Food waste reduction: bearing fruit already?

April 2018

THE CURRENT STATE OF FOOD WASTE REDUCTION IN THE DUTCH HOSPITALITY SECTOR

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Environment and Society Studies / Master's thesis

Nijmegen School of Management

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FOOD WASTE REDUCTION, DUTCH HOSPITALITY SECTOR

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FOOD WASTE REDUCTION: BEARING FRUIT ALREADY?

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Colophon

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Publication date: April 2018

Master programme: Environment and Society Studies

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Preface

In front of you is my Masters' thesis 'Food waste reduction: bearing fruit already?'. This thesis is written for the Master Environment and Society Studies and is about food waste reduction in the Dutch hospitality sector. I work in a hospitality organisation and I regularly witness waste of good and edible food. I have a heart for nature and its beauty and therefore I am concerned with the environmental and social consequences of food waste. This thesis aims to provide an understanding of the current state of food waste reduction in the Dutch hospitality sector. That is important for further research and measures to reduce food waste as a contribution to climate change adaptation.

I conducted this thesis in combination with an internship at Q-Point Consultancy, a consultancy for project and value chain management, food safety and quality systems in the agri- and food sector. Q-Point Consultancy managed a project that reduced food waste successfully in a Dutch zoo. I want to thank all employees at this firm for my first experience in the business field, the opportunity to develop skills in my work field and the independency they gave me during my internship.

For this thesis, I interviewed twelve organisations to provide an insight into the current state of food waste reduction in the Dutch hospitality sector. Thanks to all these participants for a successful data collection.

A special thanks to my supervisor Pieter Leroy. He gave me useful feedback on my concepts of this thesis and he gave me the confidence that I could finish the thesis with good results.

Last of all, I want to thank my boyfriend, friends and my family for supporting me throughout the conduction of this thesis. It was not always easy for me to stay focused to write the thesis. These people always knew the right things to say or planned some free time with me so I could keep my head up.

Abstract

These days, climate change is one of the most challenging issues for scientists and politicians. To adapt to and to combat climate change, sustainable development is required. Organisational innovation can contribute to sustainable development. Much research has already been done on organisational innovation and organisational innovation for sustainable development. Also, much research has been done about food waste reduction and organisational innovation for food waste reduction. Food waste reduction is important to contribute to sustainable development in order to adapt to and combat climate change. Food waste has various negative environmental and social consequences, and besides, food waste is a waste of money.

The Dutch hospitality sector contributes to food waste. Organisations in this sector want to achieve a fast service for their customers and therefor, these organisations prepare stock. Due to inaccurate estimations on customers it is possible that organisations prepare too much stock. Also legislation and an expected growth in the Dutch hospitality sector results in more food waste. This thesis aims to provide an understanding of the current state of food waste reduction in the Dutch hospitality. There are twelve interviews with twelve different organisations in this sector conducted for this thesis. The interviews with these twelve organisations represent the Dutch hospitality sector. Together with observations and the analysis of secondary data, the interviews provide the insight into the current state of food waste reduction in the Dutch hospitality sector organisations.

Although the degree of implementation of food waste reductive processes varies among the organisations and the content and frequencies of these processes remain unclear, every organisation efforts to reduce food waste. Cost savings, awareness and sense of responsibility for environment and society are the main factors that trigger the organisational innovation of processes regarding food waste reduction. The organisations also encounter difficulties with (further) implementation of innovative processes regarding food waste reduction. These difficulties concern the service they want to offer the customers, instability and insecurity about the amount of food to prepare among employees and chefs, and the inaccurate estimations on expected customers.

On the basis of the findings of this thesis, more research can be done concerning food waste reduction and food waste reductive processes to reduce food waste in the Netherlands.

Samenvatting

Klimaatverandering is vandaag de dag een van de meest uitdagende vraagstukken waar wetenschappers en politici mee te maken hebben. Om ons aan te passen aan de veranderingen die klimaatverandering met zich mee meebrengt en om klimaatverandering te bestrijden is duurzame ontwikkeling essentieel. Organisatorische innovatie kan bijdragen aan duurzame ontwikkeling. Er is veel onderzoek gedaan naar organisatorische innovatie (voor duurzame ontwikkeling). Het reduceren van voedselverspilling is een mogelijke bijdrage aan duurzame ontwikkeling om zo de strijd tegen klimaatverandering aan te gaan. Voedselverspilling heeft namelijk uiteenlopende negatieve milieu- en sociale consequenties en bovendien is voedselverspilling ook verspilling van geld. Er is dan ook veel onderzoek gedaan naar voedselverspillingsreductie en organisatorische innovatie voor voedselverspillingsreductie.

De Nederlandse horecasector draagt bij aan voedselverspilling. Veel organisaties in deze sector willen hun gasten snel kunnen serveren, meestal in de vorm van buffetten, waardoor ze eten op voorraad nodig hebben. Door een verkeerde inschatting van het aantal gasten is het mogelijk dat organisaties te veel eten op voorraad hebben. Door geldende wetgeving mag dit eten niet lang bewaard worden en moet het weggegooid worden. Ook een verwachte groei in de Nederlandse horecasector leidt tot meer voedselverspilling. Het doel van deze scriptie is het begrijpen en in kaart brengen van de huidige stand van zaken betreffende voedselverspillingsreductie in de Nederlandse horecasector. Twaalf diverse organisaties, representatief voor Nederlandse horecabedrijven die werken met buffetten, zijn geïnterviewd voor deze scriptie. Daarnaast zijn deze organisaties geobserveerd en zijn er secundaire data geanalyseerd, zoals websites en rapporten, om het inzicht in de huidige stand van zaken te verkrijgen.

Ondanks dat de mate van implementatie van processen die voedselverspilling reduceren tussen de organisaties verschilt en dat de inhoud en frequentie van deze processen onduidelijk blijft, geeft elke organisatie aan voedselverspilling te reduceren. Kostenbesparing, bewustzijn en een verantwoordelijkheidsgevoel voor mens en milieu zijn de hoofdfactoren die organisatorische innovatie van processen voor voedselverspillingsreductie stimuleren. Tot slot ervaren de organisaties allemaal barrières met het (verder) implementeren van innovatieve processen betreffende voedselverspillingsreductie. Deze barrières hebben onder andere te maken met de service die organisaties willen bieden aan hun gasten, instabiliteit en onzekerheid over de hoeveelheid te bereiden eten onder werknemers en koks, en de onnauwkeurige voorspelling van de verwachte gasten.

Op basis van de uitkomsten van dit onderzoek kan er verder onderzoek gedaan worden naar voedselverspilling en maatregelen om dat tegen te gaan in de Nederlandse horecasector.

Content

List of figures and tables

Abbreviations and glossary

CSR	Corporate Social Responsibility
DHSC	Dutch hospitality supply chain
Dutch hospitality sector	Restaurants in Dutch amusements parks or zoos, established self-service restaurants, established fast food restaurants and cafeterias with a demand for quick and good service, constraining legislation and an expected growth of a food waste from 25 to 35 per cent of purchase wasted
FAO	Food and Agriculture Organisation
Food loss	Food that incurs a reduction in quality such as bruising or wilting, before it reaches the consumer (Lipinski et al., 2013)
Food waste	Food that is of good quality and fit for human consumption but that does not reaches the consumer because it is discarded (Lipinski et al., 2013)
Food wastage	The combination of food loss and food waste
GFSC	Global Food Supply Chain
GRI	Global Reporting Initiative
Innovation	The development and successful implementation of new or improved products or quality of products, markets, services, operation procedures, production or distribution processes (Crossan, 2010).
Organisational innovation	Changes in preferences, working processes or management in various functions of an organisation such as research and development, environmental and governmental affairs or worker health and safety (Armbruster et al., 2008)
Sustainable development	Increases the ability of societies for climate change mitigation and climate change adaptation, while promoting economic development by preserving natural resources, and maintaining social cohesion and environmental quality (Bulkeley & Betsill, 2005; Yohe et al., 2006).

Chapter 1. Introduction

The first chapter of this thesis describes the subject of this research and defines the problem. It provides a short description of the research design and ends with a reading guide. Section 1.1 sketches the climate change problem and explains the importance of sustainable development to increase the ability of societies for climate change mitigation and climate change adaptation. The subsequent section positions the problem with food waste and how food waste contributes to climate change. This section also positions how the reduction of food waste mitigates the contribution of food waste to climate change, thus how food waste reduction contributes to sustainable development. Section 1.3 gives a brief introduction of the importance of organisational innovation to contribute to sustainable development. Section 1.4 is about organisational innovation for food waste reduction and the specificities of Dutch hospitality sector, which illustrate why the Dutch hospitality sector requires special attention on this focus point. Section 1.5 describes the research aim of this thesis. The research questions are elucidated in this section. The scientific and societal relevance are explained in section 1.6. The final section presents an outline of the thesis.

1.1 Climate change and sustainable development

Currently, climate change is one of the most challenging issues for scientists and politicians (Bulkeley & Betsill, 2005). Climate change implies the warming of planet earth due to an increased emission of greenhouse gases like carbon dioxide (CO_2), methane and nitrous oxide, primarily as a result of human activities. The concentrations of these gases have historically increased since 1750. Global warming as a consequence of the emission of these gases has led to, amongst other things, a rapid collapse of ice shelfs in Antarctica and a rising sea level, droughts, threats of drinking water supply and environmental degradation.

In order to combat climate change and their effects, sustainable development is required. The goal of sustainable development increases the ability of societies for climate change mitigation and climate change adaptation, while promoting economic development (Bulkeley & Betsill, 2005; Yohe et al., 2006). Climate change mitigation includes strategies to reduce greenhouse gas sources, while climate change adaptation is the adjustment in natural or human systems as a response to actual or expected climatic change and their effects (Taylor, 2011). Sustainable development is achieved by preserving natural resources, and maintaining social cohesion and environmental quality. This means that societies develop in such a way that greenhouse gas emissions and natural resource use are decreased and the consequences of climate change like droughts, threats of drinking water supply and environmental degradation are diminished, which enables climate change mitigation and climate change adaptation. An example of sustainable development is crop rotation. Crop rotation is the planting of different

crops on the same land as an effective strategy to improve soil fertility and soil structure. Improved soil fertility and soil structure increase the productive capacity of land and allows more cultivation, making the land optimally utilised to promote economic development. Furthermore, crop rotation controls insects and diseases without the use of chemicals which contribute to the emission of greenhouse gases (Bullock, 1992).

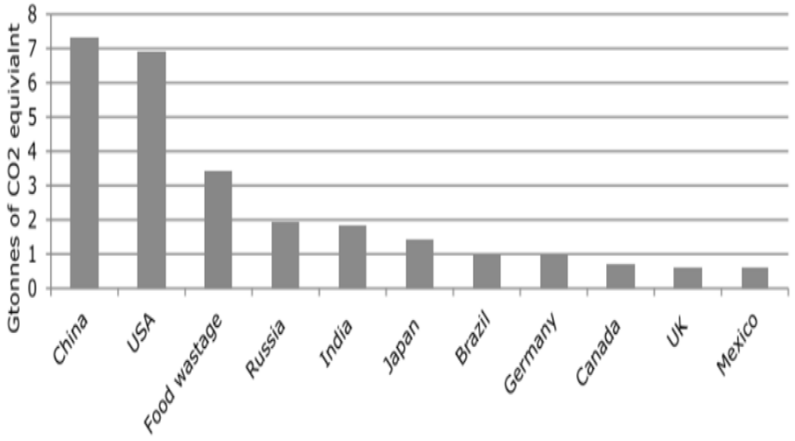
1.2 Food wastage and food wastage reduction

An example of a human activity that causes climate change is food and its production. Food production uses resources: water to irrigate crop fields, fertilisers that boost plant growth and fuel to take crops from farms to markets. Along with this resource use is pollution, for example the greenhouse gas CO_2 is emitted to power agricultural- and production machinery. Another greenhouse gas, methane, is released by livestock. The greenhouse gas nitrous dioxide is released during the fertilising of crop fields (Raloff, 2014). These greenhouse gas emissions contribute to global warming and climate change.

An even bigger problem is the environmental pressure caused by the wastage of food. Food wastage is the combination of food loss and food waste. Food loss is food that incurs a reduction in quality such as bruising or wilting, and is therefore discharged before it reaches the consumer (Lipinski et al., 2013; Parfitt et al., 2010). Food waste is food that is of good quality and fit for human consumption but that does not reaches the consumer because it is discarded: food waste is therefore avoidable (Lipinski et al., 2013; Gustavsson et al., 2011). When food is lost or wasted, the greenhouse gas emissions due to the use of energy, fuel and fertiliser to produce food are released into the atmosphere unnecessary.

The Food and Agriculture Organisation (FAO) estimates that about one-third of global available food is wasted each year (FAO, 2014a). The following figures demonstrate the contribution of food wastage to climate change and the environmental impacts of food wastage.

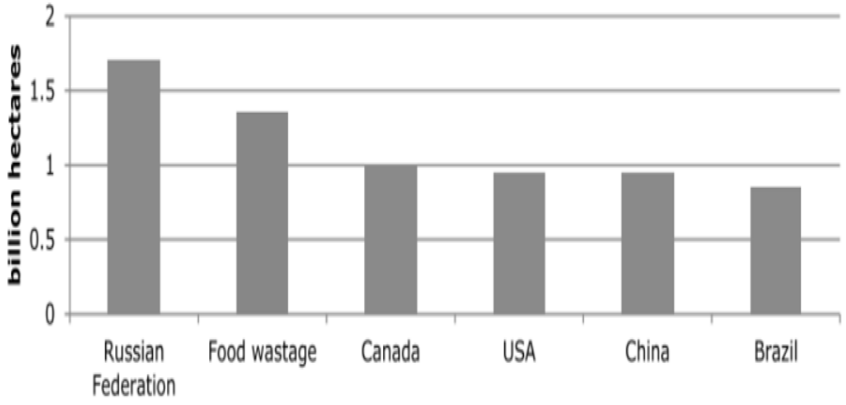
Figure 1.1 CO_2 emission of food wastage compared to emissions per nation state



Adapted Stähler, 2014

It can be concluded from figure 1.1 that food wastage globally emits about 3,3 Gigatonnes CO_2 per year (FAO, 2013). If food wastage would be country it would be one of the most emitting countries, right after China and the United States of America (USA). The following equation tries to clarify how much CO2 is released due to food waste. In 2008, researchers found that the whole food system released 9.800 to 16.900 Megatonnes of CO_2 equivalent into the atmosphere; 13.350 Megatonnes CO_2 on average (Gilbert, 2012). 13.350 Megatonnes of CO_2 equals to 13.35 Gigatonnes of CO_2. The 3.3 Gigatonnes of CO_2 emission due to food waste is 24,8 percent of the total CO_2 emission of the food system. This means that in 2008, almost a quarter of the total CO_2 emission related to food production activities, such as powering machinery, is released to the atmosphere unnecessary, because food is wasted (Raloff, 2014). These CO_2 emissions contribute to global warming which results in climate change.

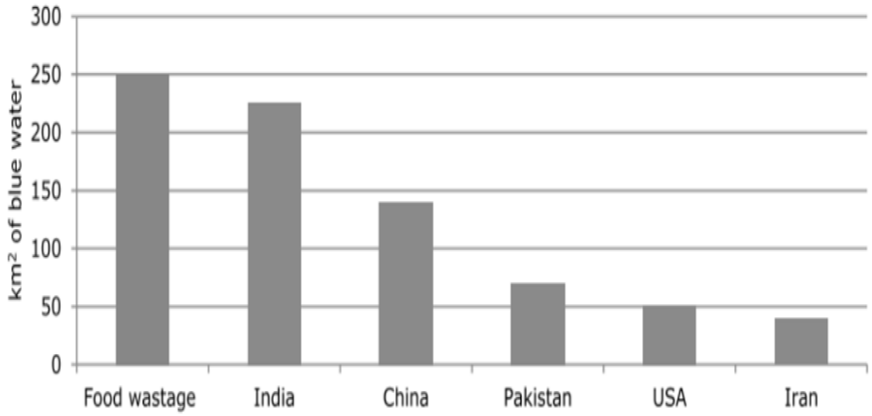
Figure 1.2 Land occupied by food wastage compared to land occupied per nation state



Adapted Stähler, 2014

Figure 1.2 shows that the surface of land that is necessary to produce food that is lost or wasted is 1.4 billion hectares (FAO, 2013). The land that food wastage occupies is even larger than the largest countries in the world occupy, except for the Russian Federation. Fertilisers are used on this agricultural land to growth food that is wasted. These fertilisers contribute to greenhouse gas emission with climate change as a consequence. Moreover, the use of land for agriculture leads to deforestation and soil sealing. As a result, the productive capacity of land decreases temporary or permanently. This is called land degradation and is recognised as a global developmental and environmental issue (FAO, 2013). This means that the quality of 1.4 billion hectares of land declines for the production of food that is wasted.

Figure 1.3 Water consumption of food wastage compared to water consumption per nation state



Adapted from Stähler, 2014

Figure 1.3 clarifies that 250 km^3 of drinking water is needed to produce food that is wasted each year (FAO, 2013). If food wastage was a country, it would be the country that consumes the most water in the world each year. The amount of drinking water that is needed to produce uneaten food has a negative impact on the available drinking water, which is already declining due to climate change.

Food wastage does not only contributes to climate change and has an impact on the environment, food wastage also has social impacts. Food wastage affects global hunger directly, since lost or wasted food is removed from the global market and therefore decreases the amount of available food for the world population. (FAO, 2013). A study shows that a global food wastage reduction of 50 percent could lead to a 7,4 percent reduction of malnourished people (Munesue et al., 2015). Another social impact is closely connected to the environmental impact of food wastage. As shown by previous figures, the production of food wastage emits greenhouse gases, uses drinking water and occupies agricultural land that results in land degradation. These

effects contribute to climate change and result in global warming, less available drinking water supply for human and environmental degradation. This leads to increase of health risks, civil conflict and so on (FAO, 2014b).

Lastly, the economic costs of food wastage is estimated at one trillion USD per year (FAO 2014a). Costs of production and labour are included in these costs. The hidden costs of food wastage, like the costs of greenhouse gas emission, costs of water scarcity and social costs, however, are not included in this calculation.

The world population is expected to increase to 9 billion people by 2050. It is also expected that the population growth is likely to be accompanied by a growth in food wastage (FAO, 2013). This means that the environmental, social and economic impacts of food wastage, as explained in this section, are likely to increase as well. And that is where sustainable food production comes in. The production of food ought to be developed in such a way it promotes economic development while maintaining social cohesion and environmental quality. This also requires food wastage reduction. When food waste is reduced, less CO_2 will be emitted in the atmosphere, less drinking water will be used and less land will be necessary for agriculture when food wastage is reduced. Health risks and civil conflict as a result of food wastage can be avoided and environmental degradation can be declined, while the economic development of food production can grow futher (with a saving up to one trillion USD each year) (FAO, 2013; FAO, 2014a; FAO, 2014b). This contributes to the ability of societies for climate change mitigation, since food waste reduction reduces greenhouse gas emission.

