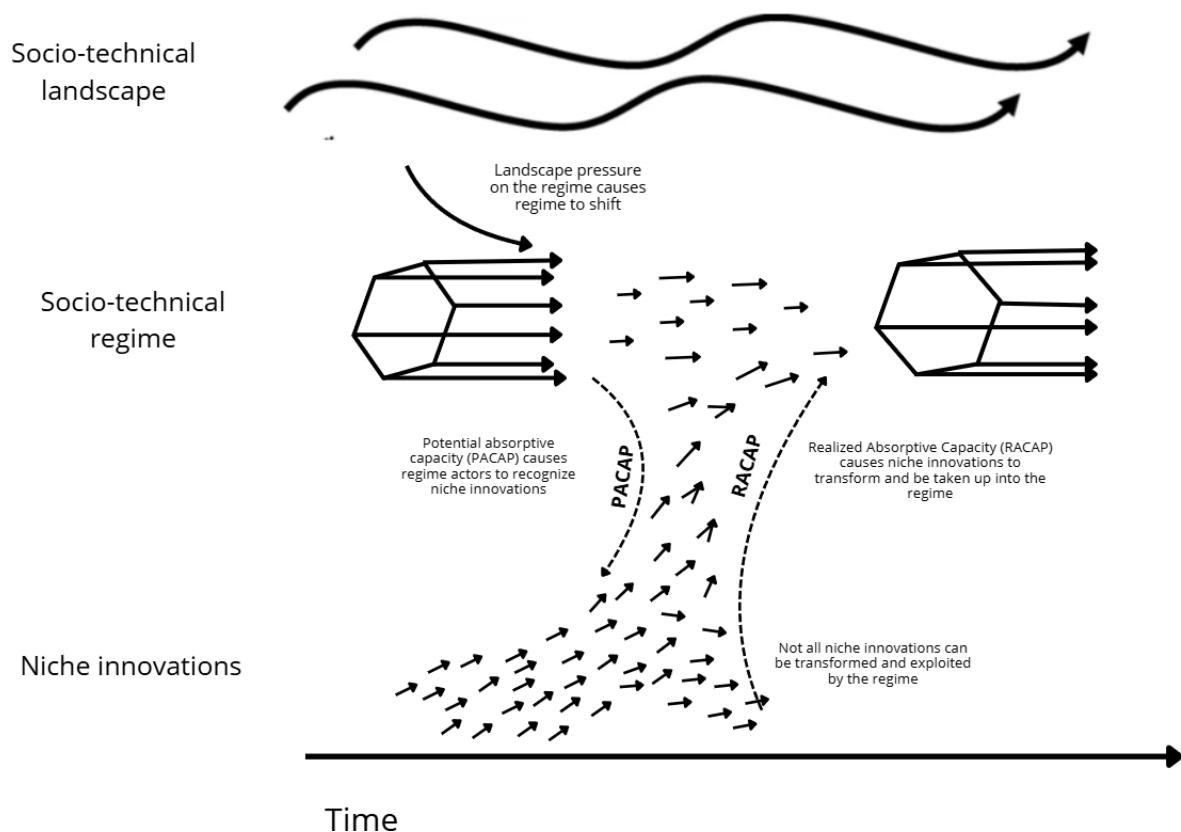


Figure 1: conceptual framework that combines MLP and absorptive capacity theory

The theoretical and conceptual framework presented in this chapter guides the following analysis of how food waste reduction practices are adopted and implemented within the Amsterdam hospitality sector, and it provides the basis for interpreting the empirical findings and examining the factors that ultimately shape the uptake of the varying practices.

3. Methodology

This study adopted a qualitative research approach, using the hospitality sector in Amsterdam as its empirical setting. This approach was considered to be most appropriate, since the research was exploratory in nature and aimed to understand how actors within the sector experience food waste reduction in practice. The research therefore focused on the perspectives of these actors and the factors that shape their experiences.

The research consisted of two complementary phases, as shown in Figure 2 below, that align with the two research questions. The first phase focused on identifying and analysing food waste reduction strategies. The findings from this phase were then used to inform the formulation of the interview questions for the second phase: interviewing representatives of hospitality businesses. Following these phases, the results were first analysed separately before ultimately being combined. In the following sections, the research process will be described in more detail, followed by the ethical considerations of this research.

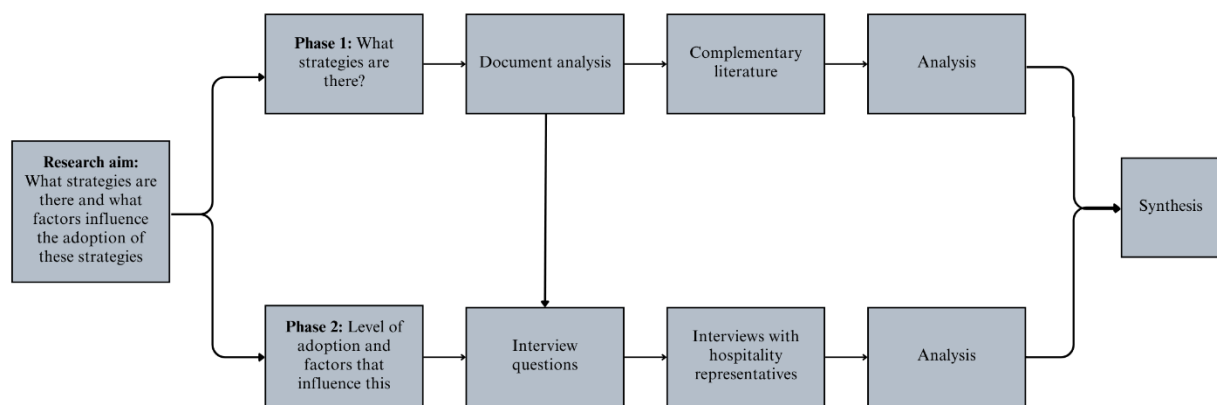


Figure 2: methodological research framework

3.1 Document analysis

The first phase of the research consisted of a document analysis, focused on identifying the waste reduction and prevention strategies in Amsterdam. A mix of grey and scientific literature was chosen. Firstly, grey literature was selected, since many practical waste prevention initiatives are documented outside of academic publications, and the research aimed to be specific to the Amsterdam region, which is more likely to be found in more regional documents.

A snowball sampling strategy was used to identify relevant sources. The search process began with newspaper articles, most notably from Het Parool, de Volkskrant, and de Telegraaf, as well as municipal documents related to food waste prevention. From these, references, citations, and links were followed to identify additional relevant materials. Through this process, approximately 25 grey literature sources were collected, which consisted of municipal reports, industry publications, news articles, impact reports, and websites. Each source was reviewed and structured in an Excel database. Information

regarding the waste prevention strategies mentioned, what they were, and the type of strategy was noted in this database. The identified strategies were categorized inductively; the categories and themes emerged from the data, instead of being predefined. After this, scientific literature was consulted to further explain and contextualize the categories that emerged from the grey literature. For this, Consensus was used to find relevant academic research and to explore how these types of strategies have been discussed in scientific literature. Searches were formulated around the identified categories, and an example of such a search can be found in Appendix B. The literature through these searches was then reviewed manually, and the articles considered most relevant were selected for further analysis. These were used to provide the scientific context for the identified strategies and to support the interpretation of the categories.

3.2 Interviews

The second phase of this research consisted of semi-structured interviews with representatives from hospitality businesses in Amsterdam. Before the data collection, interview questions had to be formulated. These were based on the research questions, the theoretical framework, and some findings from the document analysis. Four overarching themes were identified to structure the interviews: current practices, barriers, opportunities, and future outlook. These themes provided structure and ensured consistency across the interviews, while still allowing flexibility for participants to elaborate on certain topics. The questions are found in Appendix A.1.

A total of 13 interviews were conducted with either owners, co-owners, managers, or head chefs from a variety of establishments. An overview of these interviews is found in Appendix A.2. These positions were selected since they are directly involved in operational decision-making and are thus expected to possess both practical knowledge of daily operations as well as the authority to implement these changes. Participants were primarily recruited through the researcher's own professional network, as this provided access to relevant respondents who were willing and able to participate within the relatively short timeframe available for data collection. The interview durations ranged from approximately 20 to 35 minutes. All interviews were, with consent, recorded and transcribed using UniScribe.

