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## Master Thesis Exposé

# Determinants of Solid Waste and Disposal Behavior – A Literature Review

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## **Abstract**

**Title:** Determinants of Solid Waste and Disposal Behavior – A Literature Review

**Background:** There is a constantly growing amount of generated waste worldwide and an inability of institutions alone to manage the sustainable disposal of waste. Therefore, public engagement related to the issues of generation, management and separation as well as the disposal of household waste needs to be fostered. In order to be able to do so, it is necessary to have a profound understanding about which determinants influence people to dispose of their waste in the ways that they do.

However, there is a multitude of different determinants that drive certain types of disposal behavior for diverse types of solid household waste.

**Purpose:** The purpose of this thesis is to provide a review of the relevant literature and in this manner to give an overview on which types of motivators and determinants drive different types of disposal behavior for diverse types of solid waste. The aim is to conduct a structured review and present the findings in a systematic manner, to give clear insight on which determinants are the ones driving a specific form of behavior.

**Method:** A deductive-internal literature review will be carried out for the purpose of this thesis, since when it comes to the disposal of solid waste, different motivations are discussed across papers that lead individuals to dispose of their waste in the way they do. The literature search will be conducted based on key words related to different forms of solid waste, disposal behaviors as well as determinants that influence the two earlier mentioned factors. The retrieved literature will be reviewed based on its relevance to all the mentioned factors and will then be narrowed down to forms of solid waste and disposal behavior of households, thus filtering for those studies that are not of interest for the purpose of this literature review.

**Keywords:** Household waste, disposal behavior, household waste management, intrinsic motivation, extrinsic motivation, social norms, recycling, waste prevention, waste disposal, theory of planned behavior

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# **1. Introduction**

## **1.1. Background**

The generation of waste is a natural product of the rapid growth of the population, urbanization as well as industrialization. Due to the exponential population growth around the world, naturally an exponential growth of waste can be identified, which has to be dealt with in forms of waste management and disposal thereof (Das et al., 2019; Kaza, Yao, Bhada-Tata, & Van Woerden, 2018). According to the last available data from 2016, from the World Bank, waste generation was estimated to have amounted up to 2.01 billions of tons worldwide with an estimated average per capita of 0.76 kilograms per year (Kaza et al., 2018). Further, according to projections by the World Bank, by 2030 the number of waste generated worldwide is expected to increase up to 2.59 billions tons and by 2050 up to 3.40 billion tons annually (Kaza et al., 2018). Most of this waste is composed of paper, plastic and food/ organic waste (Hoornweg & Bhada-Tata, 2012). In the global context, even though 33% of generated waste is still openly dumped, governments around the world are aware of the associated risks of improper disposal methods of solid waste, such as negative consequences on health as well as related environmental issues, and are therefore aiming to establish sustainable waste disposal methods (Das et al., 2019; Kaza et al., 2018; Khandelwal, Dhar, Thalla, & Kumar, 2018). However, due to the high associated costs when it comes to proper management of discarded solid waste, civic bodies, such as governments or cities, are either incapable of managing it by themselves, because of the sheer magnitude of the endeavor as well as the necessary, affiliated expenses, or poorly organized and faced with a lack of acceptance, depending on the country (Das et al., 2019; Raab & Wagner, 2017). Therefore, it is of utmost importance to foster public engagement related to the issues of generation, management and separation, as well as the disposal of household waste (Kaza et al., 2018). In order to be able to promote and encourage the engagement of citizens to comply to certain forms of disposal behavior regarding their household waste, it is necessary to have a profound understanding about which determinants influence people to dispose of their waste in the way that they do. Even though historically most studies have dealt with the other side of the cycle, by mainly focusing on purchasing behavior and brand choice, due to the growing importance of disposal behavior of waste, it has been noted that it is a fundamental

aspect of consumer behavior and recently a multitude of studies have been carried out, investigating which factors lead to the disposal of waste and which determinants influence people concerning their disposal behavior (Harrell & McConocha, 1992).