1.3 Organisational innovation for sustainable development

There was a time when the industrial economy considered the natural environment as an unlimited resource. But climate change, shrinking natural resources like vegetation and fresh water, and a polluted environment called for a fundamental re-thinking of the industrial economy (Kuntze et al., 1998). Sustainable development is needed in the industrial economy to reduce the use of natural resources and to avoid pollution as much as possible. Innovation can contribute to a re-thinking of the industrial economy into an economy that develops in a sustainable manner (Ashford, 1994). Innovation is the development and successful implementation of new or improved products or quality of products, markets, services, operation procedures, production or distribution processes, which can lead to a sustainable industrial economy (Crossan, 2010). An innovation within an organisation is called organisational innovation. This organisational innovation may include changes in preferences, working processes or management in various functions of an organisation such as research and development, environmental and governmental affairs or worker health and safety (Armbruster et al., 2008; Ashford, 2001).

There are studies about organisational innovation to contribute to sustainable development. Examples of research on organisational innovation concern the factors that trigger the organisational innovation of processes regarding energy efficiency and waste minimisation. These factors are related to cost reduction, performance optimisation, but also related to sustainability such as lowering the carbon footprint (Bansal, 2005; Lee, 2015; Mulholland et al., 2000).

1.4 Organisational innovation for food waste reduction

Throughout the production of food, one can discern several stages. The first stage is the agricultural stage. This stage is about the cultivation of food for consumption. The second stage is the harvesting of food. This stage also includes processes the food before it is sold to wholesalers. The third stage is the distribution to wholesalers, after which it is distributed to retail markets in the fourth stage. The final stage is consumption at home. Figure 1.4 gives an overview of these different stages of food production and it shows various reasons of food wastage throughout the different stages of chain of food production, the Global Food Supply Chain (GFSC) (FAO, 2013; GSB, 2012; Munesue et al., 2015). Figure 1.5 illustrates that next to the distribution of food to retail markets, food is also distributed to hospitality (restaurants, bars et cetera). This stage consists of various sectors, such as restaurants, nursing homes and caterings. Consumption is the final stage, also in this case.

Figure 1.4 Global Food Supply Chain and food wastage throughout the Chain

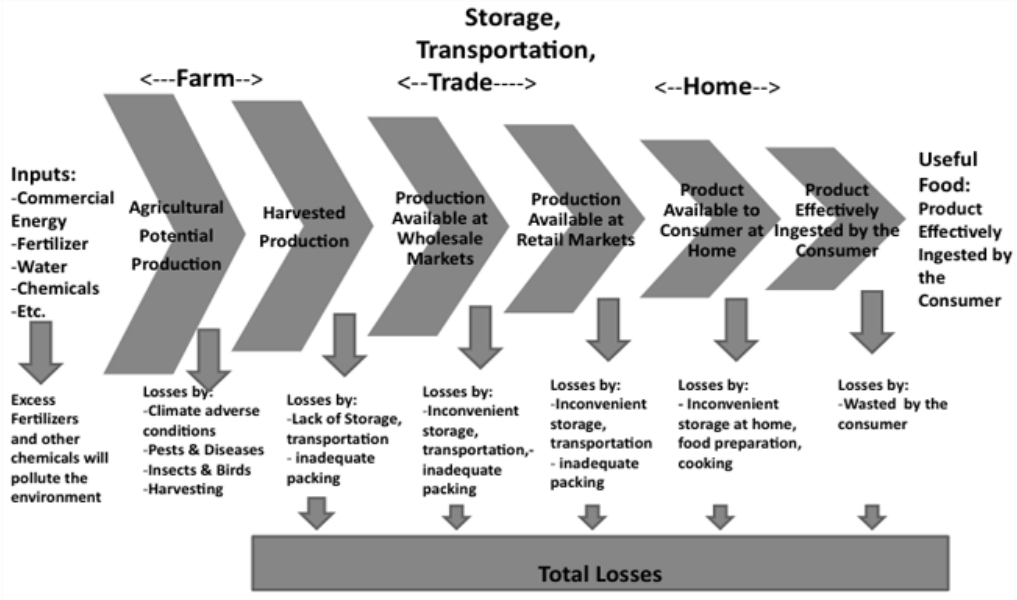


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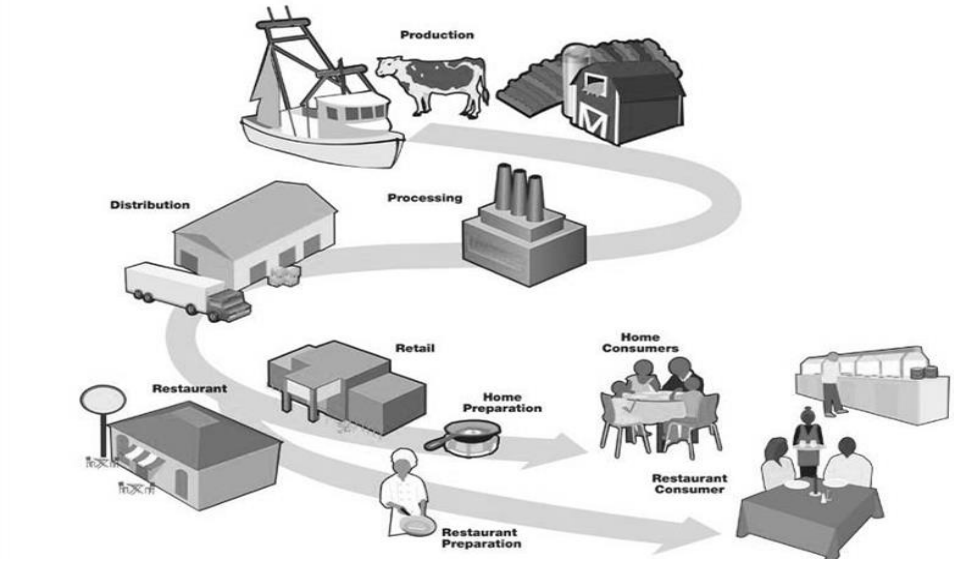
Figure 1.5 Global Food Supply Chain including hospitality



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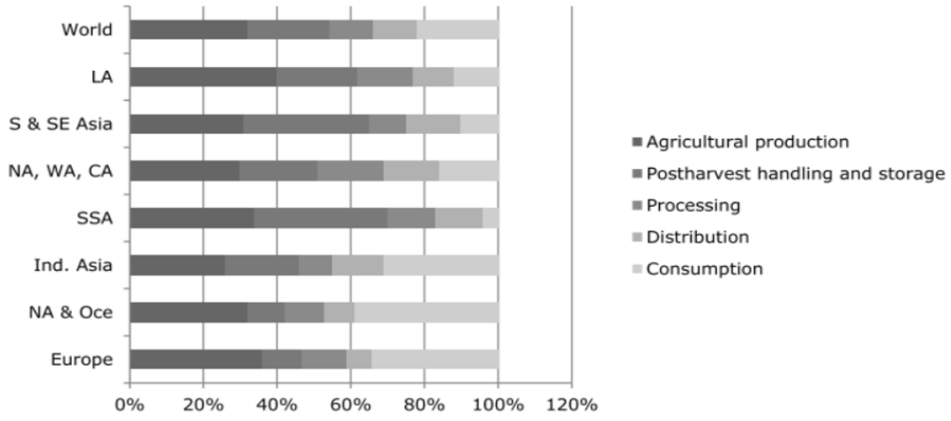
Food wastage occurs everywhere and in all different stages of the GFSC. The percentage of produced food wasted per stage of the GFSC differs per geopolitical region. Figure 1.6 demonstrates that high-income regions, such as Europe and North-America (NA), waste more food in the latter phases of the GFSC, because of consumer behaviour, communication issues throughout the Global Food Supply Chain and because of constraining regulation (FAO, 2014a). Food wastage is higher in the early stages of the GFSC in low-income regions, such as a Latin America (LA), because of lacking infrastructure and climate conditions that increase spoilage (FAO, 2014a).

Figure 1.6 Food wastage throughout the Global Food Supply Chain per region



Adapted from Stähler, 2014

To reduce food wastage, organisational processes within each of these stages should be innovated. There has already been some research done on organisational innovation for food waste reduction in the GFSC. One focus point of this research considers the factors that trigger the innovation of processes regarding food wastage reduction in the consumption stage of households. These factors are, among other things, cost-savings, awareness and priority (Graham-Rowe et al., 2014; Janssen et al., 2010). Another focus point in the research on food wastage reduction in the consumption stage considers new processes that ought to be implemented to reduce food wastage in households. Examples are planning routines and proper management (Graham-Rowe et al., 2014; Quested & Luzecka, 2014).

Also in the hospitality stage of the GFSC food is wasted. Typically on this stage, there is some research available on innovation concerning food waste reduction. This research mostly concerns organisational innovation: implementable processes to reduce food waste and factors that trigger the organisational innovation. Some of this research is about motivations and barriers for the implementation of processes regarding food waste reduction in organisations in Danish nursing home sector and the Wales catering sector (Ofei et al., 2015; Sonnino & McWilliam, 2011).

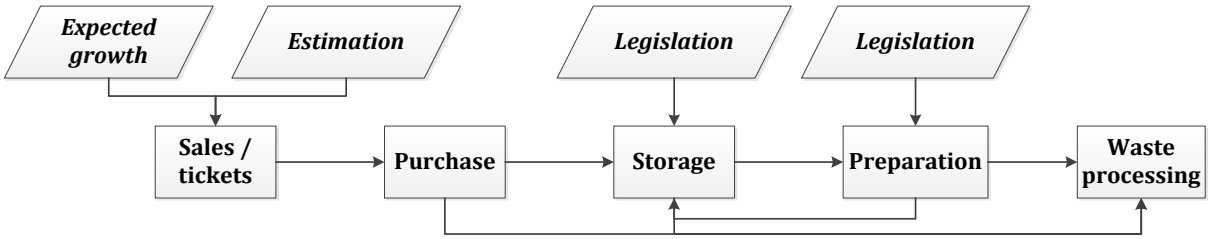
This type of research requires some special attention in the Dutch hospitality sector. This sector includes Dutch hospitality organisations, such as restaurants, cafeterias, cafés, that provide prepared meals, snacks and beverages to customers for immediate consumptions. The following specificities of the Dutch hospitality sector explain why this sector requires special attention concerning food waste and food waste reduction in the hospitality stage of the Global Food Supply Chain:

1. Inaccurate estimation: customers desire to be served quickly and well, which requires a proper preparation of food. Therefore, organisations in the Dutch hospitality sector have to make estimations on the products and dishes they think they would sell and prepare these products and dishes before it is ordered or sold. It is common practice that, as a consequence of inaccurate estimations, prepared food has to be thrown away after several hours (Soethoudt, 2012)
2. Legislation: prepared and unrefrigerated presented food has to be thrown away after several hours, because it cannot be saved due to food security (Kenniscentrum Horeca, 2012).
3. Legislation: prepared food cannot be stored (refrigerated) for longer than one day (Kenniscentrum Horeca, 2012). In addition, products may not be used after the expiration date.
4. Expected growth: between 25 percent and 35 percent of the total amount of food purchased is wasted within an organisation in the Dutch hospitality sector (Luitjes,

2007). For comparison, 13,6 percent of edible food is wasted in households ((MilieuCentraal & Voedingscentrum, 2014). This sector is expected to growth significantly in the next few years. Without extra measures, e.g. without organisational innovation, it is likely that the expansion in the hospitality sector will lead to a growth in its generated food wastage (Pirani & Arafat, 2016).

As explained in figure 1.5, the hospitality stage is one stage of the GFSC. All organisations in this stage have their own supply chain, which is a micro part of the GFSC. This supply chain begins where the supply chain of the distribution stage ends and the chain ends where the supply chain for the consumption stage begins. For organisations in the Dutch hospitality sector is this chain illustrated in the Dutch hospitality supply chain (DHSC) (see figure 1.7). This chain covers the sales of tickets or reservations made, which gives an estimation of the expected customers. Based on this estimation, food and beverages are purchased. Next, purchase is stored. Then food is prepared to serve the expected customers quickly and well. Prepared and refrigerated food that is not sold can be stored refrigerated for one day at the most. This is illustrated with the arrow from preparation back to storage. Throughout the whole DHSC, waste is generated. This is illustrated by the stage at the end of the chain where the arrows underneath the other stages lead to. The upper italic figures illustrate the specificities of the Dutch hospitality sector, wherefore this sector requires special attention, as mentioned earlier. To reduce food wastage, processes within probably each of the stages of the Dutch hospitality supply chain ought to be innovated. More knowledge about organisational innovation of processes regarding food wastage reduction in the Dutch hospitality sector is desired to reduce global food wastage.

Figure 1.7 The Dutch hospitality supply chain including waste processing



Adapted from 'Schema toolbox' Q-Point 2012-2014

There has already been some research done about food waste reduction in the Dutch hospitality sector (Luitjes, 2007; Soethoudt 2012; Soethoudt et al., 2015.). The research, conducted by Luitjes (2007), is about the amount of food wastage in kilograms and in euros and about the causes of food wastage. The causes of food wastage can be ascribed to current legislation, inaccurate estimation of customers and inattention of employees. Soethoudt (2012) determines the amount of avoidable food waste in the Dutch catering sector, causes of food waste and

improvement measures. The causes correspond to the causes exposed by Luitjes. Improvement measures are an accurate estimation of customers, dosed refill of buffets and preparation of food on order. The research conducted by Soethoudt et al. (2015) monitors food wastage in the Netherlands. Previous mentioned studies about food wastage in the Dutch hospitality sector have not dealt with processes that are already implemented in the Dutch hospitality sector in to reduce food wastage throughout the whole DHSC, factors that trigger the organisational innovation of processes regarding food wastage reduction in the Dutch hospitality sector or the difficulties organisations in this sector encounter with (further) implementation of innovative processes regarding food wastage reduction. Given the special attention that the Dutch hospitality requires, it is interesting to execute more research about these focus points.

1.5 Research aim

Organisations in the Dutch hospitality sector change by implementing new or improved preferences, values or processes in various stages of the DHSC of an organisation to reduce food wastage, so called organisational innovation. This thesis focuses on the organisational innovation of processes to reduce food waste. To reduce the expected growth of food wastage in the Dutch hospitality sector and its negative impacts, the innovation of processes is required. Before doing in-depth research into organisational innovation for food wastage reduction in the Dutch hospitality sector, it is wise to gain insight into the current state concerning food wastage reduction in the Dutch hospitality sector. Therefore, the aim of this thesis is to provide an understanding of the current state concerning food wastage reduction of the Dutch hospitality sector. This implies an understanding of 1) innovative processes that are already implemented in Dutch hospitality organisations, 2) factors that trigger the organisational innovation of processes regarding food wastage reduction in the Dutch hospitality sector, and 3) difficulties organisations in the Dutch hospitality sector encounter with further implementation of new or improved processes to reduce food wastage throughout the DHSC.

During the follow-up of this research, the term ‘food waste’ is used instead of ‘food wastage’ or ‘food loss’, because the research focuses on avoidable food waste.

1.5.1 Research questions

The research aim can be translated into the main research question that this thesis attempts to answer:

‘What is the current state concerning food waste reduction in the Dutch hospitality sector?’

In order to be researchable, the main research question is split up into four distinguishable yet interrelated sub-questions:

Sub-question 1: *'What is the current state of implementation of environment-friendly measures in the processes of organisations in the Dutch hospitality sector?'*

Section 1.2 of this chapter explained how food waste contributes to climate change. This section also clarified the negative environmental, social and economic consequences of food waste. Food waste reduction is one environment-friendly measure that organisations in the Dutch hospitality can implement to contribute to sustainable development. This means that an organisation in this sector can grow economically, while natural resources are preserved and social cohesion maintained. The answer to this question provides insight into the current state of implementation of environment-friendly measures in organisations in the Dutch hospitality.

Sub-question 2: *'What innovative processes do organisations in the Dutch hospitality sector already implement alongside their Dutch hospitality supply chain to reduce their food waste?'*

This question provides insight into the extent to which food waste reduction is already embedded in the processes in the different stages of the Dutch hospitality supply chain. It elucidates innovative processes regarding food waste reduction that are already implemented in organisations in the Dutch hospitality.

Sub-question 3: *'What factors trigger organisations in the Dutch hospitality sector to innovate processes that generate food waste?'*

The answer to this question provides specific information about various factors that stimulate organisational innovation of processes regarding food waste reduction in the Dutch hospitality sector.

Sub-question 4: *'What difficulties does the Dutch hospitality sector encounter with (further) implementation of processes regarding food waste reduction?'*

The output of this question provides insight into whether organisations in the Dutch hospitality sector encounter difficulties with the (further) implementation of innovative processes for food waste reduction and what these difficulties are.

1.6 Societal and scientific relevance

Achieving sustainable development requires innovation. Plenty of research has been done on organisational innovation to achieve sustainable development (Ashford, 2001; Armbruster et al., 2008; Bansal, 2005; Lee, 2015; Mulholland et al., 2000). There is also some research done on organisational innovation of processes regarding food waste reduction in the latter stages of the Global Food Supply Chain (Graham-Rowe et al., 2014; Janssen et al., 2012; Quested & Luzecka, 2014). This also accounts for the hospitality stage in the GFSC (Ofei et al., 2015; Sonnino & McWilliam 2011). However, the Dutch hospitality sector as a part of the hospitality stage in the GFSC requires some special attention due to some specific characteristic of this sector (see section 1.4). This thesis aims to provide an understanding of the current state concerning food wastage reduction in the Dutch hospitality sector. The scientific relevance of this thesis is to examine to what extent the generic knowledge about organisational innovation of food waste reduction is applicable to the Dutch hospitality sector, to what extent more specific knowledge is necessary and to what extent this is due to the specific characters of the Dutch hospitality sector. Therefore, a comparison is made between literature about processes that ought to be implemented during innovation for food waste reduction and factors that trigger the organisational innovation, and the outcomes of this thesis about these focus points. Another scientific relevance of this thesis is to expand the existing literature about the amount of, causes of and improvement measures for food waste reduction in the Dutch hospitality sector, as published by Luitjes (2007), Soethoudt (2012) and Soethoudt et al. (2014). This thesis aims to lay the foundation for further research on organisational innovation for food waste reduction in the Dutch hospitality sector. With an understanding of the current state concerning food waste reduction in the Dutch hospitality sector, it can be concluded which focus points require in-depth research.

The societal relevance of this thesis is that innovative processes regarding food waste reduction that are already implemented in organisations in the Dutch hospitality sector can serve as a source of inspiration for other organisations in this sector to implement those innovative processes to reduce food waste. Organisations that have knowledge about potential innovative processes regarding food waste reduction are more inclined to implement those innovative processes also (Van Gelderen & Masurel, 2012). The more organisations in the Dutch hospitality sector attempt to reduce their food waste, the more food wastage can be reduced globally. The ultimate goal is to achieve sustainable development. Food waste reduction can contribute to this by preserving natural resources, maintain social cohesion and environmental quality, while promoting economic development (Bulkeley & Betsill, 2005; Yohe et al., 2006).