After the interviews were transcribed, the thematic analysis approach as outlined by Braun and Clarke (2006) was followed. The transcriptions were read through, and initial notes were taken. Afterwards, the data were further analysed with Atlas.ti. Interesting features of the data were coded in a systematic way, and relevant data were collected for each code. These codes were then organized into broader patterns and relationships, and subsequently, these patterns into themes. This part of the analysis followed an inductive approach, as it allowed for patterns to emerge naturally from participants' experiences and perspectives. Once these key themes had been identified, a more abductive analytical approach was employed, straying from Braun and Clarke (2006). This involved connecting the empirical findings to the existing theoretical frameworks to be able to develop a more thorough understanding of the observed patterns.

3.3 Synthesis

The findings from the document analysis and the interviews were, as shown in Figure 2, analysed separately before being integrated into a single analytical framework. The document analysis provided an overview of existing food waste reduction strategies, while the interviews provided further insights into how these strategies are perceived, adopted, and experienced in practice.

The synthesis was guided by the conceptual framework, which combines the Multi-Level Perspective (MLP) and the concept of absorptive capacity. The MLP was used to position the identified strategies and interview findings within the niche, regime, and landscape levels, which allowed the interaction between different system levels to be analysed. Absorptive capacity was then used to explain differences in the extent to which hospitality operators were able to recognise, acquire, and implement food waste reduction practices. By combining the two types of data, it was possible to interpret the results of the document analysis in relation to the experiences of the hospitality operators, leading to a more thorough understanding of the opportunities and obstacles for reducing food waste in Amsterdam.

3.4 Ethical considerations

This research was conducted in compliance with the ethical guidelines of Wageningen University & Research (WUR Executive Board, 2014). Prior to each interview, participants were informed about the purpose of the research, the voluntary nature of participation, and their right to withdraw from the study at any point. Informed consent was obtained before the start of the interviews and before audio recordings were made. All interview data were anonymized throughout analysis to preserve the privacy of the participants. As a result, participants are referred to by interview number, rather than by their name or the name of their organisation. Only the researcher had access to the safely preserved audio recordings and transcripts. The collected data were used exclusively for the purposes of this research.

4. Results

This chapter presents the findings of both the document analysis and the semi-structured interviews and will be structured according to the multi-level perspective (MLP) and absorptive capacity framework, introduced in chapter 2. Firstly, in section 4.1, the niche-level innovations and practices are identified, covering both what was found in the document analysis, as well as the perspectives of operators across the interviews. Section 4.2 highlights the landscape level and examines the broader pressures that shape the operators' behaviour and attitudes towards food waste. Section 4.3 addresses the regime level and explores the tensions and dynamics, both institutional and operational, within the hospitality sector in Amsterdam. Finally, section 4.4 draws on absorptive capacity to explain why some operators are better positioned than others to adopt and sustain better practices surrounding food waste reduction.

4.1 Niches

As discussed in the theoretical framework, niches are not just limited to technical innovations, but may also include new organisational practices, projects, concepts, or ideas (Loorbach, 2007). Applying this understanding, the food waste reduction strategies identified through the document analysis were grouped into four categories of niche innovations: managerial practices, behavioural changes, technological services, and social networks. These categories provide the structure of the following sections. For each category, the findings from the document analysis are presented first, and then contextualized with scientific literature. These findings are then compared with the data derived from the interviews to understand how hospitality operators perceive and adopt, or not adopt, these strategies into everyday practices.

4.1.1 Managerial practices

The document analysis revealed a set of strategies commonly associated with knowledge, planning, and decision-making within hospitality businesses. Across the analyzed documents, food waste reduction was often linked to decisions like menu design, ingredient usage, purchasing, and overall inventory management (Cuperus, 2023; KHN, 2025; Samen Tegen Voedselverspilling, 2024a, 2024b, 2024c; Voermans, 2025). These strategies were typically described as methods that could be adopted internally, without needing significant technological investments or outside collaborations. Menu engineering, or menu planning, emerged as a recurring example: multiple documents described strategies to make better use of ingredients, including using multiple parts of the same product, offering variable portion sizes, and building menus around what is already available (Cuperus, 2023; KHN, 2025; Samen Tegen Voedselverspilling, 2024b, 2024c). Specifically, Cuperus (2023) described a restaurant that turned leftover bones and marrow into stock and offered both larger and smaller portions of rice. This is a small illustration of how flexibility can reduce waste further down the line. The Royal Dutch Hospitality Association (KHN) similarly recognizes menu engineering as a method for minimizing food waste, lending the practice further legitimacy within the sector (KHN, 2025). Although the practice is mostly described as being based on internal knowledge, Samen Tegen Voedselverspilling (2024c) also mentions an external organization that designs food concepts for its clients (We Design Food, 2021).

In academic literature, similar practices are detailed. Renfors (2024) also identifies menu planning as a crucial phase in food waste management, pointing to reduced menu complexity, flexible portion sizes, seasonal ingredients, and reusing the same ingredient across multiple dishes as effective levers. Monitoring and evaluation are also prominent, with several documents stressing the importance of tracking food waste and reviewing operational processes.

In the interviews, this practice also came up numerous times. Many interviewees mention using one ingredient in various ways and dishes as common practice, with two participants specifically mentioning the practice as the best method for minimizing food waste (Interview 5, 9). The applications of this practice differ even more greatly than found in the document analysis; interviewees describe separating sides from main courses to allow for sharing, carrying lunch items over to the dinner menu in a slightly altered form, using meat or fish trimmings in a tartare, utilizing vegetable leaves in salads, making broths from food scraps, or transforming vegetables nearing their expiration date into soups or stews (Interview 1, 2, 5, 6, 9, 10, 11, 13). One participant even mentioned that a product is only deemed viable if every part of a product can be used (Interview 5). Also, interestingly, none of the participants mentioned working with an external partner or service to assist with this practice. Menu engineering is, as outlined here, an internally driven process, developed in close collaboration between management and kitchen staff, and is therefore mainly dependent on the culinary expertise existing within the organization.

When combined, the findings of the document analysis, academic literature, and interviews highlight menu engineering as a particularly relevant strategy, and one that, across the interviews, emerged as the most widely embedded in daily operations. This positions the strategy as one of the more established practices within the sector.

Table 1: Managerial practices strategies and level of adoption

Strategy	Description	Interviewees' perception	Level of adoption across interviews
<i>Menu engineering/menu planning</i>	Designing menus around ingredient overlap, seasonality, and flexibility to minimize surplus	Viewed as one of the most effective ways to minimize food waste	High
<i>Ingredient usage</i>	Repurposing surplus ingredients into new dishes and using same ingredients for multiple dishes	Mentioned frequently as practical way to extend product usage	High
<i>Smaller menus</i>	Offering less varied menus to minimize surplus	Not explicitly mentioned, but seen in the greater context of menu optimization	Moderate
<i>Smaller portions</i>	Adjusting or splitting portions to better match customer demand	Not explicitly mentioned, but seen in the greater context of menu optimization	Moderate

4.1.2 Behaviour changes

A second theme emerging from the data concerns behavioural changes within hospitality organisations. Across the reviewed documents within the document analysis, employee awareness, operational routines, and day-to-day workplace practices appeared numerous times as strategies through which reduction can take place (KHN, 2025; Samen Tegen Voedselverspilling, 2024b, 2024c). Several documents highlighted the role of staff awareness and training in supporting the reduction of food waste. In addition, practices related to purchasing behaviour, stock rotation, food preservation, and storage procedures were mentioned numerous times. What unifies these measures is that they are dependent on people executing them, and they require changes in day-to-day habits and routines, rather than the introduction of new technologies.

These characteristics are similarly reported in scientific literature. Filimonau and De Coteau (2019) identify employee behaviour and organisational culture as key factors associated with food waste generation in hospitality settings. In addition, staff training programmes have been linked to measurable reduction in waste generation as awareness increases and food management practices improve (Del Pozo Loayza et al., 2026). Furthermore, operational procedures such as FIFO (First In, First Out) stock management, storage monitoring, and purchasing controls are similarly described as commonly applied food waste prevention measures (Kattiyapornpong et al., 2023; Vizzoto et al., 2021).

The importance of staff behaviour was also noted in the interviews. Operators consistently cite staff training and onboarding as key tools for reducing food waste, specifically naming accurate FIFO rotation, proper labeling, and general awareness of waste as being fundamental focus areas when training new staff. Furthermore, these practices were not just described as standalone actions, but as part of a broader effort to embed a larger sustainable awareness into the daily culture of the businesses. In addition, instilling this kind of culture right at the beginning is said to be effective, with one operator noting: ‘‘... we started it from scratch also with the current team. So here, there's a lot more thought in it. And with, like, the past experience, we already kind of have an idea how to go on about it and how to build a different culture’’ (Interview 13).

Across both the grey and scientific literature, behavioural strategies were framed less as on-off interventions and more as ongoing efforts to shape daily operational practices related to food handling, storage, purchasing, and preparation. This is further confirmed by the interview findings, with operators emphasising that behavioural change is most effective when it is embedded into the company culture.