## **1.2. Problem Statement**

The aforementioned studies have taken a wide array of factors into consideration regarding which determinants influence the disposal behavior of individuals such as for example extrinsic and intrinsic motivation, based on the model developed by Deci and Ryan (2000) (e.g. Cecere et al., 2014; Hormuth, 1999; Joung & Park-Poaps, 2011; Martin, Williams, & Clark, 2006), general psychological construct like values, attitudes, beliefs (e.g. McCarthy & Shrum, 2001; Vining & Ebreo, 1991; Viscusi, Huber, & Bell 2011), or the theory of planned behavior by Ajzen (1991) (e.g. Botetzagias, Dima, & Malesios, 2015; Knussen, Yule, MacKenzie, & Wells, 2004; Setti, Banchelli, Fallasconi, Segre, & Vittuari, 2018; Oztekin, Teksoz, Pamuk, Sahin, & Kilic, 2017). However, a factor that further complicates this issue is that one can distinguish between several different types of solid household waste (such as food waste, organic waste, paper waste, plastic waste, textile waste, etc.) and different forms of disposal behavior (such as recycling, reselling, donating, trashing, etc.). Some of the conducted studies only focus on one type of solid waste/form of disposal behavior when investigating which determinants influence the disposal behavior of individuals. Therefore, there is several studies investigating the determinants which influence individuals' actions regarding a specific type of solid waste or disposal behavior, however, there is a lack of academic work which provides an encompassing overview of all the possible, different types of household waste and disposal behaviors as well as which determinants drive people to pursue the behavior they carry out. The aim of this study is to provide a structured synopsis on what forms of motivators and determinants effect the various types of disposal behavior for the different types of household waste.

## **2. Theoretical Framework**

### **2.1. Solid Waste**

In order to be able to give an overview about which determinants influence the disposal behavior of different types of household waste, a breakdown to its possible types of components is necessary. This is referred to by the World Bank as “Waste Composition” which is the classification of types of substances in municipal solid waste (Kaza et al., 2018). Generally, waste composition is established by the means of a standard waste audit, which is carried out by taking samples from final disposal sites and sorting them into predetermined categories (Kaza et al., 2018). However, there is no internationally adopted, universal standard to defining the predetermined categories for a classification of solid waste (Dahlén & Lagerkvist, 2008). Different types of categorizations are used across the world, countries and even within a single country it is possible that multiple methods are being adopted. Most methods advocate for a low number of primary categories that classify types of waste, also called main components, and a larger number of secondary categories/sub-components, as long as they can be definitely matched to the correct primary category (Dahlén & Lagerkvist, 2008). Nevertheless, in the case of a unified approach, it would give the possibility to have comparable information and data about the composition of solid waste within and between countries. Therefore, Dahlén and Lagerkvist have reviewed twenty different methods that were used in studies which categorize municipal solid waste, where the number of primary categories used by the initial researchers was between 2 and 47. Further, after excluding the outliers, the average was 12 primary categories, from which they derived 11 primary categories that were used as main components in the majority of the reviewed methods. Of those 11 primary sorting categories, the 7 relevant ones for household waste, will be used for the purpose of this literature review (Table 1) (Dahlén & Lagerkvist, 2008).

Since there is no international standard regarding the categorization of solid waste, this method combines the primary categories of multiple, examined categorization methods. Therefore, it is the best possible solution to find an assortment of categories that are widely used within this field of research. The reviewed articles are analyzed on which type of household waste (biodegradable waste, paper waste, plastic waste, glass waste, metal waste,

wood waste, textile waste) is being studied and afterwards grouped into one of either the primary categories, or put into a subcategory as long as the latter is unmistakably attributable to one of the main components.