1.7 Reading guide

This chapter introduced the issue of climate change, its negative consequences and the concept of sustainable development for climate change mitigation and climate change adaptation. This chapter also introduced the concept organisational innovation and the importance of organisational innovation of processes regarding food waste reduction. The chapter concluded on the research aim, the (sub-) questions and the relevance of this thesis.

Chapter 2 gives the theoretical foundation to answer the research questions in order to attain the research aim. This chapter analyses what is written in literature about organisational innovation, factors that trigger the organisational innovation, factors that trigger the organisational innovation of processes regarding food waste reduction and processes regarding food waste reduction that ought to be implemented during organisational innovation. In addition, chapter 2 also presents the Dutch hospitality sector, its specificities and its current processes. Chapter 3 explains the philosophical perspective and the research strategy used in this thesis. This chapter also accounts for the methods used to collect data and how this data are analysed. Chapter 4 describes the outcomes of the data collection and the chapter 5 interprets, compares and reviews these outcomes.

Chapter 2. Theoretical framework

The previous chapter described the issue of climate change, how food waste contributes it, the concept of sustainable development and it touched upon the concept of organisational innovation. This chapter elaborates this latter concept and applies it onto the Dutch hospitality sector. Section 2.1 aims to provide an understanding of the concepts innovation and organisational innovation. The subsequent section (2.2) elucidates factors that trigger the organisational innovation and factors that trigger innovation of organisational processes into sustainable processes such as energy efficiency and waste minimisation. Section 2.3 provides an insight into the Dutch hospitality sector and explains the Dutch hospitality supply chain of organisations in this sector and the processes therein that contribute to food waste. Furthermore, this section reviews what scientific literature says about implementable innovative processes regarding food waste reduction. The information generated from section 2.2 and 2.3 outline the theoretical foundation of this thesis. Section 2.4 operationalises all the information relevant for this research. In conclusion, section 2.5 visualises how these concepts are interconnected and how these concepts lead to the research aim of this thesis.

2.1 Organisational innovation

Organisations innovate as a reaction to changes in or to growing demands from a wider environment (Kumpe & Bolwijn, 1994; Lekkerkerk, 2017). From the 1960s to the 1990s, for example, there was a growing demand for efficient processes, qualitative products and flexibility. Innovation showed to be the magic word for organisations to distinguish themselves from competitors. Innovation can be defined as 'the development and successful implementation of new or improved products or quality of products, markets, services, operation procedures, production or distribution processes' (Crossan, 2010, p.1155). As the definition suggests, there are five types of innovation. First, innovation can refer to the creation of new products or services via research and development. Second, a change in the application of a product or service away from its original purpose is also an innovation. A third form of innovation is changes in the market to which a service or product is applied, different from the originally identified market. Fourthly, changes in the way products or services are developed or changes in the operational and logistical design is a form of innovation. A final form of innovation contains changes in the business model of an organisation and can be considered as organisational innovation (Johnson, 2001). Throughout organisational innovation, the entire structure of an organisation may change. For example the value proposition: the value to be delivered, communicated or acknowledged to the customers or the target group of the organisation may change. Furthermore, the value chain of an organisation can change due to organisational innovation of supply chains, cost structures and working processes. Organisational innovation

can be defined as 'changes in preferences, working processes or management in various functions of an organisation such as research and development, environmental and governmental affairs or worker health and safety' (Armbruster et al., 2008; Ashford, 2001).

Organisational innovation has been studied extensively. Focus points of organisational innovation are: the management of organisational innovation or the prerequisites for successful organisational innovation (Kotter, 1995; Tidd et al., 1997). Another focus point of research into organisational innovation concerns factors that trigger the organisational innovation. These factors include awareness, regulatory requirements, cost savings or expansion of profit and public or employees demand (Ashford, 2001). Next section elaborates on these factors.

2.2 Factors that trigger the organisational innovation

Factors that trigger the organisational innovation related to the environment and to sustainable development, have also been studied for environment-friendly measures such as energy efficiency and waste minimisation. Energy efficiency is one of the most important processes that organisations can implement to mitigate their greenhouse gas emission to reduce their impact on climate change (Lee, 2015). In his research about organisational innovation of processes regarding energy efficiency, Lee (2015) lists various factors that trigger these innovations: cost savings, demand from employees or public to act more sustainable, energy taxes or high energy prices and willingness of the management to innovate processes into energy efficient ones are among the most important factors that trigger the organisational innovation. This means that organisations are most likely to innovate their processes into more sustainable ones if organisations can save money resulting from lowered energy use, have to deal with certain demands from employees or public for energy efficient processes and if organisations have a positive attitude towards and are committed to innovation (Lee, 2015). In contrast to these triggers, some difficulties might hinder innovations towards energy efficiency such as a lack of priority and awareness (Lee, 2015). In terms of a lack of priority, an organisation does not give priority to innovate processes into energy efficient ones, causing a hinder for organisational innovation. In terms of a lack of awareness, an organisation does not have knowledge and is not concern about environmental issues and consequences of current processes so that organisational innovation is not brought up for discussion.

To achieve waste minimisation, production facilities ideally should only supply the demanded products, in order not to produce any waste. Moreover, the product itself should never be wasted. This latter reason is why resources ought to be renewable and products ought to be biodegradable (Mulholland et al., 2000). Olgyaiová et al. (2005) and Osmani (2012) enumerate various factors that trigger innovation in view of waste minimisation such as taxes on waste disposal and cost savings on waste minimisation. Tonglet et al. (2004) indicate that

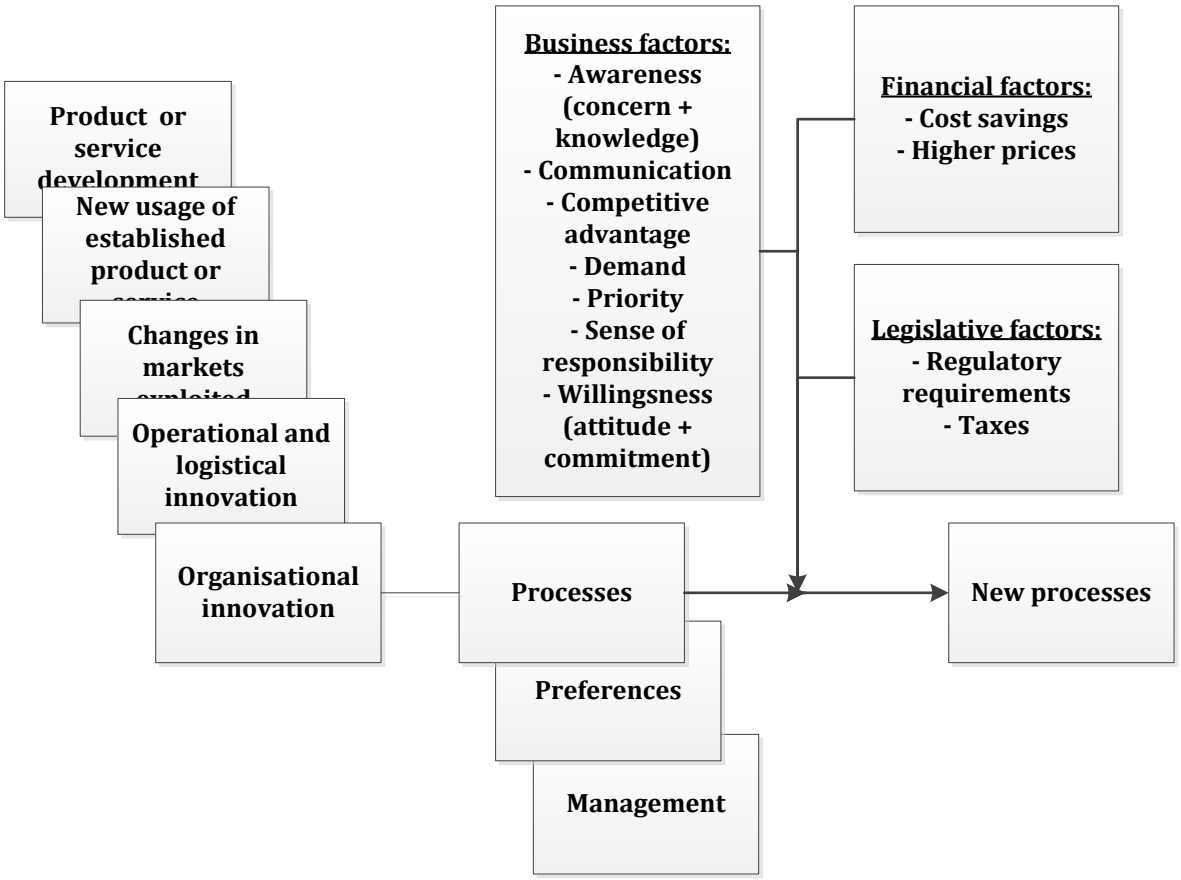
awareness, defined as knowledge and concern about environmental issues and consequences of waste, and competitive advantage of waste minimisation are factors that trigger the organisational innovation. Competitive advantage indicates is the superiority an organisation can gain when it offers service at a lower price or can provide greater value.

Next to waste reduction in general, there is also research on which factors trigger the organisational innovation more specifically concerning food waste reduction. The most widespread research regard investigations in Danish hospitals and nursing homes, regard retailers in Wales, and in households in the United Kingdom (Graham-Rowe et al., 2015; Ofei et al., 2015; Sonnino & McWilliam, 2011). They come up with factors such as cost savings, willingness of the management to innovate processes into food waste reductive ones, sense of responsibility, priority, communication and regulatory requirements. Sense of responsibility as a factor that triggers organisational innovation for food waste reduction indicates that organisations have a feeling of ownership towards the food they waste and that the organisation takes responsibility to reduce it (Ofei et al., 2015). The factor priority is that organisations consider food waste reduction as a priority over other activities (Ofei et al., 2015). Communication about food waste and about potential innovations for food waste reduction promotes collaboration which triggers organisational innovation for food waste reduction (Ofei et al., 2015). Regulatory requirement as a factor that triggers organisational innovation indicates that there is certain governmental regulation that makes it easier or more attractive to reduce food waste. Nowadays there are mainly regulatory constraints that limit the reuse of food in other meals. If these constraints are replaced requirements that make food waste reduction more attractive, organisational innovation for food waste reduction can be triggered (Ofei et al., 2015).

Figure 2.1 provides an overview of the issues discussed so far. There are five types of innovation; organisational innovation is one of them. As said, organisational innovation comprehends changes in an organisation due to new preferences, new management and new working processes. These changes are triggered by several factors. The changes and their determining factors have been investigated in research about organisational innovation in general and related to energy efficiency and waste minimisation in particular. The triggering factors can be distinguished into three categories: business factors, legislative factors and financial factors. Business factors trigger the organisational innovation from within the organisation such as willingness of the management to innovate, which includes attitude towards and commitment to innovation, or priority and competitive advantage. Employees and public demand, awareness and sense of responsibility are also labelled as a business factor. Legislative factors trigger the organisational innovation through governmental regulations such

as taxes. Financial factors relate to the opportunities to save costs or are related to a higher profit.

Figure 2.1 Organisational innovation and factors that trigger it



2.3 The Dutch hospitality sector

Organisational innovation occurs in all types of organisations, including the Dutch hospitality sector. This section focuses on the possible innovative processes an organisation in the foodservice sector can implement to reduce food waste. Figure 2.2 shows the different phases of the food relevant supply chain within a Dutch hospitality organisation. The chain starts with 'sales e.g. tickets'. Based on reservations, weather, holidays et cetera estimations are made about the amount of sales. Based on these estimations, food and beverages are purchased. Next, these purchases are stored. Then, the food has to be prepared to serve the expected customers quickly and well. Prepared food that is not sold can be stored refrigerated for maximum one day, as the arrow from 'preparation' back to 'storage' illustrates. Throughout this supply chain, from purchase to sale, food waste is created, illustrated by the arrow underneath all stages in the chain to 'waste processing' (Q-Point, 2012-2014).

The possible processes an organisation in the foodservice sector can implement to reduce food waste are already examined in other sectors such as Danish hospitals and nursing

homes and households of the United Kingdom (Ofei et al., 2015; Van Gelderen & Masurel, 2012). These processes comprehend the monitoring of food waste, the improving estimation of customers, some planning routines and the education and training of employees. Also 'first in first out', using the products which the organisation purchased first, and flexibility in portion size are processes that organisations implemented to reduce food waste (Ofei et al., 2015). Figure 2.2 visualises the Dutch hospitality supply chain. This figure summarises the implementable processes as discussed above (lower oblique squares). The upper oblique square is adapted from figure 1.7 in chapter 1, representing the specificities of the Dutch hospitality sector.

Figure 2.2 The Dutch hospitality supply chain including implementable processes and difficulties

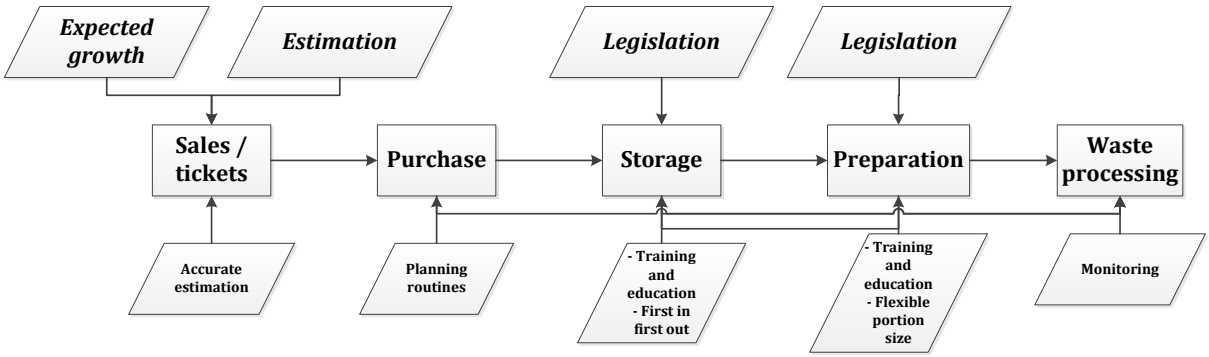


Figure 2.2 indicates five points of application for the innovation of processes to reduce food waste in the Dutch hospitality sector with the specificities of this sector, as discussed in chapter 1, taken into account. One of the reasons for special attention for the Dutch hospitality sector concerning food waste reduction occurs in the first stage of the DHSC and concerns an inaccurate estimation of the expected customers (Soethoudt, 2012). The process that estimates the amount of customers each day can be innovated to ensure that the expected number of customers is more accurate (Ofei et al., 2015). In the second stage of the DHSC, planning routines can be innovated in order attempt food waste reduction (Soethoudt, 2012). Planning routines, such as checking inventory levels, may decrease product spoilage (Soethoudt, 2012). In the third stage, certain laws apply that cause food waste. Examples are: prepared food cannot be stored refrigerated for longer than one day and products may not be used after the expiration date (Kenniscentrum Horeca, 2012). By training and educating employees, fewer mistakes will be made regarding the storage of processed products and by handling 'first in firsts out' less products will pass the expiration date (Ofei et al., 2015). Also in the fourth stage, certain laws apply that cause food waste; for example, prepared and unrefrigerated presented food has to be thrown away after two hours, because it cannot be saved due to food security (Kenniscentrum

Horeca, 2012). By training and educating employees, the amount of food will be more consistent with the expected number of customers, which reduces the change that too much prepared and unrefrigerated presented food has to be thrown away after two hours. Also, by introducing flexibility in portion size, customers dish up the amount of food that they can eat which reduces food waste (Ofei et al., 2015). A final process that can be implemented during organisational innovation is monitoring. It appears that monitoring of food waste, and the feedback of the results of monitoring, contributes to knowledge about the amount of food waste an organisation generates and the processes which cause food waste. This helps an organisation to combat food waste (Ofei et al., 2015; Van Gelderen & Masurel, 2012).

2.4 Operationalisation of concepts

This section operationalises the concepts as described in this chapter, based on what is found in literature. In case there is no proper operationalisation found in literature or if this research handles another operationalisation of the concept than found in literature, then it is explained which operationalisation is used instead. First the factors that trigger the organisational innovation of processes regarding food waste are operationalised and then the implementable processes.

Awareness as a factor that triggers organisational innovation is the knowledge and concern about environmental issues and consequences of current processes (Tonglet et al., 2004). In this research awareness is defined as the knowledge and concern about food waste, and knowledge about implementable processes towards food waste reduction. Communication is described in literature as communication about food waste and about potential innovations for food waste reduction to promote collaboration as a trigger for organisational innovation for food waste reduction (Ofei et al., 2015). In this thesis the concept 'communication' is adopted as communication between employees about the implemented processes for food waste reduction, so employees point out to each other that the processes are being executed correctly. Competitive advantage is the advantage that an organisation can gain when it offers service at a lower price or can provide greater value (Tonglet et al., 2004). Demand as a factor that triggers organisational innovation is the demand from employees or public for certain processes (Lee, 2015). This study only included demand from public, since it is expected that food waste reduction in processes in organisations in the Dutch hospitality sector is barely coming from bottom-up. Priority means the priority an organisation gives to innovation of certain processes (Lee, 2015). Sense of responsibility is the responsibility that organisations feel for their food they waste (Ofei et al., 2015). In this thesis sense of responsibility is the responsibility organisations feel for their actions resulting in food waste. This sense of responsibility can originate from responsibility for the society, the environment and for sustainability. Willingness

as a factor that triggers organisational innovation is the attitude towards and commitment of the management of an organisation to innovation (Ofei et al., 2015). Cost savings is the opportunity to save costs or to expand profit by innovation (Lee, 2015). In this thesis cost savings is explained as the possibility to reduce costs or to enlarge margin. Higher prices mean the higher prices of current processes (Ofei et al., 2015). Regulatory requirements are certain governmental regulations that make it attractive to innovate current processes, because current processes are not profitable (Ofei et al., 2015). Taxes is operationalised to taxes on current processes that make current processes more expensive (Osmani, 2012; Olgyaiová et al., 2005).

An accurate estimation of expected customers as an implementable process is an accurate expectation of number of customers (Ofei et al., 2015). Planning routines are routines such as checking inventory levels (Soethoudt, 2012). In this thesis planning routines are routines for inventory management such as 'first in, first out' and ordering on the basis of what is needed. 'First in first out' means using first the products which the organisation purchased first (Ofei et al., 2015). Training and education is defined in literature as training and educating employees, so less mistakes are made regarding the storage of processed products (Ofei et al., 2015). In addition, training and education ensure that the amount of food will be more consistent with the expected number of customers, which reduces the change that too much prepared food is presented (Ofei et al., 2015). In this thesis training and education is operationalised to the instruction and training of employees concerning processes and communication within an organisation about the execution of these processes to reduce food waste. Monitoring as an implementable process is the monitoring of food waste and feedback of monitoring results (Ofei et al., 2015).