Table 2: Behavioural changes strategies and level of adoption

Strategy	Description	Interviewees' perception	Level of adoption across interviews
<i>Staff awareness</i>	Encouraging employees to become more food waste-conscious	Considered as key tool in reducing food waste	High
<i>Staff training</i>	Teaching correct food handling, storage, and preparation techniques to staff	Seen as fundamental focus to teach when hiring new staff	High
<i>Conscious organisational culture</i>	Creating a feeling of shared responsibility within the business	Mentioned a few times, especially deemed to be important at beginning	Moderate
<i>Optimizing organisational procedures</i>	Making sure staff is aware of the optimal food handling procedures within the organisation and executes these	Is mentioned in line with training new staff to be important to have these procedures in place	High

4.1.3 Technological services

Where the previous themes centered on people and routines, the document analysis also revealed a growing number of strategies incorporating technological services aimed at reducing food waste. The majority of these technologies were associated with the collection, monitoring, and analysis of food waste data (Beks & De Innovatiegolf, 2024; Cuperus, 2023; KHN, 2026; Samen Tegen

Voedselverspilling, 2024a, 2024b; Winnow, 2025, n.d.). Several documents pointed to AI-enabled waste tracking systems that are developed by organisations such as Winnow, Orbisk, and Leanpath (Leanpath, n.d.; Samen Tegen Voedselverspilling, 2024b; Winnow, 2025). These technologies combine weighing systems, cameras, and machine learning algorithms to identify and categorise food waste. In addition to waste monitoring technologies, several documents also discussed digital tools, often powered by AI, that support inventory management, demand forecasting, and menu planning (Cuperus, 2023; KHN, 2025; Samen Tegen Voedselverspilling, 2024b, 2024c).

Similar developments are reported in scientific literature. Studies report a growing use of AI-powered waste tracking systems, capable of automatically recording food waste streams and generating reports for kitchen staff and managers (Sigala et al., 2025; Clark et al., 2025). Furthermore, research has examined predictive inventory systems, demand forecasting models, and integrated dashboards that combine data from waste tracking devices, inventory systems, and point-of-sale software (Onyeaka et al., 2025; Vukolic et al., 2025).

In the interviews, the introduction of AI to the sector was also brought up several times. However, it became clear not one dominant provider has yet emerged, and none of the participants have adopted any AI-tools into their operations. One interviewee is actively developing a tool in collaboration with an external company, but this is still in the early stages, and what this tool will look like is still unclear (Interview 12). Several other participants expressed interest in using AI-systems, but framed it as a future development, rather than a current possibility, with some expecting that perhaps their current systems will incorporate such capabilities, instead of having to invest in a separate service (Interview 1, 3, 9). The practical cost-related resistance was explicitly mentioned by one interviewee, who investigated a camera-based AI waste tracking system, but rejected it on cost grounds (Interview 11). Another, more conceptual argument raised against AI-systems was the concern that AI-driven recommendations would eventually lead to homogenized menus across the sector and would reduce culinary creativity (Interview 2).

When compared, it is clear that while the document analysis and scientific literature highlight the surge of AI-tools, in real-life practices, this is yet to be seen. While most participants were open to the use of AI-powered tools, in practice, no such tool has had a wide adoption yet. This suggests this is an area of ongoing development.

Table 3: Technological services strategies and level of adoption

Strategy	Description	Interviewees' perception	Level of adoption across interviews
<i>AI-enabled waste-tracking system</i>	AI-powered digital tools that measure and analyse food waste	Recognized as potentially valuable, but high investment costs	Low
<i>Inventory management tools</i>	Software that supports stock management and purchasing tools	Most operators possess inventory tracking tools, or still do it manually, think new developments in this need to be integrated in current systems	Moderate
<i>AI demand forecasting</i>	AI used to predict demand and optimize purchasing	Seen more as a future development, not implemented yet	Low

<i>Integrated dashboards</i>	AI-system that integrates all organisation data into one dashboard	Also seen as a future development	Low
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4.1.4 Social networks

The final theme identified concerns social networks and collaborative initiatives. Unlike the previous themes, which focused more on practical implementations within hospitality organisations, this category includes strategies that involve more continuous interaction with external actors. Across the reviewed documents, food waste reduction could also take shape through social initiatives, which involve more active collaboration between hospitality businesses, local governments, community organisations, and food redistribution initiatives.

One such example in grey literature is The Food Strategy Implementation Agenda 2023–2026 of the Municipality of Amsterdam, which highlights actions such as strengthening local initiatives, facilitating experimentation, supporting food redistribution, and promoting collaboration between actors within the food system (Uitvoeringsagenda Voedselstrategie 2023-2026 Aangepast, 2023). A similar idea is reflected in local initiatives such as *Van Amsterdamse Bodem*, a platform that connects organisations working towards a more sustainable food system in Amsterdam (Van Amsterdamse Bodem, 2026). This initiative was established through cooperation between governmental, academic, and civil society organisations, and aims to facilitate knowledge sharing and collaboration surrounding food-related sustainability issues. Other documents referred to initiatives focused specifically on the redistribution of surplus food, including partnerships with local food banks, charitable organisations, and digital platforms that connect businesses with consumers or organisations that can make use of the surplus food (Ciulli et al., 2019; De Gezonde Stad, 2026; Duijvestein et al., 2025; Mulder et al., 2020; Stil, 2021; Too Good To Go, 2025). These initiatives were generally presented as alternatives to disposal, thus extending the use of food that might otherwise be discarded.

Similar approaches are described in scientific literature. Filimonau and De Coteau (2019) identify collaboration and food redistribution as commonly discussed food waste reduction strategies within the hospitality sector. Zhao et al. (2022) further describe social innovation initiatives as mechanisms through which organisations, communities, and other actors collectively address food waste challenges. Research on grassroots innovations similarly highlights the role of networks and community-based initiatives in supporting the development and diffusion of sustainability-oriented practices (Seyfang & Haxeltine, 2012).

Across the interviews, a social innovation that came up several times was Too Good To Go (TGTG), a redistribution platform and app that lets users buy surplus food from restaurants, bakeries, supermarkets, and cafés at a discounted price to combat food waste (Too Good To Go, 2025). Within the interviews, the platform generated varied responses, ranging from successful adoption to active rejection. Two participants mentioned a full adoption of the service, although in these adoptions, there is also a nuance (Interview 6, 13). One participant mentioned little effort in adopting, since they introduced it only a few months after opening, and so the change required less adjustment (Interview 13). The other participant did experience some adjusting, with employees having to work a bit longer to prepare the packages, and having to change behaviours throughout the day (Interview 6). Now, they say, they have found a rhythm with it and usually are able to prepare the packages at the same time as closing the kitchen. What helps in both these instances is that the staff finds it important as well. This extra time and effort

experienced is the reason why some choose not to partake in the service, stating, “*...it ends up being too much work for your business, because, for instance, if those packages have to be put together and someone has to work late as a result, then participating in something like that actually costs us money.*” (Interview 11). Others have wildly different reasons, with one participant stating that when TGTG contacted them, they responded “*Actually, our food wastage is so low that I can't even work with you*” (Interview 12). TGTG’s model assumes a predictability and surplus that not all operations have. Furthermore, whether the service is viable has less to do with the willingness of the operator and more with whether the operational context, which includes staff capacity, surplus volume, and closing times, aligns with the platform requirements.

Redistribution of surplus food through more local initiatives was also discussed several times, though none of the operators interviewed had yet managed to establish a successful partnership of this kind. One participant described an attempt to collaborate with the nearby Leger Des Heils location, a nonprofit organisation that provides food and shelter to people in need, but the collaboration could not materialise because the organisation could not accept the food that had already been processed (Interview 3). Two other participants described potential partnerships with local farmers, imagining a system in which organic food scraps could be collected by cargo bikes and be directly donated (Interview 1, 11). In addition, one interviewee even mentioned that at one of their locations, a chef takes home vegetable scraps to feed his pet rabbits (Interview 1). These examples suggest an appeal among operators for such local redistribution channels, but no established pathways or infrastructure have developed yet to realize this appeal.

Across the grey and scientific literature, social networks were described as facilitating collaboration, knowledge exchange, and the redistribution of surplus food. Yet where the literature frames this potential as on the horizon, the interviews reveal that realizing it depends strongly on operational fit and the presence of functioning infrastructure, both of which were frequently found lacking in practice.