Primary Components	Alternative or subordinate terms
Biodegradable Waste	Biowaste, fermentable waste, food waste, yard waste, organic waste, degradable waste, kitchen and garden waste, natural organic products
Paper	Paper, newsprint, cardboard, mixed paper, high grade paper, paper packaging
Plastics	Plastic packaging, plastic film packaging, dense plastic packaging, foamed plastic packaging
Glass	Glass packaging, non-packing glass
Metals	Metal packaging, aluminum, iron, ferrous metals, non-ferrous metals
Wood	
Textiles	Textiles and leather, carpeting and mats

*Table 1: Primary Sorting Categories of Solid Waste.*

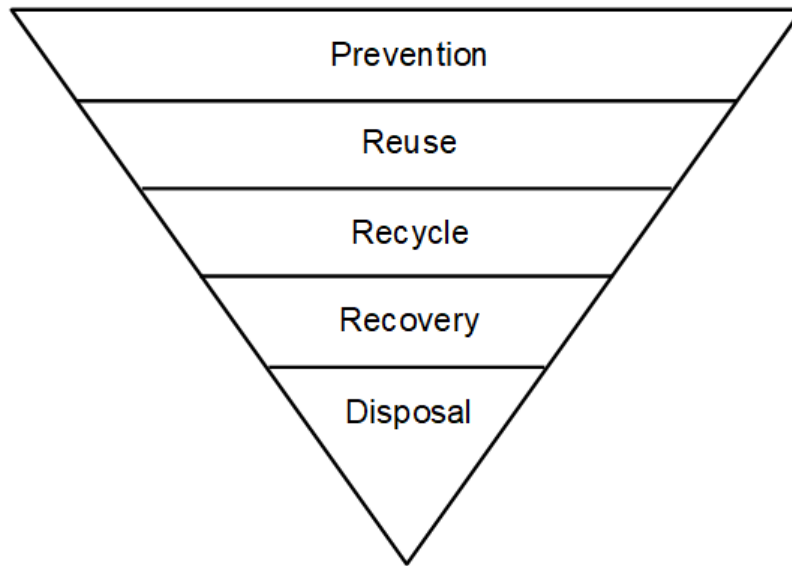
*Adapted from Dahlén, Lagerkvist, 2007.*

## **2.2. Disposal Behavior**

In pursuance of being able to understand which determinants effect the disposal behavior of households, a classification of different types of disposal behaviors is necessary. To achieve such a categorization, of different forms of disposal behavior, the waste hierarchy will provide the theoretical foundation for this literature review.

The principles behind the waste hierarchy were developed and introduced in form of the European Waste Framework Directive (1975/442/EEC) into European waste policy in 1975 for the first time. One reason for its introduction was the change in mentality to not consider waste an uniform entity anymore, alongside with the realization that it consists of many different materials which need to be treated differently when it comes to their disposal (Gertsakis & Lewis, 2003). It was later, in 1989, clearly defined in European legislation and by 2008 adapted into a five category waste hierarchy that has to be implemented into the waste management law by its member states (Papargyropoulou, Lozano, Steinberger, Wright, & Ujang, 2014). The five categories of the hierarchy include (Figure 1):





*Figure 1: Waste Hierarchy.*

*Own Elaboration based on Papargyropoulou et al., 2014.*

*Prevention:* Preventing and reducing the generation of waste.

*Reuse:* Reusing the product in the same or a different way before it becomes waste.

*Recycle:* Any form of process that allows the materials to be transformed into products or materials that can be used for the same or other purposes.

*Recovery:* Incineration of waste in forms that are more efficient than regular incineration.

*Disposal:* The ordinary disposal of waste, also known as trashing.

(Papargyropoulou et al., 2014).