2.5 Conceptual model

The conceptual model (see figure 2.3) visualises the link between different concepts, as discussed in this chapter, which are used during empirical research. Food waste contributes to climate change (Raloff, 2014). In order to combat climate change and their effects, sustainable development of food production, and thus food waste reduction, is desirable (FAO, 2014). Innovation can contribute to food waste reduction. Section 2.1 deepened in the concepts of innovation and organisational innovation in particular. Organisational innovation indicates the changes in processes, preferences and management in various functions of an organisation (Armbruster et al., 2008; Ashford, 2001). This is visualised with the arrow from 'organisational innovation' to 'processes'.

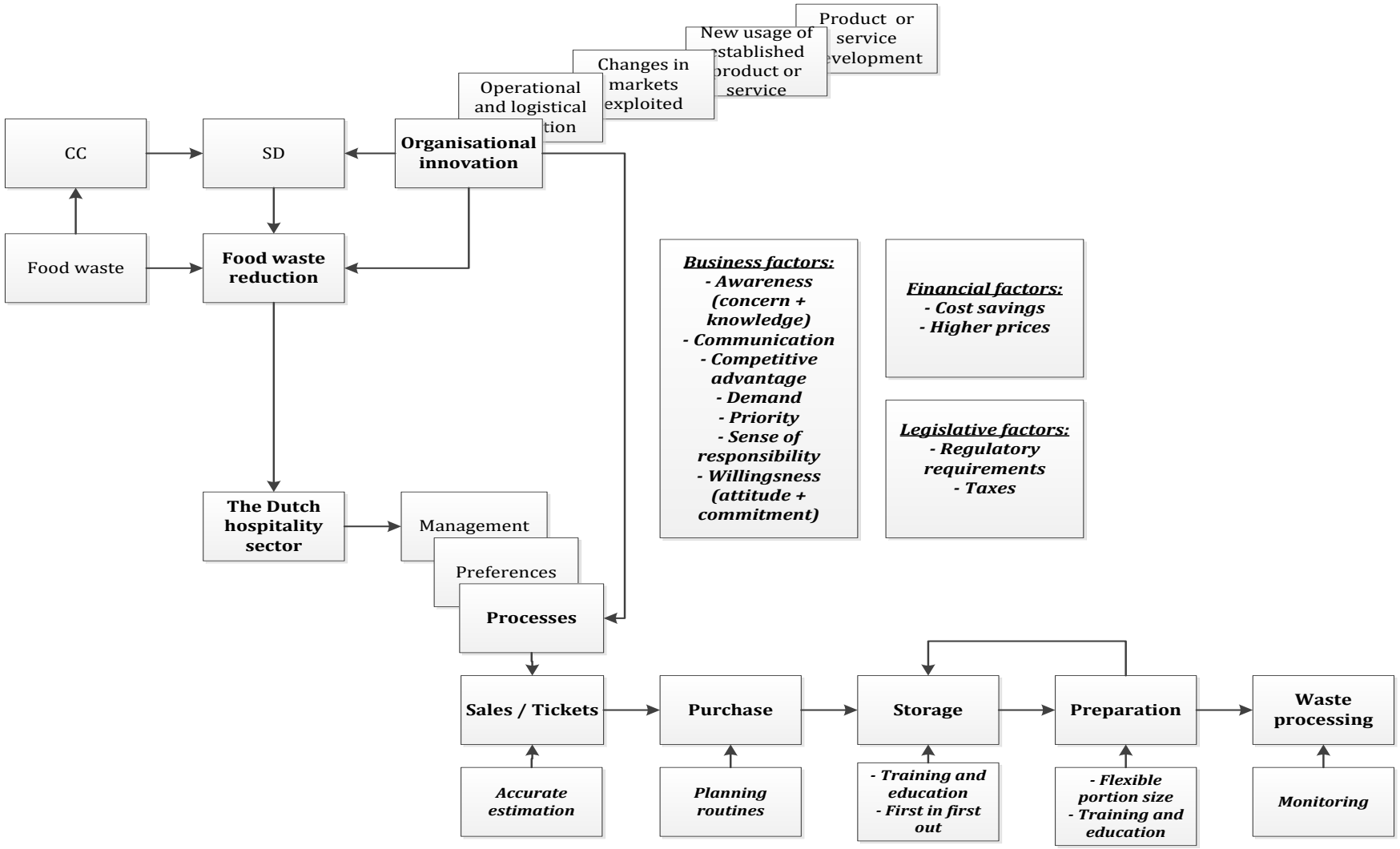
Next to the arrow from 'organisational innovation' to 'processes' are the factors illustrated that trigger the organisational innovation of processes, as one focus point for research on organisational innovation. These factors are explained in section 2.2 and can be

distinguished into three categories: business factors, legislative factors and financial factors. These factors are visualised in the boxes next to the arrow from 'organisational innovation' to 'processes'. These factors are used as a guide during the research to examine which factors trigger the organisational innovation of processes regarding food waste reduction in the Dutch hospitality sector: do they match? Are there more, fewer or other factors in this sector than in literature?

Every organisation in the Global Food Supply Chain has its own micro supply chain. This also accounts for organisations in the Dutch hospitality sector. This Dutch hospitality supply chain consists of sales e.g. tickets, purchasing based on this estimation, storage, preparation of food and food waste. In the current execution of the processes within this chain, food waste is produced. By innovating these processes, food waste can be reduced in the Dutch hospitality sector. There is already some literature about innovative processes regarding food waste reduction (Ofei et al., 2015; Van Gelderen & Masurel, 2012). The results of this literature are described in the boxes under the DHSC and serve as guide for the research. Throughout the research, it is being examined whether these innovative processes are already implemented, or if there are other, more or less innovative processes regarding food waste reduction implemented in the Dutch hospitality sector.

It is expected that the innovative processes for food waste reduction in the Dutch hospitality sector can be organised around the core point of the explained DHSC. This means that the processes regarding food waste reduction that are mostly implemented in organisations in the Dutch hospitality are: an accurate estimation of customers, planning routines, training and education, first in first out, flexible portion size and monitoring. Next it is expected that factors triggering organisational innovation can be organised around the existing literature about triggering factor. This means that cost savings, willingness, sense of responsibility, priority, communication and regulatory requirements are the main factors that trigger the organisational innovation in the Dutch hospitality sector. This expectation is examined on the basis of the methods as described in the next chapter. On the basis of this expectation, conclusions are drawn about the current state of food waste reduction in the Dutch hospitality sector.

Figure 2.3 Conceptual model



Chapter 3. Methodology

Chapter 3 describes what exactly is investigated and how the research is executed. Section 3.1 and 3.2 outline the philosophical perspective of this research and its research strategy. Section 3.3 explains the methods by which data are collected and how these data have been analysed. The final section accounts for how this thesis deals with validity and reliability.

3.1 Research philosophy

A research philosophy provides insight into how the world is seen and acted upon by the researcher (De Aragão Pereira, 2011). The research philosophy constitutes of an ontology as 'the form and nature of reality', an epistemology as 'the nature of relationship between the knower or would-be knower and what can be known' and a methodology as 'finding out whatever the researcher believes can be known' (Guba & Lincoln, 1994, p.108). Within the philosophy of (social) sciences there are two extremes: positivism and constructivism. The ontology of positivism is that reality exists and is driven by natural laws and mechanisms. The epistemological position of this paradigm is that the researcher and research objects are independent entities that cannot be influenced by the researcher. Methods used in this paradigm are experimental and have as a goal to verify hypotheses. On the other end of the spectrum one finds a research philosophy in the form of constructivism. The ontology of constructivism states that realities are mental and social constructions which are local and specific in nature. The epistemology of the constructivist is that the researcher and the research objects are linked to each other, so that findings of the research are (partly) created by the researcher as the research proceeds. The methods used in this paradigm are dialectical, since the nature of social constructions can only be elicited and refined by interaction (Guba & Lincoln, 1994).

The research philosophy of this research is an intermediate form: critical theory. The ontological position of critical theory is that reality exists, but is shaped by congeries of social, political or ethnic factors in this paradigm. Consequently, the researcher adopts the position that reality depends and the social construction and this position rules of the methods of the research (Guba & Lincoln, 1994). The epistemology of critical theory is that the researcher and the research objects are inevitably linked to the values of the researcher. This means that 'researchers understand and interpret the social world in light of their anticipatory prejudgement and prejudices' (Chowdhury, 2014, p. 436). As a consequence, the analysis of collected data is explained from the researcher's view on reality. This does not mean that the outcomes of this thesis are negligible, but it does means that this thesis helps to understand the social world by a meaningful interpretation of the world.

3.2 Research strategy

The research strategy is the general orientation of the conduct of social research (Bryman, 2012, p.35). This section describes the qualitative basis of this research, the both indicative and deductive approaches and the strategies used in this research. This research is conducted on the basis of a qualitative research. Qualitative research involves an in-depth understanding of human behaviour and the motives of human behaviour (Bryman, 2012, p.116). Qualitative research is about obtaining insight into underlying reasons, opinions and motivations described in words instead of numbers. The aim of this study is to provide an understanding of the current state concerning food waste reduction in the Dutch hospitality sector. With that in mind, this study aims to provide insight into three main themes. These are 1) the innovative processes that are already implemented in Dutch hospitality organisations to reduce food waste, 2) factors that trigger the organisational innovation of processes regarding food waste reduction in the Dutch hospitality sector and about 3) what difficulties organisations in this sector encounter with (further) implementation of innovative processes concerning food waste reduction.

The thesis is conducted on the basis of inductive approach: 'relationship between theory and research whereby the former is generated out of the latter' (Bryman, 2012, p. 380). This thesis aims to form a 'theory' about the current state concerning food waste reduction in the Dutch hospitality sector, founded on qualitative research. However, this thesis also uses a deductive approach. This approach is illustrated by the cases organised around the variables of processes that are already implemented, factors that trigger the organisational innovation for food waste reduction and difficulties with (further) implementation of processes regarding food waste reduction. This data is also used to construct the 'theory'. These variables of processes that are already implemented and factors that trigger the organisational innovation are derived from scientific literature, as described in chapter 2.

This thesis combines two strategies to answer the research question. The first strategy is a literature review. The literature review, described and illustrated in the theoretical framework in chapter 2, focuses on organisational innovation and factors that trigger the organisational innovation of processes. The literature review is also used to gather information about innovative processes regarding food waste reduction that are already implemented in other hospitality sectors than, yet comparable with, the Dutch hospitality sector. Furthermore, the literature review elaborates on the specificity of the Dutch hospitality sector, as described in chapter 1. The findings of the literature review serve as a guideline throughout data collection to get insight into the current state concerning food waste reduction in the Dutch hospitality sector. As regards the factors that trigger the organisational innovation, this thesis examines whether the factors discovered in the literature review also apply to food waste reduction in the Dutch hospitality or if there are more, less or other factors in play. As regards the innovative processes

that contribute to food waste reduction, the thesis examines what innovative processes regarding food waste reduction, according to the literature review, are already implemented in the Dutch hospitality sector, or if there are other innovative processes in play.

The second strategy is a case study. Cases are used to explore the current state concerning food waste reduction in the Dutch hospitality sector. A case study is the detailed and intensive analysis of one case or multiple cases in a certain context (Bryman, 2012, p.66). On the basis of a multiple case approach, the findings of the literature about food waste are tested on their validity in the Dutch hospitality sector to provide an understanding of the current state concerning food waste reduction in the Dutch hospitality sector. Moreover, the case studies are used to provide more insight into the difficulties that organisations in this sector encounter.

3.3 Research methods

Section 3.3.1 and 3.3.2 describe the case selection and how data are collected. The third section describes how the collected data are analysed.

3.3.1 Case selection

The multiple cases that are selected for this research are organisations in Dutch hospitality sector. However, only organisations that do not belong to the average restaurants or cafés who use la carte menus are selected. Examples are restaurants in amusements parks or zoos, established self-service restaurants, established fast food restaurants and cafeterias. This selection was made as these types of restaurants are considered to contain all four specificities of the Dutch hospitality sector, as described in section 1.4, which are related to an inaccurate estimation of customers, legislation (presentation of food and storage of prepared food) and an expected growth. In particular, the inaccurate estimation of customers holds for organisation without la carte menus. That is because these types of organisations choose to prepare in advance and present their food and beverages to serve the customers quick and well. Due to an inaccurate estimation of customers, however it is likely that prepared and presented food has to be thrown away before it is consumed.

In order to recruit cases for this research, an appeal was made to approximately 25 organisations in the Dutch hospitality sector. This case selection could benefit from connections with Dutch hospitality organisation from and market knowledge of Q-Point Consultancy (from now on ‘Q-Point’). In return, Q-Point joined some interviews to use the outcomes for a potential market research. The appeal was made via e-mail and via phone. All the organisations that asserted to contribute to this research are selected as cases for this thesis. Therefore, the selection of cases is not a-select. A-select cases are preferred in quantitative research since the potential to generalise the findings is greater (Baarda et al., 2012). However, the findings of qualitative research are to specify a theory rather generalise findings (Bryman, 2012, p.406).

This means that this thesis aims to verify results found in literature regarding their validity for the Dutch hospitality sector and to examine what difficulties organisations in this sector encounter with further innovation regarding food waste reduction. Therefore, the outcome of this thesis is not affected whether or not the cases are a-select.

Appendix 1 presents an overview of the 12 selected cases, in alphabetical order (organisation starts with an A = 1, B = 2 and so forth). A brief description of the cases clarifies the circumstances in which the interview and observations of the cases are conducted. These descriptions show that there is large variety among these hospitality organisations and that the organisations range from restaurants in zoos to catering organisations.

3.3.2 Data collection

Various methods are used to obtain information necessary to answer the research questions and to achieve the research objective and realise triangulation. Method triangulation helps find agreement in the outcomes to increase the reliability and validity of this research (Bryman, 2012). Data are collected primarily through interviews. Moreover, observations and secondary data are used to gather extra information. The following sections explain the different methods used and to which insights these methods lead.

3.3.2.1 Interviews

A qualitative interview has been conducted in all the selected cases. This research utilises semi-structured interviews that offer the possibility to deviate from the questionnaire and the flexibility regarding questions asked so as to obtain detailed answers (Baarda et al., 2012, p.193; Bryman, 2012, p.470). This makes it possible to stay open-minded about the contours of the interview and to delve into the interviewee's point of view to ensure a higher in-depth warranty (Bryman, 2012, p.12). Most of these interviews are carried out face-to-face, with one exception. One organisation wanted to contribute to the research, but there was no time to conduct a face-to-face interview.

As stated in the previous section, some interviews are also conducted in combination with an introductory meeting with Q-Point. As a result, the interview sometimes elaborated more on issues that are interesting for Q-Point. Combining the interview with an introductory meeting did not have consequences on ensuring depth. In fact, since the difficulties that organisations have with (further) innovation of processes for food waste reduction are an interesting issue for Q-Point, interviews combined with an introductory meeting with Q-Point provided even more insight into these difficulties. It can be assumed that combining the interview with an introductory meeting with Q-Point made interviewees more talkative about difficulties the organisation encounters with food waste reduction.

A questionnaire had been prepared for the semi-structured interviews, which served as a guideline (see appendix 2, in Dutch). During the interview, questions were not posed in the exact order outlined and extra questions might have been being asked as the researcher picks on things said by the interviewee. But throughout all interviews, all questions are asked in a similar wording.

The first series of questions concerns environment-friendly measures. These gave insight into what environment-friendly measures are already implemented to contribute to sustainable development within the organisation. The answers these questions give an answer to the first sub-question: '*What is the current state of implementation of environment-friendly measures in the processes of organisations in the Dutch hospitality sector?*'

The second series of questions provided insight into the extent the organisation includes specific processes regarding food waste reduction in its organisational structures and what type of processes the organisation were implemented. Findings of the literature review about innovative processes that reduce food waste are used as a lead in these questions concerning processes already implemented in the Dutch hospitality sector. These insights ought to give an answer to the second sub-question: '*What innovative processes do organisations in the Dutch hospitality sector already implement alongside their Dutch hospitality supply chain to reduce their food waste?*' The interview continued with questions that attempted to provide an understanding of the triggers for food waste reduction in the organisation. Findings of the literature review about factors that trigger the organisational innovation are used as a lead in the question concerning factors that trigger the organisational innovation for food waste reduction. The responses to these questions answer the third sub-question: *'What factors trigger organisations in the Dutch hospitality sector to innovate processes that generate food waste?'.*

The final questions aimed to provide an insight into the difficulties the organisations encounter with the (further) implementation of innovative processes regarding food waste reduction. The response to these questions gave an answer to the final sub-question: *'What difficulties does the Dutch hospitality sector encounter with (further) implementation of processes regarding food waste reduction?*'

3.3.2.2 Observations

It is inevitable that individuals do not always say what they do or do what they say. This means there is always some sort of gap between stated behaviour and actual behaviour (Bryman, 2012). A solution is to directly observe behaviour (Bryman, 2012). Therefore in this thesis, observations of Dutch hospitality organisations are used as a complement to the interviews. During these observations, the implemented processes regarding food waste reduction are observed to verify the issues discussed in the interviews, as far as possible, to examine if the researcher correctly understood the discussed issues. Nine cases are observed for this thesis.

However, most of these cases had multiple restaurant locations. Only one location has been observed for each case. Also, due to circumstances, three cases are not observed. Although this may affect the reliability of this research, the missing observations do not have consequences for the overall outcome, because the outcomes of the observations combined outweighs the outcome of each individual observation.

The observations focused on whether or not the innovative processes that are implemented to reduce food waste as mentioned in the interviews are also noticeable within the organisation. These are the processes as they can be seen by the customers. Processes that happen behind the scenes are not included. During the observation, attention has been paid to, for example, how dishes are presented (refrigerated or unrefrigerated), if it is possible to compile an own dish and/or to vary in portion size, the amount of prepared food and if employees of the organisations are preparing stock in between. Attention has also been payed to whether or not and how the organisation communicates about sustainability and food waste reduction to/with its customers. An observation scheme is drafted to examine these issues (see appendix 3, in Dutch). Appendix 1 provides an overview of the cases that are observed and when these cases are observed.

The observations are conducted individually, so influence of others is avoided. Where possible, the observations are conducted at different times than the interviews. In this manner, the researcher tried to prevent that the outcomes of the interview influence the conduction of observations and vice versa.