Table 4: Social networks strategies and level of adoption

Strategy	Description	Interviewees’ perception	Level of adoption across interviews
<i>Redistribution through digital platforms like TGTG</i>	Digital platform redistributing surplus food to consumers	Varied experiences: some fully embraced the platform, while others deemed it incompatible	Moderate
<i>Redistribution through local food banks</i>	Collaboration with food banks or other charitable partnerships	Viewed positively, but practical constraints prevent implementation	Low
<i>Food-waste related collaboration</i>	Partnerships with local farms or community organisations to reuse food waste	Operators expressed interest, but limited existing opportunities	Low
<i>Knowledge sharing platforms</i>	Formal networks that exchange information	Formal knowledge sharing platforms were not widely mentioned	Low

4.2 Landscape changes

The niche analysis in the previous section mapped out the range of practices available to hospitality operators. Yet, the existence of these practices alone does not explain why operators do, or do not, engage with them. To understand that, it is first necessary to consider the broader landscape conditions that form the context in which the operators work. These macro-level developments that emerged from the interviews will be described below.

Across the interviews, a clear picture emerged of the broader economic context in which independent hospitality businesses are currently working: one that is characterized by rising purchasing costs, increased wages, and growing energy bills. Rather than environmental concerns, it is therefore this financial pressure that has most directly shaped how operators think about, and act on food waste. *“Food waste is simply money you throw away.”* stated one interviewee briefly (Interview 4). This sentiment was expressed by many different types of establishments, from brown cafés to fast-casual concepts to full-service restaurants. One interviewee stated their waste has gone down significantly since prices have increased (Interview 1). The alignment between financial incentives and environmental outcomes is not equally visible to all participants. Those who recognize the link understand food waste as a part of their broader financial picture and therefore tend to rank it as a high priority, while those who have not made the connection view food waste in its broader sustainable concept and therefore rank it well below other priorities, such as profit and efficiency. However, as one interviewee pointed out: *“If you are more conscious of the environment or the waste you generate, you also become more conscious of your purchasing—which benefits your margins. Conversely, even if people aren't focused on the environment or the waste they leave behind, but are instead intensely focused on the numbers, the result is often still better for the environment. So, fortunately, the two go hand in hand.”* (Interview 5).

In practice, this link between costs and food waste mainly manifests itself in day-to-day operations, such as awareness, behaviour, and decision-making. Actions such as ordering tightly, labelling correctly, and maintaining limited stock are considered essential. Some participants stated they prefer a degree of exclusivity around more expensive items, as one interviewee explains: *“Every evening we have 20 steaks in the house, maybe 25. If they're gone, they're gone. But we don't keep 100 in stock.”* (Interview 9). This sentiment is shared by another participant, who argues that running out of an item doesn't mean it was ordered poorly, it simply means it was a busy night (interview 2).

To create a financial incentive not just for them as entrepreneurs, but for some of their higher-ups as well, two interviewees explicitly mentioned a bonus system they had in place, where their head chef or manager would get a bonus at the end of each month if their waste is below a certain percentage (Interview 3, 12). Furthermore, many interviewees attempt to bring about this cost-conscious mindset beyond just management. A number of operators talk about actively trying to impart this consciousness to their part-time employees as well, educating them about the fact that food waste is money spent and that what is taken or used in the kitchen without tracking it directly affects the business (Interview 4, 9). What's noteworthy is that some operators mentioned this effort seems to be getting easier over time (Interview 2, 6, 8, 9), with them commenting that younger employees are typically more conscious of consumption and waste, not because of cost awareness, but because of intrinsic values regarding sustainability. For some, this has reduced the level of effort put into staff training, with one participant even speculating that in the future, this generational shift could bring a greater awareness of sustainability in the workforce (Interview 2).

4.3 Friction within the regime

While landscape-level pressures are pushing operators toward more waste-conscious behavior, the regime within which they operate plays a more ambiguous role. Rather than working as a coherent system that either supports or constrains food waste reduction, the regime simultaneously incorporates features that encourage more sustainable practice with elements that structurally cause waste, often independent of user intent or motivation. It is essential to comprehend this paradox in order to explain why the sector's progress is still uneven.

4.3.1 One champion vs. old routines

Within company culture and organizational routines, two competing forces are at work. Several interviewees highlight that embedding waste awareness into the company culture and training staff are among some of the best strategies to reduce food waste. In particular, having a committed person within the kitchen team who pays close attention to detail is said to be especially beneficial (Interview 5, 8, 13). When asked what the single biggest factor in reducing food waste is, one interviewee stated simply: *“Having a good chef who cares about it.”* (Interview 13). Established businesses may, however, grow resistant to change. The high-stress environment of a professional kitchen leads to more mistakes being made, and staff can develop routines that become difficult to shift (Interview 1, 2, 5, 9, 11, 13). This, for instance, becomes evident when ordering behavior fails to reflect seasonal variations. Even when demand declines, chefs still used to busy times maintain the same ordering quantities. According to one operator, *“Every year, I have to go to them and say: listen, look at the reservations — it's going to be less busy, so order less. I have to remind them.”* (Interview 1). These two forces can even exist within the same organization, and how one navigates these determines how well waste is managed at the operational level.

4.3.2 Daily deliveries and minimum order quantities

Regime friction is also evident within external factors, such as the relationship with suppliers. On the one hand, deliveries have become more frequent than ever before. Some suppliers, especially those handling fresh produce, are delivering six days a week, allowing operators to order smaller quantities with greater precision. One interviewee even mentioned that Makro, a large foodservice wholesaler in the Netherlands, delivers seven days a week (Interview 4). This is in stark contrast to another interviewee, who reflected that before 2009, most suppliers had a ‘self-service model’, meaning hospitality entrepreneurs had to collect the orders themselves (Interview 10). This increased frequency of delivery directly reduces the need to hold large buffer stocks, making it easier to align ordering with actual demand and thus, create less waste (Interview 4, 6, 9, 11, 12). However, on the other hand, some suppliers, especially those who deal in things like meat and fish, have introduced a minimum order threshold (Interview 1, 3, 7). One interviewee even mentioned this as one of their biggest challenges when reducing food waste, stating: *If things are a bit quiet for two days, I might easily end up having to throw a lot away.* (Interview 3). Together, these two developments highlight a tension in supplier relationships that is difficult to resolve at the operator level: while more frequent deliveries have made precise ordering more attainable, minimum order requirements reintroduce a degree of surplus that operators must then still manage themselves.

4.3.3 HACCP as a discipline and as a waste generator

Labeling discipline, temperature monitoring, and FIFO (First In, First Out) rotation are not just recommended practices, they are required rules under HACCP (Hazard Analysis and Critical Control Points), the food safety system that governs professional kitchens (NVWA, 2026). These requirements provide overview and can reduce food waste, but can also cause rigidity. Cooling and reheating rules are particularly cited as a source of criticism, with one interviewee stating simply, *‘I mean... I would still eat it’* (Interview 3). In practice, operators sometimes find a partial workaround by preparing food that can no longer be served to customers as staff meals instead. However, in some cases, this is not possible. One participant mentioned that due to these reheating rules, they are forced to discard approximately six kilograms of grains (e.g. rice, quinoa, bulgur, etc.) across their two locations each day (Interview 11). This strictness surrounding food safety seems to contradict national consumer guidelines to ‘trust your senses’ and produce less food waste (Samen Tegen Voedselverspilling, 2024c). *‘We are suffocating in our own rules’*, said one interviewee (Interview 10).

4.3.4 Waste separation

Unlike the tensions described above, the separation of organic waste presents a more straightforward gap: the willingness is often there, but the infrastructure is lacking. Currently, operators are only required to separate paper, glass, and residual waste, but organic waste or plastic is not mandated. While a few participants admitted they would only separate waste when financially incentivised, i.e., with a fine (Interview 7, 13), most interviewees said they would separate organic waste if it became facilitated, suggesting that motivation is not the limiting factor. One participant has even been actively lobbying with their business association to get better organic waste infrastructure in their area for over a decade, but with no luck (Interview 10). An exception to current regulations was one interviewee, who, as a condition of their lease, was required to work with a circular waste processor (Interview 5). They mention that while at the start it took some adjusting, the arrangement works well. This suggests that when an external obligation creates a new pathway, operators are happy to adapt.

4.4 The capacity to change

In the preceding sections, the current conditions for food waste reduction at the niche, landscape, and regime levels have been established. The landscape analysis showed that financial pressure is a key factor for more waste-conscious behaviour, while the regime analysis revealed that waste-reducing behaviour is simultaneously supported and constrained by things like organisational culture, supplier relations, food safety regulations, and city-wide waste infrastructure. The niche breakdown showed that a range of practices and tools do exist, but their adoption is not yet uniform. However, what the MLP framework does not account for, is why some operators are more capable to navigate these conditions than others. This variation can be analyzed through absorptive capacity as explained in the theoretical framework. More importantly, a high PACAP does not automatically result in a high RACAP: an entrepreneur may be well-informed and open to applying change, but still fail to translate this knowledge into action. In the context of this research, PACAP captures the extent to which operators are exposed to and knowledgeable about food waste reduction practices, while RACAP describes the degree to which this knowledge is actually put into practice.