The purpose of this hierarchy is to classify the different forms of disposal into alternatives that are the most promising to result in the best possible environmental outcome, with most favorable to least favorable from top to bottom (Papargyropoulou et al., 2014). However, there are two schools of thought regarding the hierarchy and the way it should be interpreted (Gertsakis & Lewis, 2003). One of them argues that the hierarchy is to be seen as a “menu of options” with all of the categories being equally valid and no existing hierarchy of preference, whereas the other one states that the hierarchy should be strictly followed, according to the degree of priority (Gertsakis & Lewis, 2003). Further, economists state that the hierarchy should be seen as a flexible guideline for formulating waste strategies, thus supporting the first school of thought (Papargyropoulou et al., 2014).

For the purpose of this literature review the aforementioned first school of thought will be followed, thus giving every category of the presented forms of disposal the same degree of importance. Additionally, since the described waste hierarchy is a policy introduced for the member states of the European Union and not for individuals, an adaptation of it is necessary for the objective of this study. The hierarchy will be adapted regarding its different classifications, excluding “Recovery”, since households do not opt for this form of disposal, which is therefore irrelevant for this literature review (Figure 2).

Prevention
Reuse
Recycle
Disposal

*Figure 2: Adapted Waste Hierarchy.*

*Own Elaboration based on Papargyropoulou et al., 2014.*

The other four discussed forms will be used in order to classify which type of disposal form the reviewed papers are dealing with. Further, this classification is also congruous with another taxonomy of disposal types, developed by Brosius, Fernandez and Cherrier (2013), who adapted Jacoby's (1977) taxonomy of forms of disposal behavior. In the case of a sub-categorization, it will be admitted to one of the four categories, as long as its unmistakably clear which category it belongs to.

## **2.3. Motivational Theories/ Approaches**

### **2.3.1. Intrinsic and Extrinsic Motivators**

#### **Intrinsic Motivators:**

The behavior of individuals is, generally speaking, influenced by intrinsic and extrinsic motivations. Intrinsic motivations are composed of factors that are internally determined by an individual themselves, without any involvement or interference of a third party influencing the individual's actions. It refers to forms of altruistic behavior which ultimately have the goal

to maximize individual as well as social well-being (Ryan & Deci, 2000). There are certain forms of activities that cause people to be intrinsically motivated to perform a specific task. However, when different individuals perform the exact same activity, they individually experience different degrees of intrinsic motivation. Behaviors that are carried out due to being associated with intrinsic motivations are said to be accompanied by a merit, which is received solely by performing the action itself, since it is providing satisfaction for internal, psychological needs (Cecere et al., 2014). Cognitive Evaluation Theory (Deci & Ryan, 2000) argues that factors which contribute and trigger feelings of competence while performing a task, intensify intrinsic motivation for said action, since it satisfies the individual's fundamental psychological need for competence. However, experiencing competence alone will not lead to an increase of intrinsic motivations by itself, in order for this to be possible, the increase in competence, or self-efficacy, also has to come alongside a sense of autonomy (Deci & Ryan, 2000). This means that the individual needs to feel that the action they're taking is self-determined, not influenced by any other factor, in order to induce the enhancement of intrinsic motivations, along with self-efficacy. Thus, for it to be possible to have a high level of intrinsic motivation for an individual's behavior, it is necessary for them to feel satisfaction in both self-efficacy as well as autonomy. External factors such as deadlines and threats reduce peoples' intrinsic motivations, since they are seen as regulators of their behavior, therefore limiting their autonomy. In contrast, elements such as having a free choice and being able to decide individually on how to act, give people an increased perception of autonomy and thus lead to an increase of their intrinsic motivation (Ryan & Deci, 2000). Intrinsic motivation is caused by hedonic goal frames which have the aim to behave in a manner "to feel better right now" (Lindenberg & Steg, 2007). Individuals with a hedonic mind frame are specifically responsive to variables that increase or decrease the amount of pleasure they are experiencing in a given situation (e.g. looking for improvement related to self-esteem, not having to exert any effort, avoiding negative states of mind, etc.).