3.3.2.3 Secondary data

Secondary data entails data collected by others (Bryman, 2012, p.312). The advantage of secondary data is that it saves costs and time and it may offer new interpretations. Secondary data are used to gather additional information of the selected cases concerning sustainable development, food waste and food waste reduction. It is also used for the purpose of method triangulation to execute a reliable research. The secondary data used in this thesis are websites of the selected organisations, annual reports and financial reports of the selected cases and other documents such as Global Reporting Initiative (GRI) report or Corporate Social Responsibility (CSR) reports. These secondary data provide insight into the organisations' communication about sustainability and food waste reduction. They also provide an understanding of innovative processes the organisations already implemented concerning sustainability and food waste reduction. These websites and documents are probably also used as promotion material for the organisations. Therefore, the sustainability performance can be presented more advanced than it actually is. A list of terms that are examined during the analysis of secondary data is added in the appendices (see appendix 4). As mentioned earlier, Q-Point provided suggestions for organisations as cases may appear to be interesting market

opportunity for Q-Point. In return, market knowledge of Q-Point is used as secondary data in this thesis. Data collected by Q-Point provided the researcher with knowledge of the processes within organisations in the Dutch hospitality sector.

3.3.4 Data analysis

Throughout the collecting of data, interviews are recorded and observations and secondary data are documented. These records and reports are analysed in different phases. (Bryman, 2012, p.13).

First of all, the data are ordered. In this phase the twelve cases are randomly numbered from one to 12. This order differs from the numbering in appendix 1 (case description), in which organisations are ordered alphabetical, to prevent recognition. In both data analysis and appendix 1 the organisations are numbered, instead of called by name, too assure anonymity as guaranteed to the interviewees. Furthermore, this phase examines whether there are obvious flaws. These obvious flaws, if present, are not involved in the data analysis.

In the second phase the documentation of the observations and secondary data are reported in Dutch and the records of interviews are transcribed in Dutch, except for one interview which was conducted in English. During this transcription, fragments of interviews that answer the sub-questions are transcribed. The time of these fragments in this interview are registered, which enables finding and verifying them. This selective method of transcription has been chosen, instead of transcribing the whole interviews, because the context and interpretation of interview are less significant and therefore omitted. After the interviews are transcribed and the observations and secondary data are reported, the findings were ready to analyse.

In the third phase, labels are created to categorise the interviews, observations and secondary data into the four sub-questions. Matching the sub-questions, the following labels have been created: 1) implementation of environment-friendly measures concerning sustainable development, 2) implemented processes regarding food waste reduction, 3) factors that trigger the organisational innovation of processes regarding food waste reduction and 4) difficulties with (further) implementation of innovative processes regarding food waste reduction.

In the fourth phase of the data analysis, all the transcribed fragments reported observations and secondary data were given the appropriate label.

Then, in the fifth phase, parts of the fragments of the interview and parts report of the secondary data and observation are sub-labelled. A sub-label is a concept that summarises the fragment or part and can be reused if the concept appears in more organisations. These sub-labels are, where applicable, linked to concepts of implementable processes and factors that trigger the organisational innovation, referring to the concepts thereon presented in chapter 2. All the fragments of the interviews and all the parts of the observations and secondary data are

now sub-labelled within one of the four categories. Figure 3.1 presents an example of this labelling process: it first presents a quote and the number in the margin reflects the time of the quote in the interview. The red mark is used for the data analysis. It indicates the label 'factors that trigger the organisational innovation of processes regarding food waste reduction' (3) and the sub-label (costs). Economic advantage is in this example the notion that is linked to the sub-labels costs.

Figure 3.1 Example of data analysis

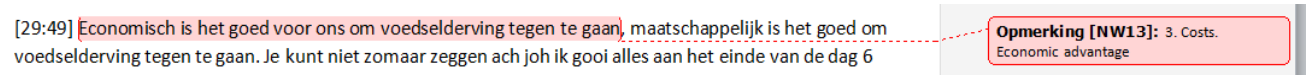


Table 3.1 presents an example of the sixth, and final, phase of the data analysis. The outcomes of phase one to five are presented in a table. The first column describes the label, in the example label three. This label turns the research question into descriptive concepts. During the interview (column 3), answers are given by all organisations concerning factors that trigger the organisational innovation for processes regarding food waste reduction. For example, organisations 1, 2, 4, 5, 8, 10, 11 and 12 indicate that cost reduction is a trigger to innovate processes to reduce food waste. Organisations 3, 6 and 9 indicate that the possibility to enlarge margin is a factor that triggers organisational innovation for food waste reduction. These arguments and triggers are a part of 'costs'. The sub-label 'costs' is a factor that triggers organisational innovation of processes regarding food waste reduction.

Table 3.1 Example of analysis scheme

Factors that trigger organisational innovation of processes concerning food waste reduction		*Interview*											
		Costs											
		Economic advantages/ cost reduction	1	2		4	5			8		10	11	12
		Enlarge margin			3			6			9			

When the scheme is filled in (see appendix 5), the findings can be analysed, which is reported in chapter 4. The labels one to four, aiming to answer the matching sub-questions, are presented in four separate sections: each section present one of the four main labels. The sections are subdivided into new sections. These 'sub-sections' elucidate a sub-label, belonging to the label. The sub-sections contain: an explanation of these sub-labels, a table that indicates how many times the sub-label appears and a review of these labels. Quotes of the interviews or citations from the reports of observation and secondary data are used as a support for the elucidation of the sub-labels. Since most of the interviews are conducted in Dutch, the quotes are the researcher's own translation. The quote which is not an own translation is indicated with 'literally translated'. Also, the Dutch secondary data are translated by the researcher. If secondary data were already written in English it is indicated with 'literally translated'. The

review of each sub-label attempts to analyse the findings by comparing the outcomes and by casting a critical eye on it to discover remarkable or odd issues to provide an understanding of the current state concerning food wastage reduction of the Dutch hospitality sector.

3.3.5 Ethics

It is important to conduct the research in an ethically acceptable manner. Therefore, the following requirements are taken into account during the collection of data, the analysis of data and the discussion of the results: the respondent has explicitly consented to research; the respondent is properly informed about the research and data is processed anonymously. The latter means that although the organisations that contributed to this research are well defined, who the interviewees are and what outcomes belong to which organisation are not identified. Other requirements include conducting the research in a fair and scientific manner and the independent operations of the researcher (Baarda et al., 2012, p38-39; Bryman, 2012, p.135-140). Although the cooperative relationship with Q-Point gained more insight into the Dutch hospitality sector and provided cases for this research, the researcher operated independently.

3.4 Reliability and validity

Reliability and validity are important criteria in establishing and assessing the quality of research. However, there is some discussion about the relevance of these criteria according to qualitative research: reliability and validity require different kinds of measures in qualitative research (Bryman, 2012, p.389). Validity consists of internal and external validity. Internal validity states something about the quality of the research design; in this case the importance of the validity of concepts, which can be achieved by credibility. Credibility is the actual measurement of what the researcher claims to measure to determine the acceptability of the findings. This is attained by using more than one method to check the results: triangulation (Bryman, 2012). In this thesis interviews, observations and secondary data are used to determine whether or not the results obtained are homogeneous. Furthermore, this thesis achieved credibility by using consistent concepts. This means that concepts of implementable processes and factors that trigger the organisational innovation, as found in literature, are used during data collection.

External validity is the extent to which results of a study can be generalised to the wider world, which for this thesis means the complete Dutch hospitality sector. In qualitative research, external validity is achieved by transferability, which is the thick description of the circumstances (e.g. environment and time) in which data are collected. Appendix 1 provides a description of the selected cases that clarifies the circumstances in which the interview and observations of the cases are conducted and summarises the outcomes of the research. Moreover, fieldwork documentation is written for each case, describing the time and

circumstances in which the data are collected. These documentations can be obtained from the researcher. Based on the descriptions and fieldwork documentation, there is large variety among the selected cases, which increases the generalisability of the outcomes to the Dutch hospitality sector. It is, however, up to other researchers to make judgements about the circumstances this research is conducted in, and whether these circumstances can be translated into the total Dutch hospitality sector (Bryman, 2012).

Reliability can be achieved with the realisation of dependability and confirmability. Dependability can be explained on the basis of traceability; it increases the ability to verify the history and location, through documentation and records (Bryman, 2012). For this thesis, complete records are collected throughout the research processes. All parts of the process, such as fieldwork notes, recordings and transcripts of interview, deregistration of observations and secondary data, and various editions of the thesis after obtaining feedback to gain insight into the process of problem formulation and analysis, are collected as satisfactorily as possible. All these documents can be obtained from the researcher. The other criterion involved in ensuring reliability is confirmability. This criterion acknowledges that complete objectivity is impossible in qualitative research; the researcher, however, can show that she acted in good faith; the researcher did not openly allow personal values (Bryman, 2012). The researcher described interpretations of the findings in the data analysis to provide reasons why personal values are excluded.

Chapter 4. Results

This chapter presents the empirical results and is divided into four sections: sustainability in the Dutch hospitality sector, innovative processes for food waste reduction in the Dutch hospitality sector, factors that trigger the organisational innovation of processes for food waste reduction in the Dutch hospitality sector, and difficulties with (further) implementation of processes regarding food waste reduction. These four sections aim to answer the four research questions of this thesis, as enumerated in chapter 1. Each section elucidates the outcomes of the research methods to answer the corresponding research question. These outcomes are critically analysed: what they mean, what they say and how they relate to other sub-labels.

Every outcome corresponding to the research question includes a table. This table shows how many organisations agree to include the outcome in the organisation; it does not clarify which organisations are involved. The four sections are therefore in descending order: beginning with the sub-label with the most organisation and ending with the sub-label with the least organisations.

4.1 Sustainability in the Dutch hospitality sector

This section provides insights into the environment-friendly measures already implemented within organisations in the Dutch hospitality sector. These environment-friendly measures involve obtaining a certification and writing reports, minimising resource use, and recycling as well as the origin of food products, education and innovation, and foundation of funds.

4.1.1 Certification and reports

There are certificates that organisations can obtain to show that it contributes to sustainable development. Examples of certificates that organisations in the Dutch hospitality sector include BREEAM and Green Key. The BREEAM certificate provides insight into the performance of a (renovated) building as regards sustainability. Meanwhile, organisations with a Green Key certificate strive to protect the natural environment, without sacrificing comfort and quality for their guests. Organisations can also choose to have a sustainability report in which they describe how the organisation contributes to sustainable development. Examples of reports written for organisations in the Dutch hospitality sector are the Corporate Social Responsibility (CSR) and Global Reporting Initiative (GRI). The GRI helps organisations understand and communicate their impact on critical sustainability issues such as climate change, while CSR refers to how organisations take responsibility for their impact on society. Sustainable development and environment-friendly measures are not mandatory subjects in this report. Notably, it is possible that organisations in the Dutch hospitality sector formulate their own sustainable development report.

Organisation 8 [interview 00:16]: *'We now try to achieve a BREEAM-certificate, BREAM-standardisation. This certificate is building-wide.'*
Organisation 6 [secondary data, annual report]: *'*Organisation *recently won the Green Key certificate Silver!'*
Organisation 2 [interview 05:22]: *'We fill out GRI.'*
Organisation 7 [secondary data, CSR]: *'In this report, you'll read about how we're building on many years of working with social and environmental issues to ensure we have a positive impact on people and the planet.'*
Organisation 11 [interview 01:23]: *'We have our own* name *Plan in* organisation*, maybe good to mention... our plan with all the sustainability goals we have.'*

Table 4.1 Certification and reports

Certification and reports	9 out of 12 organisations
CSR	6 organisations
Green Key	4 organisations
Own sustainability plan	2 organisations
GRI	1 organisation
BREEAM	1 organisation

Most organisations have a Green Key certification or write a CSR report. Three organisations that write a CSR report also have a Green Key certificate. Organisations with a Green Key certification go a step further than what laws and regulations require, where there are gradations from little (bronze) to progressive steps (gold). Organisations with a CSR report describe their effects and communicate how they contribute to a better society. Because three of the four organisations that write a CSR report are also Green Key certified, it can be assumed that these CSR reports also include social responsibility of implementing measures to protect the natural environment. The other certifications and reports are not internationally recognised or are less known. Competitive advantage may be a reason why organisations opt to obtain a Green Key certification or to write a CSR report, instead of less-known certifications and reports.

4.1.2 Minimise resource use

Organisations in the Dutch hospitality sector try to minimise their resource use to contribute to sustainable development. This includes minimising water consumption and the use of plastic and other materials, managing organic waste, and minimising energy production to reduce CO_2 emission.

Organisation 1 [interview 00:14]: *'Take into account the flushing of glasses... indeed, turning the water tap off.'*
Organisation 3 [interview 03:16]: *'To ensure that we do not have 100 different wholesalers at our gates.'*
Organisation 11 [interview 04:28]: *'And food waste is one of the spearheads, so say less organic and VFG* (vegetable, fruit and garden) *waste.'*
Organisation 10 [observation]: Organisation indicates that bread is prepared freshly to ensure quality and to prevent waste.
Organisation 4 [interview 03:22]: *'And we try to do as little plastic as possible.'*
Organisation 10 [interview 53:41] *'So we do not have any huge parties of cardboard.'*
Organisation 7 [secondary data, website]: *'We are working towards an ambitious goal: we want no more crumb of food waste ending in the trash can.'*
Organisation 2 [secondary data, GRI]: *'The following topics are important for us: reducing energy and water use, mobility and reducing transport, reducing CO_2 emissions, reducing waste and reducing food waste, avoiding environmental complaints, reducing and preserving raw materials (assortment, paper consumption ...).'*

Table 4.2 Minimise resource use

Minimise resource use	8 out of 12 organisations
Water consumption	7 organisation
Energy use or CO_2 footprint	7 organisations
Organic waste	3 organisations
Plastic use	2 organisations
Material use	2 organisations

Seven out of the 12 organisations indicated that they reduce water consumption to minimise resource use and reduce energy use to minimise energy production. Section, 4.3.1, later in this chapter, shows that almost all organisations reduce food waste in order to save costs. It is therefore also possible that organisations implement these above-mentioned environment-friendly measures to easily save costs. Only three organisations claim to reduce organic waste. Meanwhile, section 4.4 demonstrates why reducing organic waste (food waste) is considered difficult and this explains why only three organisations signify organic waste reduction.

4.1.3 Recycling

Recycling is the process of converting waste materials into new materials and objects. Organisations recycle their materials, for example recycling organic waste for energy generation,

or make use of recycled products such as car tires as carpet. Organisations in the Dutch hospitality sector contribute to sustainable development by recycling waste materials, since these avoid using natural resources. A step further than recycling is circularity, which means the exclusion of waste by closed loops, so all materials are used repeatedly.

Organisation 5 [interview 24:44]: *'We do all our food remains in green containers to send it towards biomass power plants.'*
Organisation 8 [interview 01:03]: *'Our coffee residue is picked up and mushrooms are grown on it.'*
Organisation 4 [secondary data, website]: '*Some examples: use of rainwater for the WCs, solar panels above our service parking, floor coverings of recycled tires, where possible use of organic, fairtrade and pet friendly catering products, ecological coffee cultivation in Peru and sugar palm plantations on Borneo.*'
Organisation 12 [secondary data, website]: *'Sustainability is in our genes. We use energy and water, raw materials and waste streams in a closed cycle.'*

Table 4.3 Recycling

Recycling	8 out of 12 organisations
Organic waste	6 organisations
Use of recycled products	1 organisation
Circularity	1 organisation

Although the minimisation of organic waste has only been implemented to a small extent, as described in section 4.1.2, recycling of waste has already been implemented reasonably well in the Dutch hospitality sector. Six of the 12 organisations recycle their organic waste. As noted in the previous section, only three organisations minimise organic waste. Two of these organisations recycle their minimised organic waste, while the other four choose to recycle organic waste instead of minimising it. This indicates that for organisations in the Dutch hospitality sector, it takes less effort to recycle food waste than to minimise it. Only one organisation indicates operating in closed loops, which proves how challenging the implementation of circularity is; hence, only a few organisations implement it.

4.1.4 Origin of food products

Another environment-friendly measure implemented by organisations in the Dutch hospitality sector, is the use of food products with a specific origin. The origin of food can be divided into three scopes: local food products, food products harvested in a particular season and food products of biological origin. The use of local and seasonal products reduces transport costs, as

there is no need to import from other countries. The products of biological origin are prepared with animal and environmental welfare in mind. Moreover, some organisations in the Dutch hospitality sector use products that are certified. A certification mark is a visual judgment about a product that signifies that is it is tested or verified to comply with standards and regulation, which vary from quality to sustainability. The certification mark thus shows that products are prepared under favourable human and environmental conditions. This accounts for fair trade products, which gives all actors in the supply chain a fair price for their products.

Organisations 5 [interview 02:45]: *'That not some kind of cow comes from Venezuela, but that we buy a cow in the Netherlands.'*
Organisation 8 [secondary data, website]: *'... and by working with local suppliers.'*
Organisation 11 [interview 14:13]: *'So we try to work as much as possible with seasonal and local, the Netherlands in our case, products.'*
Organisation 4 [interview, 05:34] *'*Supplier *also, who delivers our fries, at one point they had different products biologically and then they eventually have only one product and then I think 'that's biological so we should take it.'*
Organisation 6 [secondary data, website]: *'This includes goods and services that are preferably provided with an environmental sustainability and / or social certification mark.'*
Organisation 11 [secondary data, website]: *'And note the ethics within all links of the purchasing chain (Star certification of the Animal Protection, Organic Croquette, MSC Fish and Fish Poison, Biodegradable, Sustainable Products, FSC Certification).'*

Table 4.4 Origin of food products

Origin of food products	8 out of 12 organisations
Certification mark	6 organisations
Biological	5 organisations
Local	4 organisations
Fairtrade	3 organisations
Seasonal	1 organisation

Seven of the 12 organisations indicated that they use products that are prepared with animal and environmental welfare considerations or produced under favourable human and environmental conditions. These products often carry a certification mark for biological or fair production, which means that these products are tested or verified to comply with standards and regulation. It is possible that organisations mostly use food products with a certification mark because these products make a fine impression on potential customers.

4.1.5 Education and innovation

There are organisations in the Dutch hospitality sector that consider it their duty to inform visitors and customers about sustainable development or to stimulate their suppliers to implement sustainability. Other organisations consider it important to innovate to be a leader in their market as regards sustainability.

Organisation 3 [interview 00:45]: *'The goal is, as an organisation we have a role in society. It is not just entertainment; it is education and exposing our visitors to everything that is happening in nature.'*
Organisation 6 [secondary data, annual report]: *'*Organisation *aims to: nature conservation in general and nature conservation education.'*
Organisation 7 [observation]: At the waste sites there is communication about food waste: they want to sort organic waste so that the waste can be used for other purposes (e.g. compost or biogas).
Organisation 2 [secondary data, organisations' website]: *'*Organisation *does more; it encourages suppliers to switch to more sustainable products and has an active role in various projects to make the products healthier and more sustainable.'*
Organisation 9 [interview on paper] *'We see ourselves as one of the leaders in the market. We want to go in front with innovation in our assortment.'*

Table 4.5 Education and innovation

Education and innovation	7 out of 12 organisations
Educate visitors (communication)	6 organisations
Stimulate suppliers to implement sustainability	1 organisation
Innovation	1 organisation

Six organisations consider it their duty to educate visitors and customers about sustainable development; therefore, they inform visitors and customers about the environmental impact of human actions. Notably, only one organisation stimulates suppliers to implement sustainability as well; this organisation is progressive in sustainable development and food waste reduction, as the data analysis shows (see appendix 5). Most organisations are not yet in the position to stimulate suppliers.