4.4.1 - Potential Absorptive Capacity

At the level of potential absorptive capacity, one of the enabling conditions that gets mentioned numerous times is experience. Most participants have been active within the sector for a considerable number of years, and they describe their accumulated knowledge as their most reliable tool (Interview 1, 2, 3, 5, 6, 9, 10). Through this experience, they know the ins and outs of their operations, the best way to use products, the most effective way to communicate with staff, and the seasonal shift in demand. More specifically, one operator that hasn't been active in the field for long, names it as one of their biggest downfalls, saying: "...yeah, I don't really think there are all that many advantages to being young." (Interview 11). Besides experience, another enabling condition is the peer network. When asked, several participants explained a certain level of information sharing within a network of other hospitality entrepreneurs, whether on suppliers, best practices, regulations, or innovations (Interview 1, 2, 3, 5, 9, 11). These peer networks act as an additional source of external knowledge. This information is mostly shared informally in group chats, but this does point to the possibility of new developments reaching operators, even without a formal knowledge-sharing infrastructure.

However, access to relevant knowledge remains uneven. A recurring observation is that operators often have a sense of what they would like to do differently, but lack the clarity on how to act on it. For instance, several participants expressed enthusiasm to collaborate with social initiatives, such as urban farms or food redistribution networks, however, they described having little knowledge of what actually exists and how such an arrangement would work in practice (Interview 1, 3, 10, 11). A similar experience was shared by another interviewee, who mentioned that they felt they had reached a ceiling, explaining that they had implemented the measures they were aware of but were uncertain about what other possibilities existed (Interview 5). This gap, between general orientation toward change, and the specific knowledge needed to realize this change, is a characteristic of a high PACAP but a low RACAP.

4.4.2 Realized Absorptive Capacity

Despite most operators having some form of potential absorptive capacity, the realized capacity across the interviews remains relatively low. While knowledge, knowledge sharing, and willingness exist, the transformation of this knowledge into practice largely depends on whether new approaches can fit into the operational reality of these businesses.

One important barrier is the effort threshold. Even when operators are aware of a new tool or practice, its adoption is dependent on the possibility of integrating it without considerable effort. One interviewee stated candidly: "*It shouldn't cost me any effort*" (interview 7). This shows the operational reality of running a high-stress business with limited personnel and tight margins, where the capacity to take on new practices can feel constrained. Financial constraints function in a similar way: several operators can identify investments that would likely reduce waste, but cannot justify the costs needed, given the current margins, resulting in knowledge without the ability to act on it (Interview 8, 11). Contributing to this is a broader attitude, present across several interviews, that a certain degree of waste is unavoidable. "*Yes, I definitely think it's important. It's just that the tricky part is—well, unfortunately—that it's somewhat part of the job in the hospitality industry.*", answered one interviewee when asked about the importance of food waste reduction (Interview 8). Where this perception is present, changes are less likely to be pursued, as the operators do not expect them to make a significant difference. Together, these factors, effort, costs, and attitude, explain why PACAP has not always translated into a more widespread RACAP.

The distinction between those with a lower and those with a comparatively higher RACAP is the degree to which waste awareness was embedded in the company culture and the presence of individuals who actively carry it out. Where this was the case, the knowledge that exists at the managerial level is more consistently translated into daily operational practice, and new tools or operations are more likely to be tried and sustained. As one operator put it: *“I am in favour of renewal and innovation, I think that is the only way to survive as an entrepreneur”* (Interview 9).

Overall, these findings show that while a wide range of food waste reduction practices are present in the hospitality sector in Amsterdam, their adoption and implementation remain uneven. The findings also point to a number of organizational factors that affect how much these practices are implemented in day-to-day operations. Building on these results, the next chapter examines the implications of these patterns for the hospitality sector as a whole and what they can imply for the further uptake of food waste reduction practices.

5. Discussion

This research set out to understand why food waste reduction strategies in the Amsterdam hospitality sector are not more widely adopted by the hospitality actors, despite the range of solutions already available. The results show four distinct niche categories: managerial strategies, behavioural changes, technological services, and social networks. The research found uneven adoption of these strategies. Furthermore, on the landscape level, the research found that financial pressure leads to more cost-conscious behaviour. On the regime level, it found a regime that simultaneously enables and constrains food waste reduction practices. Finally, the degree to which individual operators manage to adopt these niches into practice differs according to their absorptive capacity, particularly their realized capacity to act on what they already know. Together, these findings speak on the gap identified in the introduction: the persistence of food waste in the sector is not just a matter of missing solutions, but also on how the existing solutions interact with the structural, financial, and organisational conditions within the regime. The following sections interpret these results in more depth, trying to give an accurate reasoning for the uneven adoption of the niche solutions, before turning to the limitations of this study and the directions for future research.

5.1 Niche analysis

The four niche categories identified in the results section can be positioned along two axes that together reveal something about why some practices are more widely adopted than others. As shown in Figure 3, the horizontal axis distinguishes between strategies that are more technical in nature and those that depend on social interaction, while the vertical axis differentiates between practices that are implemented within the organisation and those that require collaboration with external actors.

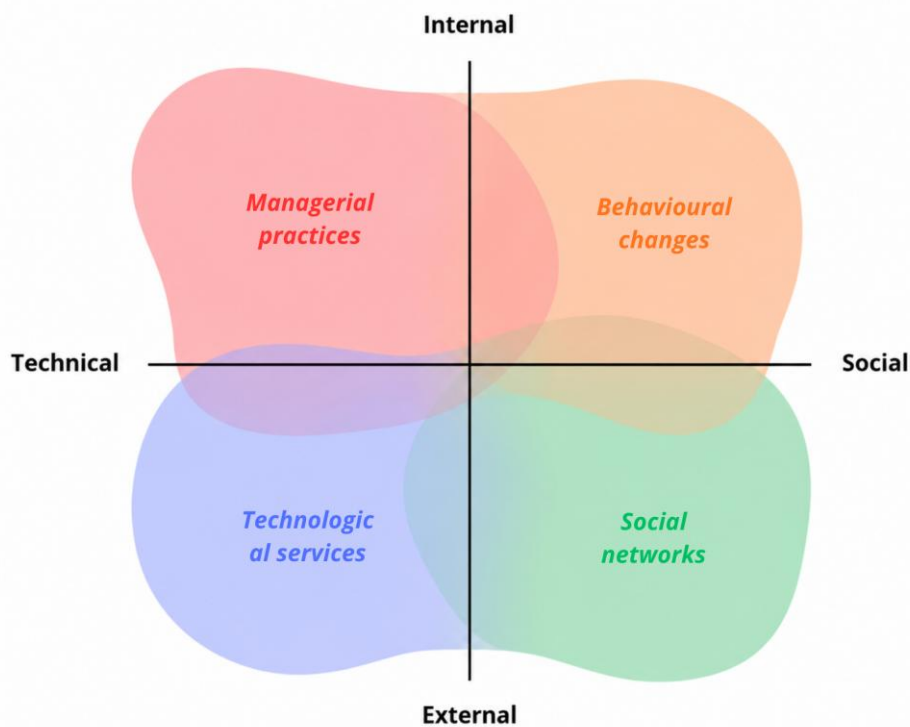


Figure 3: The four niche categories against the two main dimensions identified in this thesis

Managerial practices are in the internal-technical quadrant. They are knowledge-intensive and are predominantly executed by operators and head-chefs, based on the accumulated experience and culinary expertise. The interviews showed that operators typically don't include external parties in decisions regarding menu design or purchasing strategy; these are considered core competencies that are managed from within, and rely on the knowledge already present in the organisation, rather than seeking advice from the outside.

Behavioural changes occupy the internal-social quadrant. They are also internally driven, however, the effectiveness is not based on technical tools, but instead on the culture that exists in a team. The importance of food waste at the management level, tends to trickle down into daily practice. Where it is a priority, staff tends to act accordingly, and where it is not, the indifference is reflected in the kitchen. It is less about the systems, and more about the shared norms and habits that go into how a team operates day to day.

Technological services fall into the external-technical quadrant. They tend to focus on a service or system that is built and maintained by an external party, whether it be a digital inventory tool or a waste monitoring platform. Being external, adoption is not just a financial investment, but also requires a level of understanding of what the technology can offer long-term.

Finally, social networks are in the external-social quadrant. They are not tools or internal routines, but strategies based on relationships and partnerships outside the organisation, with platforms like Too Good To Go (TGTG) or with broader food system initiatives. As the varied responses to TGTG in the interviews, however, illustrated, the effectiveness depends on how well the demands and structure of the initiative match the operational reality of the individual business.

An important consideration, as also shown in Figure 3, is that the dimensions given to these categories shouldn't be seen as rigid or mutually exclusive. Instead, in real-world situations, they often tend to overlap. Behavioural change can originate from managerial decisions, managers or operators need to choose to implement external services, and the adoption of technological services can raise awareness of food waste and can cause behavioural change. So, even though the categories are separated to aid in interpretation, the interconnectedness of these topics illustrates the complexity of reducing food waste in practice. But, simultaneously, placing the categories along the internal-external and technical-social dimensions can provide a useful framework to identify the type of support or intervention required to further promote their adoption.

5.2 The internal-external divide

What stands out across the results is that the internal quadrants are more widely adopted than the external ones. The level of adoption is shown in Figure 4 below. Rather than treating this as a single observation, this inequality can be traced through each layer of the conceptual framework: how the landscape pressure is felt, how the regime responds, and how absorptive capacity gets developed. In particular, the distinction that is made between potential and realized absorptive capacity, as explained by Zahra and George (2002), helps explain why some niches have progressed further into the regime than others. This will be further explained in the sections below.

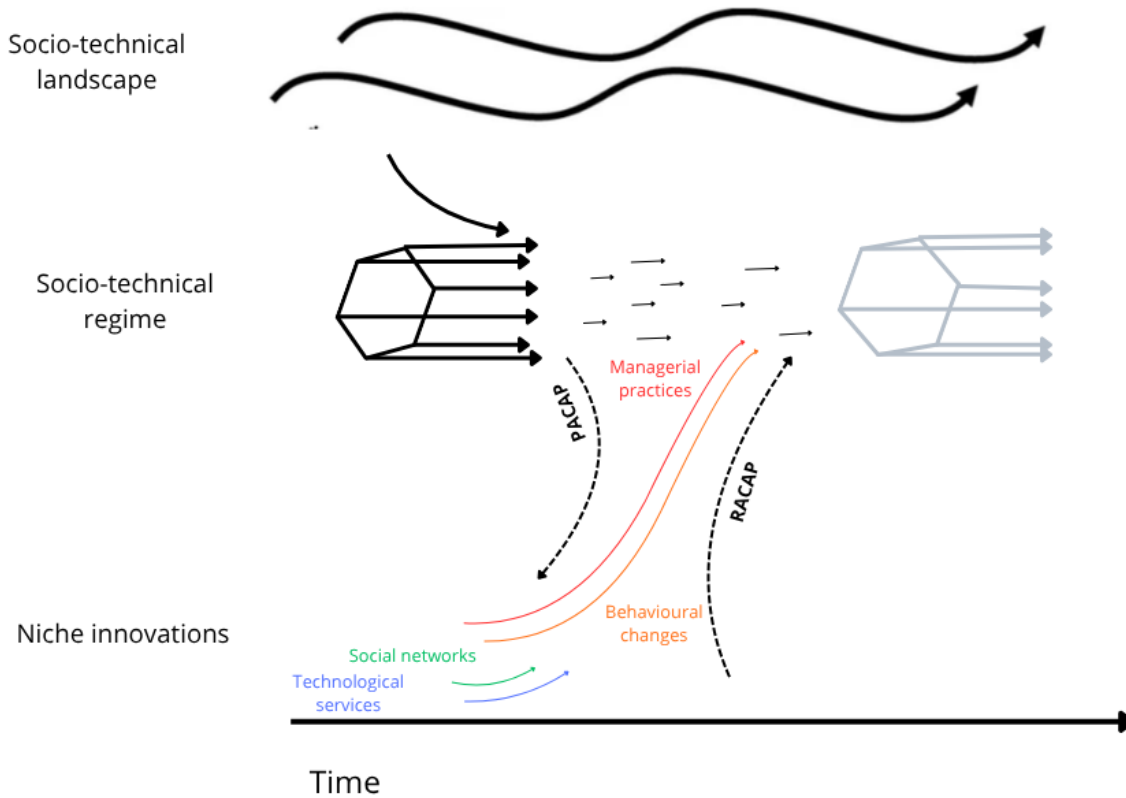


Figure 4: Visualization of the asymmetry of the adoption of the different categories within the framework

The financial pressure at the landscape level has pushed operators to look inward: when margins become tighter, it is a natural first response to optimize existing processes before considering external solutions. In this sense, it seems the financial pressure at the landscape level has turned these operational improvements into financial imperatives. As a result, practices such as menu engineering and precise ordering, which were deemed internal niches, have become very broadly embedded and can hardly be considered niches anymore. They have, in fact, been largely integrated into the operational standard at the regime level. This same financial pressure works against the external dimension. Technological services typically require a significant upfront investment, so, under tight margins, some operators struggle to justify this kind of investment, as mentioned in section 4.1.3. In this sense, the landscape pressure that normalizes internal practices, simultaneously holds off external ones.

This disconnect further continues at the regime level. As stated in the section before and as shown in Figure 4, both internal categories have been absorbed as a somewhat operational standard at the regime level. Managerial practices, such as menu engineering and precise ordering, have become thoroughly integrated into daily decision-making and standard operating procedure, while behavioural changes have become embedded as an everyday norm within some kitchen cultures. But, this is also what leaves the operators with the sense that they have reached a ceiling with what can be achieved from within, as mentioned by one operator in section 4.2.1. Part of this perceived ceiling can be explained by the belief, which is also raised in section 4.2.2, that a certain level of food waste is unavoidable in hospitality operations. This then diminishes the further pursuit of changing the system. In this sense, these findings complement those of Nand et al. (2025), who describe the normalization of food waste within the hospitality sector by suggesting that this normalization may also limit the further exploration of niches outside the regime.

Crucially, this normalization also affects the external dimension: because operators feel they have little more to gain from further effort, they also become less motivated to look for solutions elsewhere. Yet, this reduced motivation is only part of the picture. The regime itself also forms an obstacle. This manifests concretely in the lack of awareness and the effort threshold, as already outlined in section 4.2.2. Engaging with external niches means looking beyond the immediate network, towards initiatives or tools operators may not even know exist, and then adjusting the existing operations to accommodate them once they do: this requires a higher absorptive capacity than sustaining what is already familiar. The effort barrier is illustrated in the results by the cases of AI-based tools and TGTG. Some operators stated that they were waiting for AI-based tools to be introduced in their existing systems, rather than actively looking for what is already available elsewhere. Similarly, some operators chose not to adopt TGTG, not out of disinterest, but because doing so would require behavioural changes that sit outside their current operational behaviour. The awareness barrier was already illustrated in the results by the lack of knowledge regarding social initiatives, and a similar gap can be pointed out within the willingness to separate waste, yet little knowledge exists of what partners or arrangements could make this possible.

These two barriers appear to reinforce one another. The same experience and opportunity that allows operators to master the internal practices, also seems to narrow their frame of reference: the more fluent and confident operators become within their own operations, the less inclined they appear to look beyond this. This creates something of a bubble, in which the combination of the internal success, the lack of awareness, the effort threshold, and the belief that a certain level of food waste is simply unavoidable culminates and helps explain why so many external tools, platforms, and partnerships remain out of sight. These barriers also illustrate why the absorptive capacity for the external niches remains low. As explained in section 2.2 of the theoretical framework, Zahra and George (2002) ascribe acquisition and assimilation of external knowledge to a potential absorptive capacity, while transformation and exploitation are assigned to realized absorptive capacity. The findings suggest that while hospitality operators do have some degree of acquisition in relation to external niches, but the barriers appear to be too high to develop an understanding of how their business could assimilate this knowledge. Since this assimilation is absent, the subsequent steps required to develop realized absorptive capacity, transformation and exploitation, are also missing. Therefore, as is illustrated in Figure 4, the external niches remain at the niche level.

Taken together, these findings suggest that bridging the gap between internal and external niche adoption will require intervention on both sides of the divide: not only lowering the threshold for external engagement through efforts of regime-level actors such as the municipality or the KHN, but operators' own inward focus needs to be addressed as well. It's not enough to make operators aware of external options, they also need a reason to engage with them.