4.1.6 Other products

Organisations in the Dutch hospitality sector also implement other environment-friendly measures in products other than food. The implementation of these products is categorised under 'other products', for examples biological cleaning detergents and biodegradable disposables. Other organisations design their buildings in such a way that they have, for example, low energy use, which contribute to sustainable development.

Organisation 8 [interview 00:16]: *'We in the catering industry have detergent which is not based on chemicals ... bio-detergent.'*
Organisation 5 [interview 02:45]: *'Therefore, this year we also made the switch to everything compostable, all disposals.'*
Organisation 3 [secondary data, website]: *'When the animal shelters are built or renovated, careful attention is paid to insulation, durable materials and smart technology to save energy.'*

Table 4.6 Other products

Other products	6 out of 12 organisations
Biodegradable disposals	5 organisations
Biological cleaning detergents	3 organisations
Sustainable building	2 organisations

Five of the 12 organisations use biodegradable disposals to contribute to sustainable development. Biodegradable disposals are an excellent alternative to normal disposables because they save water from the dishwasher, and since they are made from organic materials, they can be dissolved in the environment. Nevertheless, proper sorting of these disposables as organic waste is required to ensure that these disposables are dissolved into the environment. Therefore, it is necessary that the customers dispose these disposables into the correct waste bin. It is debatable whether this actually happens, thereby diminishing the positive effect of biodegradable disposables on the environment.

4.1.7 Foundation funds

There are organisations in the Dutch hospitality sector that initiate their own foundation where they raise money and share knowledge and labour for nature conservation projects.

Organisation 4 [interview 02:08]: 'Organisation *itself is also a foundation, we have several projects, for example, closer to the catering industry, the coffee project in Peru to ensure that the natural areas are not all cut for livestock to graze.'*

Organisation 10 [secondary data, website]: 'Organisation *supports many nature conservation projects. These are mostly small projects with a big impact. We support these projects by bringing them to the attention of our visitors, but also through funding and we want to expand this funding with our visitors.'*

Table 4.7 Funds and foundation

Foundation and funds	4 out of 12 organisations
Foundation and funds	4 organisations

Four organisations have their own foundation to raise money for nature conservation projects. These organisations are not only hospitality organisations, but are organisations that provide shelter for organisms from all over the world. The foundations do not only strive for a healthy environment for the organisms in the Netherlands, but also for organisms in the rest of the world. Based on the data analysis (see appendix 5), these organisations implement a considerable number of environment-friendly processes regarding sustainable development.

4.2 Innovative processes for food waste reduction in the Dutch hospitality sector

There are numerous processes that can be implemented during organisational innovation, which are proven to reduce food waste. This section provides an overview of the processes that are already implemented to reduce food waste in the Dutch hospitality sector. These processes comprise preparing stock, monitoring, training and education, processing the menu, reusing food and managing the inventory.

4.2.1 Prepared stock

To manage the expected rush of customers throughout the day, organisations already prepare some products to serve guests faster. Due to incorrect estimations on this expected rush, food waste can occur. To reduce food waste, organisations in the Dutch hospitality sector calculate the amount of food products they prep based on the number of customers expected. This way, organisations are able to balance the prepared stock with the expected number of customers; they place prepared stock in the refrigerator. Notably, it is also possible that organisations do not always have prepared stock and produce products fresh on demand.

Organisation 5 [interview 04:50]: *'There are so many today... then we have to prepare this and this and that much.'*
Organisation 4 [interview 12:32]: *'Then you get the total number of visitors, and that amount of money and then you calculate how much you have to prepare of which product.'*

Organisation 11 [interview 12:22]: *'We have our expertise, catering managers who know how much people there are on Friday and how much milk they drink.'*
Organisation 2 [interview 27:46]: *'We put it in the refrigerator ... so it can be sold tomorrow or the day after tomorrow.'*
Organisation 3 [interview 19:28]: *But there is just one 'show model' sandwich so you can say 'I want one of that', which I will make for you.'*
Organisation 10 [observation]: Organisations indicates that bread is prepared freshly to ensure quality and to prevent waste.

Table 4.8 Prepared stock

Prepared stock	11 out of 12 organisations
Balance prepared stock and prognosis	11 organisations
Produce fresh on demand	5 organisations
Prepared stock in refrigerator	2 organisations

Five of the 12 organisations do not only prepare stock, but produce products fresh on demand. Section 4.4.3 shows that employees and chefs of organisations in the Dutch hospitality sector experience insecurity regarding the amount of food to prepare. They want handle busy moments without worrying about not having enough prepared stock; as a result they prepare more food than necessary for the expected number of customers. Based on the data analysis (see appendix 5), four of the five organisations that produce fresh on demand did not state that their employees and chefs experience insecurity. It is likely that these organisations prepare on demand, because their employees do not experience insecurity.

Meanwhile, almost all organisations stated that they balance their prepared stock with the prognosis for the number of customers. Although this is a proper start to reduce food waste, section 4.4.3 notes that there are four organisations that have difficulties with the exact estimations on the number of customers. It appears that the balance between prepared stock and prognosis for the number of customers is not always accurate. Prepared stock is based on an inaccurate expectation of number of customers which results in food waste.

In conclusion, although almost all organisations indicated that they balance prepared stock and prognosis as an innovative process regarding food waste reduction; it is debatable whether this innovative process is effective since some organisations have difficulties with accuracy.

4.2.2 Monitoring

Knowledge about the amount of food waste an organisation produces and the places where food waste occurs helps the organisation to reduce food waste; therefore, monitoring is necessary. Monitoring food waste can be divided into different phases. First, monitoring starts with an inventory and the registration of how much food is wasted and where throughout the Dutch hospitality supply chain (DHSC) food is wasted. Second, the processes in the DHSC generating food waste are improved, which means that based on records about how much and where food waste occurs, processes are improved to reduce food waste. In the final phase these improved processes are actually controlled. In this case processes are not only improved, there is also an organisational feedback mechanism. Consequently, the amount of food waste due to improved processes is compared with the amount of food waste due to previous processes. Progress is investigated to determine what other processes have to be made. Organisations in the Dutch hospitality sector that control food waste have introduced a management system to ensure and monitor food waste reduction in their daily operations.

Organisation 9 [interview]: *'Every day, all depreciations per product are mapped.'*
Organisation 12 [interview 01:17]: *'Per day, they register what losses they have or not. It is possible that they do not have losses...So that it is clear, per day and per location, what losses we have and we can also see that per month.'*
Organisation 6 [interview 33:48]: *'Actually, every time I have to make my people crazy to reach my goal.'*
Organisation 7 [interview 03:51]: *'And we have now, most recently, introduced the food waste project, that is not very old in the Netherlands... you need to weigh everything you throw away and you need to say why are you throwing that away... and we were trying to push the stores to do reduction of 20 or 30 or 40 per cent depending on what employees feel that is possible.'*

Table 4.9 Monitoring

Monitoring	10 out of 12 organisations
Register food waste	9 organisations
Improve processes to reduce food waste	4 organisations
Control food waste (management)	2 organisations

Although most organisations register food waste, four of these organisations actually improved the processes, thereby reducing the most food waste. Only two of the organisations have introduced a complete management in the organisation that controls food waste and is

responsible for the constant feedback regarding improved processes. Food waste management is one step further and requires the organisation's dedication and effort. This probably explains why only a few organisations control food waste. Most organisations know how much food they waste, but they do little about it: they do not improve processes to reduce food waste nor do they have a feedback mechanism to manage food waste reduction, which may be due to the dedication and effort it requires. Section 4.4 presents the difficulties the organisations encounter with the implementation of processes regarding food waste reduction. These difficulties also explain why, in addition to measuring food waste, it is still unfeasible for organisations in this sector to improve the processes which cause food waste.

4.2.3 Training and instructions

Another process implemented by organisations in the Dutch hospitality sector to reduce food waste is employee training. Training of employees varies from the occasional instruction of employees to regular communication about food waste and processes among all layers of the organisations. Instructing employees usually takes places on the work floor to ensure the correct execution of processes to reduce food waste. When an organisation trains its employees, the employees attend one course or multiple courses about processes to reduce food waste. This is a step further than just instructing employees. Communication about and evaluation of working processes is the proper way of continuous employee instruction about food waste, food waste reductive processes and processes execution.

Organisation 3 [interview 14:54]: *'These are our employees who are trained in it.'*
Organisation 2 [interview 34:00]: *'You have to train them, you have to bring them in what* organisation *wants and how we want our chefs to go with it.'*
Organisation 1 [interview 08:35]: *'We are in this business for years so you can estimate: this food can be used, this not... and it is therefore important to deliberate, to communicate.'*
Organisation 10 [interview 16:10]: *'So every time evaluating what have you done: what is prepared food is presented, did you take into account...'*
Organisation 11 [interview 52:19]: *'We are distributing digital information, we do that every year, we organise a 'Wasteless' week, and we are making people aware that this is as sustainable as possible.'*

Table 4.10 Training and instruction

Training and instruction	9 out of 12 organisations
Communication	7 organisations
Instruction	4 organisations

Training	2 organisations

There are nine organisations that implement training and instructional processes to reduce food waste. Although these organisations clarified the purpose of these training and instructions, the frequency (e.g. weekly, monthly or yearly basis) and the content of these training and instructions remain unclear. It is therefore not possible to determine whether the organisations get the most out of training and instructions or whether these are indeed effective. Similarly, it is unclear whether communication is clear and effective as the organisation indicates or whether the frequency of communication between employees is sufficient.

4.2.4 Menu

Organisations in the Dutch hospitality sector also innovate processes regarding the present menu within the organisations, allowing them to reduce food waste. These processes include: refrigerated presentation of the prepared dishes on the menu, which make products last longer, adjustment in the menu if products do not sell, possibility to compile their own dish so customers only eat what they want, and the flexibility in the amount of food. In which case, customers dish up the amount of food they want to eat.

Organisation 5 [interview 16:00]: *'Then it is only refrigerated presentation, not unrefrigerated presentation, which is very nice. So I can just make it and it can be stalled for a whole* day.'
Organisation 7 [interview 39:52]: *'We can consider to outrange and to include another one.'*
Organisation 12 [interview 22:31]: *'So they say I want a satay or I want a satay with fries. Then it is just a matter of walking by and say what you want.'*
Organisation 11 [interview 42:53]: *'You can grab a small dish, you can have a medium sized or big dish.'*

Table 4.11 Menu

Menu	9 out of 12 organisations
Compile an own dish	7 organisations
Possibility to vary in amount of food on dish	6 organisations
Adjustment in assortment	5 organisations
Refrigerated presentation of products	3 organisations

Seven of the 12 organisations give their customers the opportunity to compile their own dish. This process aims to give customers the possibility to only eat what they like. The downside of this is that customers put too much of the food they like on their plate so food is still wasted. This also accounts for the variation in the amount of food on the dish. It could be that, instead of

an employee serving a standard portion, customers serve more on their plate than they can eat. Only three organisations choose for total refrigerated presentation of products to avoid the 2-hour assurance; these organisations can present their prepared food the whole day instead throwing them away after two hours due to legislation for unrefrigerated presentation of food.

4.2.5 Reuse of food

Food can be reused to reduce food waste. With this approach, food is still used where it would otherwise be discarded; hence, food can be saved since food that is already in the circulation and that is reused spares the use of new food. Food can be reused for other dishes, divided among employees, function as animal food or donated to charities.

Organisation 1 [interview 03:45]: *'It sounds silly, but if it is really a leftover we take it home and we use it at home.'*
Organisation 3 [interview 04:14]: *'Disapproved products can we use for the feed for our animals.'*
Organisation 7 [interview 37:36]: *'... or something that is close to the best-before-date is used in our co-workers restaurant.'*
Organisation 11 [interview 07:47]: *'We have a central menu cycle, which also takes into account a leftover-day.'*
Organisation 8 [interview 22:56] *'We have tried. You have here* foundation*, a day-care for homeless people and drug addicts...and then we call* foundation*, but they also ask 'Has it been in the refrigeration?'*

Table 4.12 Reuse of food

Reuse of food	5 out of 12 organisations
In other dishes	4 organisations
Divide among employees	3 organisations
Animals	1 organisation
Charities	1 organisation

Five organisations reuse food as a practice to reduce food waste. One organisation reuses its food to feed animals, while the other four organisations reuse their food in other dishes or divide it among employees. As shown in section 4.4.2 and the data analysis (see appendix 5), it appears that two of these four organisations also indicate that current legislation is an obstacle for food waste reduction. This means that these organisations would reuse food even more if the legislation would allow them to give it also to extern parties such as charities. However, this

research does not provide insight whether the other 10 organisations would consider reusing food if the legislation is arranged in such a way that this practice becomes interesting.

4.2.6 Inventory management

An accurate inventory management is important in reducing food waste. This includes several processes starting with 'first in first out'; products that are the longest in stock are used first. This process prevents products from crossing their expiration dates. Subsequently, placement of products can be considered as a process of inventory management as products in stock that are refrigerated are last longer. Another process to reduce the amount of food waste is ordering what is needed, and nothing more. As such, a prognosis for the expected number of customers is necessary. These processes can be better executed when organisations have their products delivered on a daily basis. With this, the products needed can be more accurately ordered.

Organisation 1 [interview 01:26]: *'Something fresh is kept in the refrigerator as long as possible, so we can vacuum it so we can still put it in the freezer.'*
Organisation 12 [interview 01:31]: '*That is also another part of FiFo, a piece of storage management.'*
Organisation 2 [interview 21:43]: *'Of course, the challenge is now to balance the day stock, the stock in your refrigerator.'*
Organisation 1 [interview 11:40]: *'Keep the stock as low as possible... so make sure you have the minimum in the house.'*
Organisation 2 [20:42]: *'We get delivered daily, so if there is such a day that the sale is suddenly peaking, we can also contact well with our home suppliers.'*

4.13 Inventory management

Inventory management	4 out of 12 organisations
First in first out	3 organisations
Only order what is needed	3 organisations
Consider placement	2 organisations
Daily delivery	1 organisation

It is striking that only a few organisations have an inventory management, particularly regarding 'first in first out' since this concept is well-known in the Dutch hospitality sector. It is questionable whether other organisations did not mention the 'first in, first out' process, because this is a self-evident innovative process in this sector or because they do not strictly use it. Moreover, section 4.2.1 shows that 11 organisations indicate that they balance their prepared

stock with the prognosis regarding the expected number of customers. It is remarkable that only three originations indicate that they also only order what corresponds with the expected number of customers. This research does not clarify whether the other eight organisations also do the same but did not mention it, or if these organisations do not consider the process 'only what is needed' applicable because it does not affect the amount of food waste.

4.3 Factors that trigger the organisational innovation of processes for food waste reduction in the Dutch hospitality sector

It is important that an organisation exemplifies certain factors that trigger the start of innovation. Chapter 2 explains that for sustainable development processes and for food waste reductive processes in nursing homes, retailers and households these factor consists of: awareness, communication, competitive advantage, demand, priority, sense of responsibility, willingness, cost savings, higher prices of current processes, regulatory requirements and taxes. Factors that trigger the organisational innovation of processes regarding food waste reduction in the Dutch hospitality sector include cost savings or enlarging margins, awareness, responsibility, waste, and willingness. These factors are evident in section 4.3.

4.3.1 Costs

The opportunity to save costs or to enlarge margin is a factor that trigger the organisational innovation of processes regarding food waste reduction in the Dutch hospitality sector. These factors are closely link to the factor 'costs'.

Organisation 2 [interview 29:49]: *'Economically, it is good for us to counteract food waste.'*
Organisation 8 [interview 03:36]: *'Just the money you are throwing away.'*
Organisation 6 [interview 10:12]: *'How can I enlarge my margin, because that is the motive.'*
Organisation 9 [interview]: *'The less you throw away, the more profit you make.'*

Table 4.14 Costs

Costs	11 out of 12 organisations
Economic advantage/ costs reduction	8 organisations
Enlarge margin	3 organisations

As demonstrated in table 4.14, the opportunity to save costs or to enlarge margin is a factor that triggers organisational innovation of processes regarding food waste reduction for 11 of the 12 organisations, because all the organisations have a profit objective, is it only reasonable that these organisations do not attempt to reduce food waste if it does not provide a financial benefit. Although there is just one organisation that did not mention 'costs' as a factor that triggers

organisational innovation of processes regarding food waste reduction, it is unlikely that this organisation does not include 'costs' in its decision to reduce food waste.

4.3.2 Awareness

Awareness among employees about food waste, food waste reductive processes and the impact of food waste motivates organisations in the Dutch hospitality sector to innovate their processes regarding food waste reduction. By forcing employees to think differently not only about the purchase, preparation, and supply of food but also about food waste, become more careful with food products to reduce food waste. Furthermore, the realisation that over-production of food is a synonymous to a waste of food, money, and labour, triggers employees in the Dutch hospitality sector to innovate their processes regarding food waste reduction to work more efficiently.

Organisation 5 [interview 31:06]: *'As long as you make it self-interest, they (*employees*) are really reluctant to get started.'*
Organisation 10 [interview 05:56]: *'The result of it was that the mindset of all employees completely changed.'*
Organisation 12 [interview 28:11]: *'The moment you have your employees also aware of the products they work with, the materials they work with... because at the moment everything goes automatically, I think that they will take that into account at the moment they are at work.'*

Table 4.15 Awareness

Awareness	7 out of 12 originations
Awareness about food waste among employees (change in thinking)	7 organisations
Self-interest	2 organisations

Seven organisations revealed that their employees are aware of food waste; employees have knowledge about food waste, and its impacts and are concerned with it. Two of these organisations use communication and instruction, to enhance their employees' awareness and interest in food waste reduction. As a result, employees start to work more efficiently to not only prevent food waste, but also to prevent unnecessary work. But what about employees' insecurity about a proper preparation of food? Does it mean that organisations that are aware of the problems concerning food waste and are aware that food waste is also a waste of labour, are less insecure? In section 4.4.4 it appears that four organisations indicate that insecurity about proper preparation of food among chefs and employees is an obstacle for further implementation of innovative processes regarding food waste reduction. Three of these organisations also explain that awareness is a factor that triggers organisational innovation of processes regarding food

waste. This suggests that although awareness triggers organisational innovation of processes regarding food waste reduction and is necessary to reduce food waste, the actual implementation of these processes remains difficult and therefore insufficient due to the insecurity of the employees about the amount of food to prepare.