5.3 Implications

The findings of this research show both theoretical and practical implications in understanding food waste reduction practices in the hospitality sector in Amsterdam. First, this research expands the categorization of food waste reduction strategies by identifying four different types of niche innovations: managerial practices, behavioural changes, technological services, and social networks. Although many of these practices have been studied in the past, this classification, together with the dimensions of internal-external and technical-social, provides a more nuanced view of why some

practices are implemented more easily than others. The results suggest that different categories need different types of organizational learning and external support before they can be embedded into the regime, rather than viewing food waste reduction strategies as one singular, interchangeable group of interventions.

Furthermore, this study contributes to the literature of sustainability transitions by showing that the successful diffusion of food waste reduction practices is not only a matter of the availability of niche innovations. Rather, the results show the importance of the realized absorptive capacity of the hospitality operators when transforming the awareness of opportunities or practices into implementations. While many operators expressed a willingness to adopt food waste reduction strategies, they often lacked the knowledge or organizational capacity to translate this intent into action. This indicates that the barrier does not only lie in the acquisition of knowledge, but also in the assimilation of this knowledge into an understanding of how these opportunities can be applied within the existing operations. This shows that absorptive capacity can be a useful supplement in the MLP framework, as it explains that different hospitality businesses in similar positions within the same regime can differ in their adoption of niche innovations.

Finally, from a practical perspective, the findings indicate that the increasing amount of food waste reduction initiatives alone will most likely not lead to widespread adoption. Therefore, more focus should be given to reducing the effort for hospitality businesses to engage with external initiatives and organisations. The findings also suggest that regime-level actors, such as the municipality and KHN could play an important role in facilitating this process by improving knowledge exchange, and creating more supportive infrastructure to actively connect hospitality operators to existing initiatives. This could entail organizing knowledge-sharing or co-creation sessions, as well as establishing more channels that allow for two-way communication between different regime actors and hospitality business operators. Another option could be to create a programme similar to the No Waste 020 Challenge, but with a greater focus on the social networks side. Such structures could help bridge the gap between the available niche innovations and their relatively limited uptake in everyday hospitality practice, but further research is required.

5.4 Limitations

There are several limitations that should be considered when interpreting the findings of this study. Firstly, the relatively small sample size limits the generalizability of the results. Despite the attempts made to include a wide variety of restaurants for this research, the hospitality sector in Amsterdam is highly heterogeneous, with a large variety of restaurant types, cuisines and business models. Consequently, some views and experiences may have been missed. This limitation is further reinforced by the recruitment strategy, which mostly used the researcher's own network, since these contacts were more readily available than contacts outside of it. While this made recruitment more feasible within the timeframe of the research, it likely introduced some selection bias because the sample might over-present types of restaurants, networks, or operator attitudes, rather than accurately representing the sector's diversity.

Furthermore, the use of the Dutch terms *voedselverspilling* and *voedselafval* during the interviews may have introduced some variation. Both refer to food waste, but *voedselverspilling* generally means avoidable food waste, while *voedselafval* is the broader term which also includes unavoidable food

scraps. As these terms were not used in a completely consistent manner throughout the interviews, it is possible that participants interpreted and reported their food waste practices somewhat differently at times.

In addition, the study primarily reflects the perspectives of the regime actors, as the interviews were conducted among restaurant owners and operators. While this is in line with the research focus, it also means the perspectives of other relevant actors, such as policy makers, municipal representatives, industry organisations, and niche actors developing food waste innovations, were not explored to the same extent. Including these stakeholders could have provided a more comprehensive understanding of the barriers and opportunities for regime change.

Finally, the time constraints of this research limited both the scope of data collection, and the opportunity for more extensive engagement with participants and additional stakeholder groups. Despite these limitations, the findings provide valuable insights into the barriers to food waste reduction in the hospitality sector in Amsterdam, and offer a foundation for future research that incorporates a broader range of actors with a larger and more diverse sample.

5.5 Recommendations for future research

Several directions can be taken for future research. First, research with a broader sample size could provide further insights into the extent to which the identified barriers and practices are shared across the hospitality sector, or are specific to particular business models. A larger sample would provide an opportunity to compare different types of regime actors such as fine dining restaurants, fast-casual concepts and other segments of the hospitality industry, to determine whether specific challenges are industry-wide or context-specific. Secondly, future research could further explore the perspectives of niche actors, in particular the social external actors. These actors appeared to be perceived as interesting and potentially valuable by restaurant operators, yet their role in enabling food waste reduction within the local context remains underexplored. Since social niches are often highly dependent on the regional network, research focusing on the Amsterdam or Dutch sector could provide valuable insights into how these actors interact with regime actors and what enables or constrains collaboration. While technological external niches also remain underadopted in the Amsterdam hospitality sector, these technologies have received considerable attention in existing academic research and are often less dependent on a specific local context, thus this research is more generalisable across settings. Further research into the social external niches could highlight the importance of context-specific collaborations in sustainability transitions. Finally, future research could examine the applicability of the conceptual framework of this research: the combination of the MLP with absorptive capacity. Applying this framework in different sectors or contexts could provide insight into whether absorptive capacity can offer a useful explanation for differences in how niche innovations are taken up and integrated into existing regimes.

6. Conclusion

This research set out to answer the following research questions:

What strategies aimed at reducing food waste are currently implemented in the Amsterdam hospitality sector, and to what extent have individual hospitality businesses adopted these strategies?

What internal and external factors enable or hinder the adoption of these strategies?

Rather than treating the persistence of food waste as a problem of missing solutions, this thesis approached it as a systemic issue, where the interaction between the available strategies and the sectors' existing structures would determine whether the reduction efforts would be implemented in everyday practices.

The findings show that adoption of strategies is uneven, and beyond this, that this unevenness follows a pattern. Strategies that are internally driven, such as menu engineering and behavioural changes among staff, have become well-integrated into daily operations, even to the point that they can hardly be considered niche practices. External strategies, such as technological services and social partnerships, however, remain less integrated. This research explains this gap through the interaction of the multi-level perspective (MLP) and absorptive capacity. At the landscape level, rather than increased sustainability concern, financial pressure has pushed operators towards more waste-conscious behaviour. This financial pressure is handled internally, since these practices can be seen as more within reach than external ones. At the regime level, the sector does not act as a uniform barrier or enabler: organisational culture, supplier relations, food safety regulation, and waste infrastructure can simultaneously support and constrain food waste reduction efforts, and this is often simply dependent on an individual operator's intentions. This ambiguity helps explain why progress in the sector remains partial rather than absent.

Furthermore, absorptive capacity adds a layer to this explanation by also accounting for variation between operators who face similar landscape and regime conditions. For internal practices, most operators have built up a strong potential absorptive capacity over years of experience, supplemented by informal peer networks, and this knowledge is consistently realized into daily practice. For external niches, however, the picture is different: potential absorptive capacity itself is already limited, since operators are rarely exposed to what exists beyond their immediate network, and even where a general openness to external collaboration is present, it is not backed by concrete knowledge of how such arrangements would work. On top of this already limited awareness, an effort threshold further discourages adoption unless a practice is nearly frictionless, and, for some operators, an underlying belief that a certain level of food waste is simply unavoidable in hospitality work reduces the perceived value of pursuing external options altogether. Together, these factors help explain why the sector has reached what this thesis describes as a ceiling: operators have optimized what can be changed from within, while what lies beyond the organisation remains largely out of sight and, consequently, out of reach.

Taken together, these findings suggest that the persistence of food waste in the Amsterdam hospitality sector is best understood not as a lack of willingness or available solutions, but as a compounding gap between limited awareness of external strategies and the internal capacity or incentive operators have to pursue them once known. Addressing this will likely require more than the continued introduction of

new tools or initiatives, since operators cannot be expected to adopt what they do not know exists. It calls for regime-level actors, such as the municipality and the KHN, to actively surface and connect operators to external niches, for instance, through improved knowledge exchange and more visible, accessible infrastructure, rather than assuming awareness will spread on its own. Without such support, the sector risks remaining in its current position: having exhausted much of what can be achieved from within, while the possibilities that lie beyond the organisation stay largely unseen.

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Appendix A: Interviews

1. Interview questions

Understanding current practices

How does your business currently handle food waste?	Hoe gaat uw bedrijf momenteel om met voedsel afval?
Are there currently strategies or practices in place to reduce food waste? If so, what?	Zijn er momenteel strategieën of praktijken om voedselverspilling te verminderen? En zo ja, welke?
How are these practices implemented in day-to-day operations?	Hoe worden deze praktijken in de dagelijkse bedrijfsvoering toegepast?
How important is food waste reduction for your business compared to other priorities (e.g., cost, efficiency, sustainability)?	Hoe belangrijk is het verminderen van voedselverspilling voor uw bedrijf in vergelijking met andere prioriteiten (bijv. kosten, efficiëntie, duurzaamheid)?
Have your food waste practices changed in recent years? If yes, what triggered those changes?	Zijn praktijken rondom voedselverspilling de afgelopen jaren veranderd binnen uw bedrijf? Zo ja, wat heeft deze veranderingen veroorzaakt?

Assessing barriers to adopt:

<i>Internal barriers</i>	What challenges do you face when trying to reduce food waste within your business?	Tegen welke uitdagingen loopt u aan bij het verminderen van voedselverspilling binnen uw bedrijf?
<i>Internal barriers</i>	Are there organizational routines, habits, or constraints that make change difficult?	Zijn er huidige organisatorische gewoontes die verandering moeilijk maken?
<i>Resource constraints</i>	Do time, cost, or staff capacity or other resources affect your ability to implement food waste reduction strategies?	Hebben tijd, kosten of personeelscapaciteit of andere middelen invloed op uw vermogen om strategieën voor voedselverspilling te implementeren?
<i>External barriers</i>	Are there external factors (e.g., regulations, suppliers, customer expectations) that limit what you can do?	Zijn er externe factoren (bijv. regelgeving, leveranciers, klantverwachtingen) die beperken wat u kunt doen?

Assessing potential opportunities to adopt:

What has helped your business successfully reduce food waste so far?	Wat heeft uw bedrijf tot nu toe geholpen om voedselverspilling succesvol te verminderen?
Are there specific skills, knowledge, or routines that support these efforts?	Zijn er specifieke vaardigheden, kennis of routines die deze inspanningen ondersteunen?
Have you tried any new or innovative approaches to reducing food waste?	Heeft u nieuwe of innovatieve methodes geprobeerd om voedselverspilling te verminderen?
What made it easier or harder to experiment with these approaches?	Wat maakte het makkelijker of juist moeilijker om met deze aanpakken te experimenteren?

Future outlook:

What do you think would need to change for your business to significantly reduce food waste?	Wat zou er volgens u moeten veranderen om voedselverspilling binnen uw bedrijf aanzienlijk te verminderen?
Are there solutions you would like to adopt in the future but currently cannot? Why?	Zijn er oplossingen die u in de toekomst zou willen toepassen, maar momenteel niet kunt? Waarom?
How do you see food waste practices in your sector evolving in the next 10 years?	Hoe ziet u de ontwikkeling van voedselverspillingspraktijken in uw sector in de aankomende 10 jaar?

2. Overview of interviewees

Table A.2: Overview of interviews conducted

Interview number	Role	Location	Date
Interview 1	Co-owner	Multiple locations	01/05/2026
Interview 2	Manager	East	06/05/2026
Interview 3	Co-owner	East	06/05/2026
Interview 4	Co-owner	Centre	07/05/2026
Interview 5	Co-owner	West	08/05/2026
Interview 6	Head chef	West	08/05/2026
Interview 7	Co-owner	Centre	11/05/2026
Interview 8	Manager	South	11/05/2026
Interview 9	Co-owner	Multiple locations	12/05/2026
Interview 10	Owner	Centre	13/05/2026
Interview 11	Co-owner	Multiple locations	13/05/2026
Interview 12	Operations manager	Multiple locations	14/05/2026
Interview 13	Manager	East	26/05/2026

Appendix B: AI-statement

Some AI was used when creating this thesis. First, the AI-tool Consensus was used to find some supporting literature in section 4.1, as also mentioned in section 3.1. An example of a prompt is shown in figure 5. These papers were then always checked for accuracy and connection to the research. Furthermore, generative AI like ChatGPT and Claude was used to clean up some phrasing and structuring during writing. An example of a prompt is shown in figure 6. ChatGPT was also used in cleaning up Figure 3, the example of how this was done is shown in figure 7. These generative AI-tools were also used to organize and check the source list. Finally, Grammarly was used to clean up grammar and spelling mistakes. All work was checked rigorously; nothing the AI produced was trusted without double-checking, and all work in this thesis is fully my own.

Hiii i am looking for articles that are about technological innovations surrounding reducing food waste in the hospitality industry, specifically restaurants and cafes. Things like digital waste tracking systems and predictive algorithms or things like that.

Pro · 3 steps >

- technological innovations for reducing food waste in the hospitality industry, especially resta... 45.8K ↗
 - food waste reduction technologies in restaurants and cafes such as digital monitoring, smart... 33.8K ↗
- Read Papers 20 >

Yes, AI, IoT, and digital tools are already cutting food waste in restaurants, hotels, and similar foodservice settings through waste tracking, forecasting, and smart inventory systems.

Digital technologies are being used in real-world hospitality venues (restaurants, hotels, canteens) to monitor waste, forecast demand, and optimize inventory, leading to substantial reductions in food waste and costs.

Figure 5: a prompt used for finding supporting literature for results

Can you rewrite this to make it flow a bit better: When combined, the findings of the document analysis, academic literature, and interviews highlight menu engineering as a specifically relevant strategy. This strategy is also the most widely adopted within the daily operations of the interviewees.

"When combined, the findings of the document analysis, academic literature, and interviews highlight menu engineering as a particularly relevant strategy — and one that, across the interviews, emerged as the most widely embedded in daily operations."

A bit more integrated, cuts the repetition of "strategy", and "embedded in daily operations" feels more natural than "adopted within."

Figure 6: an example of cleaning up language by generative AI

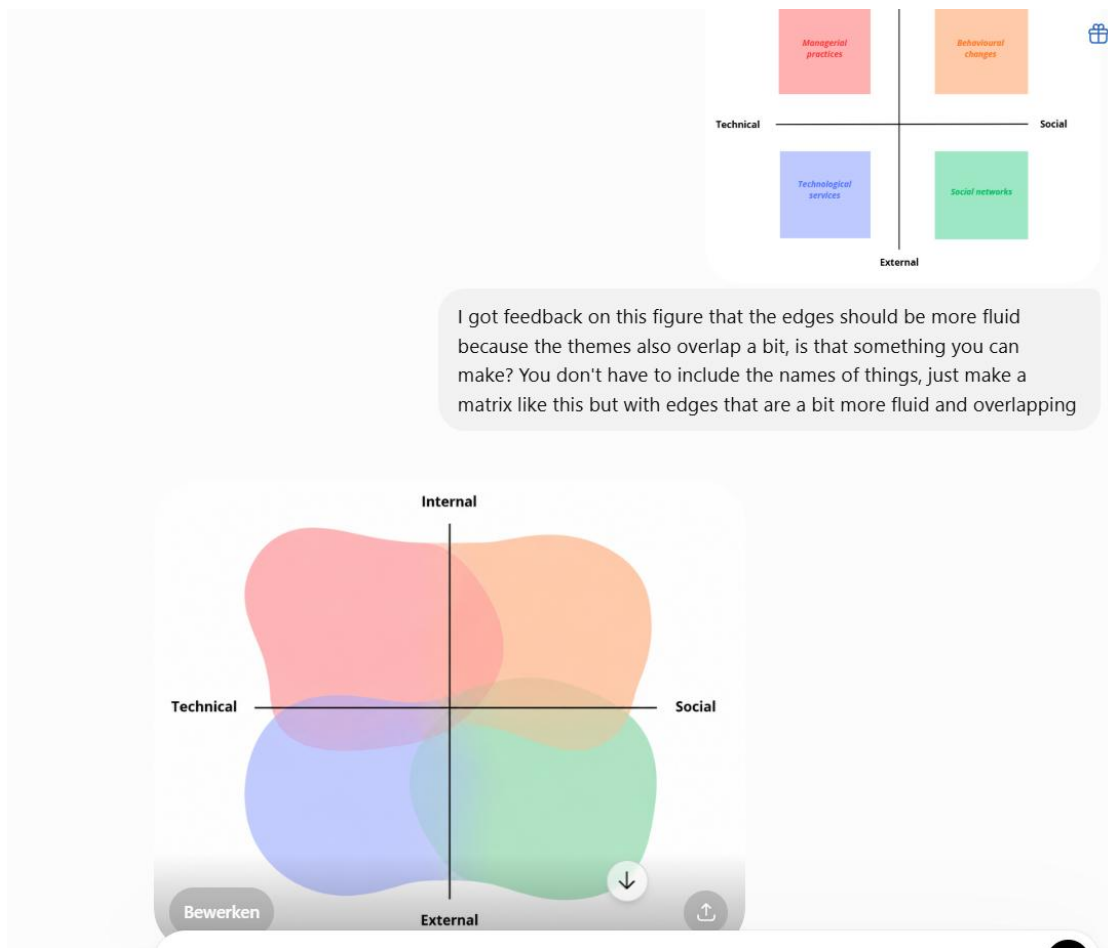


Figure 7: How Figure 3 was reshaped by generative AI