4.3.3 Responsibility

Responsibility is another key factor that triggers organisational innovation of processes regarding food waste reduction. Organisations exemplify responsibility regarding food waste reduction in a variety of ways: organisations take their responsibility for the society, organisations take responsibility for the natural environment or they take responsibility for sustainable development.

Organisation 12 [interview 06:12]: *'Well, it is an important thing in society that takes place in the whole sector.'*
Organisation 4 [interview 08:27]: '*It is a bit the underlying meaning of the less food you have to produce the less damaging it is for the environment.'*
Organisation 7 [37:04]: *'Sustainability, how this connects with our range, what organic products we have, allergies and it are the food safety programs we have to train our people.'*

Table 4.16 Responsibility

Responsibility	5 out of 12 organisations
Social responsibility	3 organisations
Sustainability responsibility	2 organisations
Environmental responsibility	1 organisations

Five organisations indicated that the sense of responsibility they have for society, natural environment or sustainability is a factor that encourages organisational innovation concerning food waste reduction. Based on the data analysis (see appendix 5), four of these organisations also have CSR report (see section 4.1.1). Therefore it is only reasonable and consistent that these organisations also want to carry out this responsibility through food waste reduction.

4.3.4 Waste of

There are some organisations in the Dutch hospitality sector that initiate the organisational innovation of processes regarding food waste reduction, because they consider food waste as a waste of labour or a sin of the wasted food.

Organisation 3 [12:09]: *'With us, it is also just because we find it a waste of food.'*

Organisation 8 [03:36]: *'Just the money you are throwing away and the working hours in it.'*

Table 4.17 Waste of

Waste of	2 out of 12 organisations
Food	1 organisation
Labour	1 organisation

Although there is one organisation that regards food waste as a sin and although there is one organisation that regards food waste as a waste of labour, the factor 'waste of' is not worth considering as one of the most important factors that triggers organisational innovation for food waste reduction in the Dutch hospitality sector.

4.3.5 Willingness

Based on this research, the final factors in attempt to reduce food waste in organisations in the Dutch hospitality sector involve having the right attitude towards organisational innovation for food waste reduction and the commitment to reduce food waste. These factors are fused with the factor 'willingness'. As such, the organisations should be committed to reduce food waste or should make a game of food waste reduction to innovate processes regarding food waste reduction.

Organisation 10 [interview 10:10]: *'In the whole story, I think it is, you should like to do it. You really have to make your hobby.'*
Organisation 3 [interview 12:09]: *'The challenge for our executives is therefore to link Critical Presentation Indicator to make it a game for them, because they are also settled for breakage and spoilage.'*

Table 4.18 Willingness

Willingness	2 out of 12 organisations
You must like it to do	1 organisation
Make a game of it	1 organisation

It is worth mentioning that there is one organisation that is committed to food waste reduction, and one organisation that makes a game of food waste reduction. Nevertheless, the factor 'waste of' is not worth considering as one of the most important factors that triggers organisational innovation for food waste reduction in the Dutch hospitality sector.

4.4 Difficulties with the (further) implementation of innovative processes regarding food waste reduction

This section provides an overview of the difficulties that organisations in the Dutch hospitality sector encounter with (further) implementation of innovative processes regarding food waste reduction. Chapter 1 (see section 4) describes four specificities of the Dutch hospitality sector which are the reasons why this sector requires special attention concerning food waste reduction. This chapter shows that these specificities are among the difficulties that organisations encounter with for further implementation of innovative processes regarding food waste reduction. Difficulties that organisations in this sector encounter include service, legislation, inaccurate estimation of customers, insecurity, priority, lack of stability and registration system. These difficulties are evident in this section.

4.4.1 Service

An important issue that causes food waste in the Dutch hospitality sector is service such that a hospitality organisation avoids having to say 'no' to its customers when products and dishes are sold out. Moreover, customers are inclined to buy more when presentation cases are filled up with food than when they are half-empty. Needless to say, presentation cases filled up with food is linked with the presentation of the restaurant. Another difficulty concerning service is that some hospitality organisations cater to external businesses, so they have fulfil contracts with these external businesses that decides what the hospitality organisation has to offer. These external businesses often want choice, resulting to more food being presented than eaten. Furthermore, hospitality organisations like to welcome guests by presenting much food. One reason for such a case full with food is the idea of freshness it generates, even though hospitality organisations know that not everything is sold. The final difficulty concerning service is that hospitality organisations want to offer their customers something; as a result they have a variety of dishes and products on the menu which are prepared for presentation, but remain uneaten.

Organisation 5 [interview 13:36]: *'I want to offer my guests something, so we are going to sell more products.'*
Organisation 10 [interview 31:52]: *'If you do not show and present everything you offer, you do not sell anything.'*
Organisation 6 [interview 54:37]: *'That is field of tension, how much can I reduce in food so the customer does not experience it as a negative.'*
Organisation 7 [interview 10:59]: *'So my challenge is first of all we know that a cold cabinet or hotline sell more if it is completely full than it is half-empty, because the main perception of the customers is that the products are fresh.'*

Organisation 12 [interview 23:52]: *'Then I want to have it prepared so I do not have to sell 'no' or that people have to wait for too long.'*
Organisation 3 [interview 10:37]: *'Because in your business, you also take into account the presentation of food... to fully appreciate the products you offer and to provide the visitors the best possible experience of your products, that has the do with the presentation of food.'*
Organisation 11 [interview 35:57]: *'The things we offer is a contractual obligation to our external organisations, so we offer it while we know that we are throwing it away at the end of the day.'*

Table 4.19 Service

Service	10 out of 12 organisations
Not selling 'no'	4 organisations
Full presentation cases = selling more, presentation	4 organisations
Principal in charge	3 organisations
Full presentation cases = feeling of welcome	3 organisations
Full presentation cases = freshness perception	2 organisations
Something to offer	2 organisations

Ten out of the 12 organisations stated that they struggle with two contrasting issues: they want to highlight service to their customers by offering and presenting plenty of food and dishes, yet they want to reduce food waste. The service the organisations want to offer is therefore a barrier for the implementation innovative processes regarding food waste reduction. Given the nature of organisations in the Dutch hospitality sector, this observation is only logical since organisations in this sector strive for the best experience for their customers.

4.4.2 Legislation

Another difficulty that organisations in the Dutch hospitality sector encounter with (further) implementation of processes regarding food waste is legislation. Because of the 2-hour assurance on unrefrigerated presentation of food, organisations struggle with the food products they want to present and the products they do not sell within these two hours. This results in food waste. Furthermore, some organisations state that government-imposed laws make it impossible to donate leftovers. Nowadays, the organisation that purchased the food products always remains responsible for the products it wants to give away to charity. Therefore, giving leftovers to charity is an unattractive measure for organisations to reduce food waste.

Organisation 11 [interview 05:39]: *'Because in the Netherlands, the legislation and regulations are still that at the moment we give it away to charity, what many people would like and what we*

would also prefer, we remain responsible for the quality of the product... And we cannot or will not take that responsible for that quality.'
Organisation 10 [interview 15:21]: *'And then they may last for two hours, suggest that it would not be sold, and then it is registered how many sandwiches are thrown away.'*

Table 4.20 Legislation

Legislation	6 organisations
2-hour assurance	5 organisations
No possibility to give away (to charity)	2 organisations

Section 1.4 describes specificities of the Dutch hospitality sector showing that this sector requires some special attention concerning food waste reduction. Two of these specificities concern legislation. As explained, legislation makes it difficult for organisations to implement innovative processes regarding food waste. This confirms that food waste reduction in the Dutch hospitality sector requires special attention, because no less than five organisations identify legislation as a hindrance to reduce food waste. Only two organisations refer to the implausibility to giving away to charity as a barrier for organisational innovation for food waste reduction. As evidenced in section 4.2.5, only one organisation admits donating to charity. This research does not clarify how the other organisations think of donating to charity when legislation about this topic is liberalised.

4.4.3 Expected customers

Some organisations in the Dutch hospitality sector consider it difficult, or even impossible, to estimate the exact number of expected customers. There are always more or less customers and as a result organisations prepare more or less food than needed.

Organisation 1 [interview 02:23]: *'If you can estimate how many people are coming in advance, and that is never possible.'*
Organisation 10 [interview 05:40]: *'What would be nice if we can predict what is going to happen in advance.'*

Table 4.21 Expected customers

Expected customers	4 out of 12 organisations
No possibility to estimate exact amount of expected customers	4 organisations

The estimation of expected customers in Dutch hospitality organisations is also considered as a difficulty that hinders the implementation of innovative processes concerning food waste, which reiterates that food waste reduction in the Dutch hospitality sector requires special attention (see section 1.4). Table 4.21 shows that four of the 12 organisations experience difficulties with further implementation of innovative processes regarding food waste reduction since it is impossible to estimate the exact number of expected customers. Because of this difficulty, the assertion in section 4.2.1 that organisations balance prepared food with the expected number of customers, is questionable since the expectation is not always accurate.

4.4.4 Insecurity

Insecurity among chefs or employees regarding the amount of food to prepare is considered a difficulty for organisations in the Dutch hospitality sector that try to reduce food waste. Chefs and employees are often inclined to prepare more food than necessary, because they want to feel safe in case there are more customers than expected, making them busier later.

Organisation 2 [interview 21:43]: *'A chef tends to have a stock: I would rather have more, I need to have stock'*
Organisation 6 [interview 31:25]: *'The stress factor for part-timers who work for the first time should never be underestimated. Things happen... What they do, they are going to cover it: it does not happen that I get my whupping, and what I throw away does not interest anyone'*

Table 4.22 Insecurity

Insecurity	4 out of 12 organisations
Employees	3 organisations
Chef	2 organisations

Four organisations indicated that insecurity among chefs and employees makes it difficult to implement innovative processes regarding food waste reduction. In the data analysis (see appendix 5) and in the previous sections, three of these organisations stated that their chefs and employees are aware of food waste (see section 4.3.2) and food waste reduction and that training and instruction are included in their organisations (see section 4.2.3). It is expected that this would have an effect on the security of the employees: the more employees are aware about food waste and are trained and instructed to reduce it, the more secure they would be about the amount of food to prepare. However, it seems that the extent to which employees are aware, trained, and instructed does not affect the degree of insecurity. This may be because some organisations have high employee turnover, so the awareness and training alter to different employees each time; hence, these have no effect on employees' insecurity in the long term.

Nevertheless, there is too little data to make a statement about the relation between insecurity and awareness and training among employees.

4.4.5 Priorities

Another reason for organisations not to (further) implement innovative processes regarding food waste reduction is they have priorities other than reducing food waste.

Organisation 3 [interview 21:19]: *'We are doing a lot of work, many projects had the deadline April the first. It's just a matter of priority.'*
Organisation 4 [interview 32:01]: *'We are a zoo so animals always have priority, standing at number 1... For example we have a machine that does not work ... and at the same time there is something wrong with the cage, it may be possible that we do not sell soft ice cream for a while on a hot day.'*

Table 4.23 Priorities

Priorities	3 out of 12 organisations
Other priorities	3 organisations

It is important to mention that three organisations indicated having other priorities, which make it difficult to (further) implement innovative processes regarding food waste reduction. Based on data analysis (see appendix 5) and section 4.3.3, one of these organisations wants to reduce food waste because its responsibility to nature and sustainability. Although only one organisation feels so, it is worth mentioning that despite having other priorities, this organisation recognises its responsibility. It could be an explanation that other environmental issues are prioritised more than food waste reduction. Nevertheless, the 'priority' is not worth considering as a difficulty for (further) implementation of innovative processes regarding food waste reduction

4.4.6 Stability of employees

The employees working at organisations in the hospitality sector are often seasonal workers. The summer months, which are the busiest for this sector, are covered with these seasonal workers. Seasonal workers often work for the organisations for a year; consequently, organisations have to deal with different employees every year. This means that, each year, food preparation processes within the organisation must be taught again, starting at the base, which leaves little room for food waste reduction processes. Thus, there is little stability among employees in an organisation, making advanced processes such as food waste reduction complicated. Furthermore, seasonal workers and weekend workers often lack knowledge and

experience to make correct estimates of what needs to be prepared, resulting in more food wasted.

Organisation 4 [interview 15:41]: *'Also because we offer seasonal work, on seasonal basis and in November everybody is leaving... the opportunities are definitely there, but then you need stability among your staff.'*
Organisation 5 [interview 28:26]: *'For 16-17 years old who have a job for the first time, of course, great, you can give people as much as you want.'*

Table 4.24 Stability of employees

Stability of employees	3 out of 12 organisations
Low stability seasonal workers	2 organisations
Lack of knowledge and experience holiday/weekend employees	2 organisations

Although there are just three organisations that indicated to encounter difficulties with the stability among employees as regards (further) implementation of food waste reductive processes it is interesting to note the connection between awareness and training of employees, and stability among employees. As shown in sections 4.2.3 and 4.3.2 and the data analysis (see appendix 5), only one organisation that indicated training in and making aware its employees aware of processes, experienced difficulties with stability among its employees. This means that organisations that train and instruct their employees, and those that indicate that their employees are aware of food waste reduction do not experience instability. Nevertheless, there are too few organisations that experiences difficulties with stability to make a statement about it or to consider 'stability among employees' as a difficulty for the further implementation of innovative processes concerning food waste reduction.

4.4.7 Other difficulties

There are more stand-alone difficulties that organisations in the Dutch hospitality sector encounter as regards food waste reduction. The first one pertains to high investment costs of implementing food waste processes. The second difficulty is that suppliers do not cooperate with the organisations to reduce food waste. The third difficulty concerns technique: if refrigerators or freezers become defective, the entire content must be discarded. These stand-alone difficulties are categorised under 'other difficulties'.

Organisation 9 [interview]: answer to the question which problems *organisation* could encounter *'High investment costs'*

Organisation 10 [interview 51:37]: answer to the question what the biggest challenge is *'That suppliers go along'*
Organisation 5 [interview 31:27]: *'On average 3 to 4 times a year, there is a freezer defect somewhere and then you can throw the whole content away. It never happens during the day so we can see it'*

Table 4.25 Other difficulties

Other difficulties	3 out of 12 organisations
Investment costs	1 organisation
Suppliers do not cooperate	1 organisation
Technique	1 organisation

Only one organisation stated that the investments costs of food waste reductive processes and measures are too high. In addition, only one organisation indicated that is it difficult to further implement innovative processes concerning food waste reduction because suppliers do not cooperate and only one organisation stated that technique is not advanced enough and not always reliable. Although these difficulties are important to mention, they cannot be considered as 'other difficulties' for (further) implementation of innovative processes regarding food waste reduction.

4.4.8 Registration system

Another difficulty encountered by an organisation in the Dutch hospitality sector is the absence of a proper registration system of food waste. As such, the organisation considers it impossible to estimate food waste as a first step to innovate processes concerning food waste reduction.

Organisation 3 [interview 20:40]: *'The biggest challenge for me at this time is the registration, which allows you to do much more precise and accurate nowadays'*

Table 4.26 Registration system

Registration system	1 out of 12 organisations
No proper registration system for food waste	1 organisation

There is only one organisation that mentioned the absence of a proper registration system to register food waste as a difficulty for (further) implementation of innovative processes regarding food waste reduction. This difficulty is therefore not included in the conclusion about food waste reduction in the Dutch hospitality sector.

Chapter 5. Conclusion and discussion

This final chapter presents the conclusion and the discussion of this thesis. Section 5.1 contains the main and most remarkable findings in chapter 4 and provides answers to the sub-questions, leading to the research question. In the discussion (see section 5.2), the research is evaluated: comparing the current research to previous research, suggesting follow-up research, describing the limitations of this research, and identifying possible causes and consequences of this research.

5.1 Conclusion

The degree to which sustainable development is implemented in organisations in the Dutch hospitality sector range from 'we think about it in the sense of turning off the tap and lights' to writing reports to understand and communicate the impact of the organisation on sustainable development. Most organisations are certified for their execution of sustainable businesses or have a written sustainability report, such as the Corporate Social Responsibility or the Global Reporting Initiative. Most of these organisations also use (food) products that are biologically certified or have a certification mark for their sustainable origin. These reports and certifications reflect the contribution of the organisation to social welfare. However, these certification marks and reports do not always imply that organisations are truly progressive in terms of the implementation of environment-friendly measures that contribute to sustainable development. Notably, this research shows that most of these organisations possess certifications marks of reports that indicate that they contribute to sustainable development, while there are numerous difficulties that Dutch hospitality organisations encounter with food waste reduction. A possible explanation is that even though these certifications and reports are initiated to contribute to sustainable development, the content regarding food waste reduction in these certification marks and reports remains unclear.

Another environment-friendly measure implemented concerns the minimisation of resources, particularly energy and water use are minimised, as it also saves the most money. Furthermore, Dutch hospitality organisations also implement the recycling of organic waste. Since the recycling of organic waste is more implemented in organisations than the minimisation of organic waste, it suggests that the recycling of organic waste is easier than reducing organic waste (e.g. food waste). Moreover, the education of visitors is another environment-friendly measure implemented in organisational processes to contribute to sustainable development, in the same way as the establishment of foundations to raise money for nature conservation. Similarly, the final measure targets sustainable development by using biodegradable disposables. Organisations affirm that they use biodegradable disposables instead of other disposables to contribute to sustainable development. Nevertheless, the

advantage of disposables in relation to water use for washing dishes is debatable, because disposables are not (always) separated correctly for composting. In conclusion, the answer to the sub-question *'What is the current state of implementation of environment-friendly measures in the processes of organisations in the Dutch hospitality sector?'* is that the extent to which environment-friendly measures have been implemented in Dutch hospitality organisations differs too much to make one conclusive statement about the level of implementation of these measures in the entire Dutch hospitality sector. As previously mentioned, all organisations indicate that they feel responsible for and are concerned with contributing to sustainable development.

This research also answered the sub-question: *'What innovative processes do organisations in the Dutch hospitality sector already implement alongside their Dutch hospitality supply chain to reduce their food waste?'.* There are various processes already implemented in the Dutch hospitality sector to reduce food waste. Almost all organisations indicate balancing their prepared stock with the prognosis for expected customers. This means that organisations coordinate the stock that they prepare for the day the number of customers they expect, so food waste can be minimised. It is remarkable that in chapter 4.4 some organisations reveal having difficulties with the implementation of food waste reductive processes within their organisation, because it is difficult to accurately estimate the number of customers. As a result, organisations still prepare too much food that has to be thrown away at the end of the day. Moreover, monitoring is a process that is implemented in quite a few organisations. These organisations register their food waste; they know how much food is wasted and where food is wasted. However, there are only a few organisations that use this information to improve processes to reduce food waste and even less organisations have implemented complete management systems to control food waste. Improvement of and a feedback mechanism for processes that cause food waste requires dedication and effort and most organisations have not attained this so far.

In addition, Dutch hospitality organisations admit training and instructing employees to reduce food waste. However, the content and frequency of these trainings and instructions remain unclear. Similarly, most organisations have the possibility to vary in the presentation of their menu to reduce food waste, such as adjusting the available menu, the possibility for customers to compose their own dish or the possibility to vary in the amount of food on their dish. Conversely, the latter two opportunities can also encourage food waste if customers dish up more food that they can eat. Lastly, a few organisations already implemented the process of reusing food in other dishes, dividing it among employees or using it as animal food.

In chapter 2.4, it is expected that *'processes regarding food waste reduction that are mostly implemented in organisations in the Dutch hospitality include: an accurate estimation of*

customers, planning routines, training and education, 'first in, first out', flexible portion size, and monitoring'. 'Planning routine' is not mentioned as a process that is already implemented to reduce food waste, while 'first in first out' (i.e. three organisations) is not among the most implemented processes regarding food waste. Although the expectation is not completely fulfilled, it corresponds reasonably with the outcomes of the literature review in chapter 2. Organisations register and monitor their food waste, they conduct trainings for their employees, and they can be flexible in portion size.

Various factors that trigger the organisational innovation of processes regarding food waste reduction are mentioned during this research. In particular the costs that can be saved or the margin that can be enlarged with food waste reduction are triggers for organisations in the Dutch hospitality sector. This is only logical because this research focuses on hospitality organisations with a profit objective. Awareness about food waste and its negative impacts among employees is another factor that triggers organisational innovation. However, it appears that awareness does not decrease the employees' insecurities about the amount of food to prepare. This means that even though awareness initiates innovation of processes regarding food waste, it does not take away the difficulty of 'insecurity' for (further) implementation of food waste reductive processes. Another motivation for hospitality organisations in the Netherlands is the sense of responsibility they have towards society, the environment, and towards sustainable development. Hereby, the sub-question *'What factors trigger organisations in the Dutch hospitality sector to innovate processes that generate food waste?'* has been answered.

Chapter 2.4 contends that *'according to organisations in the Dutch hospitality sector, cost savings, willingness, responsibility, priority, communication and regulatory requirements are the main factors that trigger the organisational innovation'*. In this research, priority, communication and regulatory requirements as triggers for the organisational innovation of processes regarding food waste are either discussed to a lesser extent or not discussed. Therefore, the assertion is not completely fulfilled. Notably, priority and regulatory requirements (i.e. legislation) are mentioned as difficulties instead of triggers for the organisational innovation of processes concerning food waste.

Finally, this research has attempted to identify the difficulties that organisations in the Dutch hospitality sector encounter with (further) implementation of processes regarding food waste reduction. Service is, by the far, the difficulty that organisations encounter the most with organisational innovation for food waste reduction. Organisations consider it difficult to reduce food waste without affecting the service they want to offer to their customers. Service is associated with having full presentation cases, having something to offer and not having to say 'no' to customers because products are out of stock. Moreover, the current legislation that

prepared stock may not be presented unrefrigerated for more than two hours makes it difficult for organisations to implement processes regarding food waste. This is mentioned in chapter 1 as a specificity of the Dutch hospitality sector and is perceived as a hindrance. In addition, it is also difficult for organisations to accurately estimate the number of expected customers. This is also mentioned in chapter 1 as a specificity of the Dutch hospitality sector and is considered as a hindrance. Another difficulty that organisations encounter is the insecurity of chefs and employees about the amount of food that has to be prepared. This research shows that training and awareness do not impact the insecurity as organisations have a number of seasonal workers, which means that trainings and awareness-raising concern different employees each time. As a result, training and awareness do not affect insecurity in the long term. Based on the findings of this research, the answers to the question *'what difficulties does the Dutch hospitality sector encounter with (further) implementation of processes regarding food waste reduction?'* point out service, legislation, accurate estimation of customers and insecurity among employees.

The above-mentioned answers to the sub-questions, generate the answer to the research question '*What is the current state concerning food waste reduction in the Dutch hospitality sector and what difficulties do organisations in this sector encounter with further innovation for food waste reduction?*'. Organisations in the Dutch hospitality sector definitely consider food waste reduction and processes regarding food waste reduction. In fact, various processes are implemented to reduce food waste. Nevertheless, the current research only has limited explanation on the content, scope and actual reduction of food waste using these processes. Further research is needed to examine the detailed content and effectiveness of these implemented processes.

5.2 Discussion

This thesis aims to provide an insight into the current state of food waste reduction in the Dutch hospitality sector. Prior researches have already been done concerning food waste reduction in the Dutch hospitality sector, focusing on the amount of food waste, the causes of food waste, and improvement measures for food waste reduction. This thesis confirms these findings: food waste is caused by legislation and an inaccurate estimation of customers, while the preparation of food on order is an improvement measure already implemented to reduce food waste. This thesis also provides additional knowledge about food waste reduction in the Dutch hospitality sector. It has 1) generated an impression regarding the extent to which environment-friendly measures are considered in processes of organisations in the Dutch hospitality sector, 2) extended on the discussion on innovative processes that are already implemented in the Dutch hospitality sector concerning food waste reduction, 3) highlighted the factors that trigger the organisational innovation of processes concerning food waste reduction, and 4) provided knowledge about the

difficulties with (further) implementation of innovative processes regarding food waste reduction. Furthermore, this thesis confirms that organisational innovation for food waste reduction in -the Dutch hospitality sector cannot be explained on the basis of existing literature and thus requires more attention and more knowledge, due its specificities on 'legislation' and 'the impossibility of knowing the exact number of customers'. These specificities appear to be difficulties that organisations encounter when implementing food waste reduction processes.

As the main difficulties regarding the implementation of food waste reductive processes for Dutch hospitality organisation are revealed, further research should demonstrate how these difficulties should be addressed. A focus point could be the link between 'balance of prepared stock and prognosis' and 'difficulties with accurate estimations of the number of customers'.

Previous section also mentions striking outcomes of this thesis. Some of these outcomes require further research. One suggestion for further research concerns the content of the certifications marks and reports because this thesis does not clarify whether the certification marks and reports also include food waste or whether they require the organisations to tackle food waste reductive issues. Moreover, this research does not provide insight into the extent to which the processes are implemented, for example training and instructions. Possible questions for further research are: *Are these food waste reductive processes implemented properly? Do these processes require optimisation? Are these processes completely integrated and is food waste reduction clearly visible through its implementation?* The content and scope of these processes remain unclear and further research should provide clarification. A final suggestion for further research is to provide statements about existing connection since this thesis does not have enough cases to make conclusive statements about possible existing connections, for instance the connection between insecurity about the amount of food to be prepared, and the employees' awareness and training, or the connection between the size of the organisations and the degree of food waste. It may be possible that larger organisations, in earnings and employees, have more possibilities to reduce food waste than smaller organisation, or that smaller organisations are more flexible to innovate processes regarding food waste reduction.

There are also some critical points regarding the performance of this research. First, the outcomes of the research depend on the person interviewed. Incidentally, a person who is on the work floor may have another view on how the organisation operates and may experience other difficulties about food waste reduction than the manager for instance. Second, it is possible that some processes are actually present within an organisation, but are not mentioned in the interview or not noted during observation. For example 'first in first out' is a self-evident innovative process in this sector but it is barely mentioned in the interviews. It could also be the opposite: processes may have been mentioned as present within the organisation whereas they are not actually executed.

Third, this research conducted both interviews and observations. By combining these two research methods, the depth of each research method is probably than when the researcher focuses on just one. Another critical note on the methods chosen for this research is the researcher's choice to not explicitly refer to already implemented processes regarding food waste reduction or factors that trigger the organisational innovation. For example, the sub-label 'costs' as a trigger for organisational innovation of processes regarding food waste is not mentioned by one organisation as a factor while it is unlikely that this organisation would also reduce food waste if it only costs money and does not generate money. If the researcher noticed this missing trigger for organisational innovation and referred to it explicitly, it could have determined whether this issue is present in the organisations. Nevertheless, due to the chosen research method (i.e. interview) interviewees are not pushed into a certain direction to discuss possible or already implemented processes regarding food waste reduction or factors that trigger the organisational innovation. Therefore, the answers given are completely based on the point of view of the interviewee.

A final critical note regards to the chosen theoretical frame. Given that the Dutch hospitality sector requires more than just generic knowledge about organisational innovation for food waste reduction (due to the specificities of this sector), it would have been interesting to take a closer look at the generic knowledge about organisational innovation for food waste reduction in the theoretical framework (see chapter 2). There are several researches on organisational innovation for food waste reduction, along the whole Global Food Supply Chain, yet this research only discussed a few of them. More generic knowledge about organisational innovation for food waste reduction means more opportunities to compare it with the outcomes of this thesis. It is possible that this research missed a few researchers that nullify the statement that the Dutch hospitality sector requires special attention. Nevertheless, this outcome has been discovered afterwards, and therefore is the chosen theoretical framework matching the research aim.

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Appendices

Appendix 1. Case description

Organisation 1

Organisation 1 is a catering organisation. They cater for various companies, but cater also amusement parks, universities or hospitals. The interview took place on April 21th in Keukenhof, a company that organisation 2 caters for. The interview was conducted in one of the restaurants in the amusement parks and the interviewee was a quality consultant. Right after the interview the observation took place. The observation was in combination with a tour through Keukenhof. The observation took place when the restaurants were not open yet, but when the chefs were preparing for lunch.

Organisation 2

Organisation 2 is a zoo, expert in the field of monkeys. There are three restaurants in this park to eat and drink. The interview took place on March 20th with the first employee hospitality. At this time the park was not opened yet, and the interview was conducted at the office of the foundation of this organisation. The observation took place on April 24th. Although the weather was bad, it was busy in the park; probably because of holidays. The observation took place during lunchtime at the biggest restaurant of the zoo and was combined with a tour around the kitchen.

Organisation 3

Organisation 3 is also a zoo, expert in the field of birds. The interview took place in the a la carte restaurant outside the park, in combination with orientation conservation with Q-Point on April 19th. The interviewee was the kitchen manager. At the time of the interview it was not busy, except some coffee drinkers. This park is not observed.

Organisation 4

Organisation 4 is a zoo with several restaurants in it. The interview took place in combination with an evaluation conservation with Q-Point on June the first. The interviewee was a kitchen hospitality employee. The observation was conducted after lunchtime on February 22th. This was also in combination with an evaluation observation with Q-Point.

Organisation 5

This organisation is a small all-you-can-eat grill restaurant, open from Friday till Sunday. Next, the organisation offers sport activities, fitness, bowling and other entertainment. The interview

took place on April 29th, Saturday afternoon with two employees of the organisation. They are responsible for the preparation and course of the restaurant. The restaurant was not open. The observation was on May 14th, Mothers' day.

Organisation 6

This organisation is a zoo and has various restaurants in it were there are possibilities to eat and drink. The interview took place in one of these restaurants on May 23th with manager hospitality day operation. This park is not observed.

Organisation 7

This organisation is also a zoo, but expert in the field of dolphin and other sea animals. The park as three main restaurants for food and drinks, but there are several stands in the park. The interview took place in one of the main restaurants with assistant hospitality manager at May 30th. After that the observation took place in combination with a tour around the zoo. Due to bad weather circumstances and no holidays the restaurant for food and drink where the interview took place was the only restaurant opened. Another restaurant was opened as a cafeteria. The stand in the park where all closed.

Organisation 8

This organisation is a multinational group that designs and sells ready-to-assemble furniture, kitchen appliances and home accessories. Every store includes a buffet restaurant. The interview took place on May 18th in the service office of the organisation in Amsterdam. The interviewee was the Food Safety and Operations Leader. The observation took place April 20th at breakfast time in one the stores of this organisation in the Netherlands.

Organisation 9

Organisation 9 is a museum, focused on children. This museum includes on restaurant and two cafés. The interview took place on March 3th in the morning with manager 'horeca'. The observation was conducted individually right after the interview in the restaurant at the final floor of the museum. It was very quit at the time of the observation. Not much food was prepared for the customers.

Organisation 10

This organisation is a cafeteria, located at train station in the Netherlands. This interview was conducted via email and sent to the format marketer. The answers were received on April 7th.

The observation took place on May 26th. I was almost dinnertime, so plenty of customers stopped by for snack and/or fries.

Organisation 11

Organisation 11 is a catering organisation that caters for hospitals, universities and companies. The interview was conducted in the head-office located in Amsterdam. Two people participated in the interview. One dietician and one responsible for food security, both operative QHSE department. The observation took place on a university, one of the locations the organisation caters for, during lunchtime.

Organisation 12

This organisation is a zoo. There are several restaurants located in this zoo. The interview took place on April 28th. The interviewee was the coordinator hospitality. This park is not observed.

Appendix 2. Questionnaire

This appendix is in Dutch: the original version of questionnaire for the interview. Throughout the conductions of the interviews, this list expanded and the extra questions were also asked during following interviews.

- Welke rol speelt duurzaamheid binnen *organisatie*? Is het een bepaalde doelstelling?
- Wat doet *organisatie* al aan duurzaamheid binnen het bedrijf?
- Welke rol speelt voedselverspillingsreductie binnen *organisatie*?
- Wat doet *organisatie* al aan voedselverspillingsreductie?
- Wie is verantwoordelijk voor de productie van voorbereid voedsel?
- Hoe wordt er gecommuniceerd over wat er voorbereid moet worden?
- Is het momenteel inzichtelijk hoeveel voedselverspilling *organisatie* heeft?
- Op basis waarvan worden gerechten nu voorbereidt? Wordt het aantal bezoekers geschat?
- Is het mogelijk om je eigen gerecht samen te stellen?
- Is het mogelijk om te variëren in portiegrootte?
- Wat zijn de redenen voor *organisatie* om voedselverspilling te reduceren?
- Wat zijn, volgens *organisatie*, factoren die de implementatie voedselverspillingsreductie processen vergemakkelijken?
- Welke moeilijkheden ervaart *organisatie* met het implementeren van voedselverspillingsreductie in werkprocessen?
- Indien ik nog vragen heb die mij nu niet te binnen schieten, mag ik met u contact daarover opnemen?

Appendix 3. Observation scheme

This appendix is in Dutch: the original version of observation scheme. Throughout the conductions of the observation, this list expanded and the extra observations point were also observed during following observations.

- Communicatie van bedrijf naar consument over duurzaamheid en voedselverspilling
- Wat ligt er klaar voor de consument: gekoeld en ongekoeld (grootte assortiment) (i.c.m. tijdstip observatie)
- Worden er tussendoor nog gerechten klaargemaakt
- Mogelijkheid om zelf menu samen te stellen
- Mogelijkheid om te variëren met portiegrootte
- Hoeveelheid gerechten/producten die aan het eind van het bezoek op de afvalbak blijven liggen

Appendix 4. Aspects of secondary data

- Duurzaamheid/ sustainability
- Voedselverspilling/ voedselderving/ food waste/ food losses
- Milieu/ environment
- Natuur/ nature
- Maatschappelijk verantwoord onderwerpen/ corporate social responsibility

Appendix 5. Analysis scheme

1st column = interview
2th column = observation
3th column = secondary data

Implementation of environmental friendly processes concerning sustainable development

Minimise resource use																																				
Water consumption	1						7																			2	3	4				8			11	
Energy use (CO2 footprint)	1	2	3				7			10																2	3	4			7				11	
Organic waste							7				11															2					7					
Plastic use				4						10																										
Material use										10																									11	
Certification and reports																																				
GRI		2																								2										
BREEAM								8																												
Green Key						6																					3	4		6				10		
Corporate Sustainability																										2	3	4		6	7				11	
Own sustainability plan											11								7																	
Recycle																																				
Organic waste		2	3		5			8			11																3				7					
Use of recycled products																												4								
Circularity																																				12
Education and innovation																																				
Educate visitors (communicate)			3	4												4			7							2	3	4		6						12
Innovation									9																											
Stimulate suppliers to implement sustainability																										2										
Origin (food)procuts																																				
Local			3		5			8			11																					8				
Seasonal											11																									
Biological			3	4			7																					4			7			10	11	
Certification mark (sustainable)							7	8		10																	3			6	7	8			11	
Fairtrade											11																	4						10		
Foundation																																				
Nature conservation				4																							3	4		6				10		
Other products																																				
Biological cleaning detergent				4	5			8																												
Biodegredabale disposables				4	5			8																			3								11	
Sustainable building												12															3									

Implemented processes concerning food waste reduction

Reuse																																				
Divide among employees	1						7	8																												
Animals			3																																	
In other dishes	1						7	8			11																									
Charities								8																												
Inventory management																																				
First in first out	1	2										12																								
Consinder placement (fridge of freezer)	1	2																																		
Only order what is needed	1										11	12																								
Daily delivery		2																																		
Prepared stock																																				
Balance prepared stock and prognosis		2	3	4	5	6	7	8	9	10	11	12																								
Produced stock in fridge		2			5																															
Produce fresh on demand			3		5						11	12									10	11														
Monitoring																																				
Register amount of food waste		2	3	4	5		7		9	10	11	12																								
Improve processes to reduce food waste		2				6	7					12																								
Control food waste		2					7																													
Training/ instructions																																				
Instruct employees		2	3		5						11																									
Train employees		2					7																													
Communication	1	2			5				9	10	11	12																								
Menu																																				
Products displayed in cold cabinet	1				5		7										5																			
Adjust assortment if products don't sell				4	5		7				11	12																								
Compile your own dish		2							9	10	11	12					5			7	9	10	11													
Possibility to vary in portion size		2					7		9		11	12								7	9	10	11													

Factors that trigger organisational innovation of processes concerning food waste reduction												
	Costs											
	Economic advantages/ cost reduction	1	2		4	5			8		10	11	12
	Enlarge margin			3			6			9			
	Responsibility												
	Social		2									11	12
	Environmental				4								
	Sustainability				4			7					
	Awareness												
	Self-interest					5					10		
	Awareness about food waste(-processes) (and other conseq.) among employees (change in thinking)		2		4	5		7		9	10		12
	Waste of												
	Food			3									
	Labour								8				
	Willingness												
	You must like to do it										10		
	Make a game of it			3									

Difficulties with (further) implementation of innovative processes concerning food waste reduction												
	Expected consumers											
	Not possible to estimate exactly	1	2							10		12
	Registration system											
	No proper registration system			3								
	Service											
	Someting to offer	1				5						
	Full display cases = selling more or presentation			3				8		10		12
	Full display cases = feeling of welcome						6	7	8			
	Full display cases = freshness perceptiop of costumers							7	8			
	Not selling 'no'		2				6		8			12
	Principal in charge (wants choices/full display)		2						8		11	
	Priorities											
	Other priorities			3	4		6					
	Stability employees											
	Low stability seasonal workers (every year other employee				4	5						
	Lack of knowledge and experience at holiday/weekend employees					5	6					
	Insecurity											
	Chef		2				6					
	Employees						6			10		12
	Legislation											
	No possibility to give away (charity)							8			11	
	(2-hours) assurance		2	3				8	9	10		
	Others											
	Investment costs								9			
	Suppliers do not cooperate									10		
	Technqiue					5						