### **Extrinsic Motivators:**

Even though intrinsic motivation is a crucial factor when it comes to influencing peoples' behavior, most of the actions people perform are not intrinsically motivated, but extrinsically. Most actions that are being performed are not for the psychological merit of performing the action itself, but in order to obtain a separable outcome, such as receiving a reward or

avoiding a sanction, which can be tangible or intangible (Ryan & Deci, 2000). As a result of this, extrinsic motivators can be divided into two general groups related to either gain goals, which refer to “retaining and improving one's resources”, or normative goals, which are considered “acting appropriately” (Lindenberg & Steg, 2007). Following a gain goal frame makes individuals sensitive to any changes in their available resources and they strive to be as efficient regarding their resources as possible, which includes factors such as managing threats to their finances, increasing their income, saving money, etc. (Lindenberg & Steg, 2007). Thus, a gain goal frame leads individuals to pursue positive, tangible incentives and to avoid negative, tangible sanctions whenever possible.

When following normative goals individuals are sensitive related to how they should behave, what the morally correct behavior in the situation is, according to themselves and others (Lindenberg & Steg, 2007). Related to the interpretation of others, extrinsic motivation can be attributed to “perceived social pressure” (Benabou & Tirole, 2006; Kirakozian, 2016). An influential factor considering external motivation is related to obtaining social appraisal as well as averting being socially judged by the members of society. Extrinsic motivation is connected to reputation concerns of the individual, who's aim is maintaining or obtaining a positive image in society. Therefore, individuals are acting in accordance with societal norms in order to gain positive judgment by the members of society and to avert being judged negatively, thus they are striving for social rewards as a result of pro-social behavior (Cecere et al., 2014). Further, normative goal frames also influence the individual to feel a personal, moral obligation to perform a specific behavior in a given situation, since it is the objectively correct way to act. Therefore, even when there is no external judgment by the members of society, normative goals can still cause a certain behavior, stemming from the individual themselves. They personally want to comply with moral norms, by acting in what is seen as the correct way (Miao & Wei, 2013). Extrinsically motivated actions can vary greatly in the degree to which they are taken autonomously. Some forms of extrinsic motivators provide very little room to make a voluntary decision, since they come in the form of legal and governmental sanctions, such as taxes and fines, therefore abiding to them is a mere compliance with a form of external control (Ryan & Deci, 2000).

Both forms of motivation, extrinsic as well as intrinsic, play an important role when it comes to the disposal behavior of household waste. For that reason, this is an influential framework for pro-environmental behavior, including factors that influence the disposal behavior of

individuals.

Concerning intrinsic motivations, on one hand, certain forms of disposal behavior seem to be caused by internal motives and are carried out as a form of completely altruistic motivations, thus not being influenced by any forms of external factors. Carrying these forms of disposal behavior out is not connected to receiving any type of economic rewards or being exposed to any type of external, social pressure. The merits individuals receive that are subject to intrinsic forms of motivation regarding the disposal of their waste are maximization of their personal welfare, due to performing actions in the “right way”, which induces positive emotions, gives them affirmation about their own competence and induces positive feelings due to them choosing the appropriate form of disposal voluntarily (Massarutto, Marangon, Troiano, & Favot, 2018). For instance, Cecere et al. (2014) conducted a study concerning the influence of intrinsic and extrinsic factors on food waste reduction behavior. In their results it becomes clear that intrinsic motivation is positively correlated with food waste reduction, meaning that people following this type of disposal behavior were neither motivated by economic incentives (gain goals), nor were they influenced by external, social pressure (normative goals), which are both of the factors of extrinsic motivation. In a similar light, Aprile and Fiorillo (2019) investigated a different form of disposal behavior, namely recycling, where, according to both theoretical as well as empirical evidence, they interpret recycling to be an egoistically motivated behavior and thus mainly affected by intrinsic incentives, as long as there is no monetary incentives present. However, other studies (e.g. Botetzagias, Dima, & Malesios, 2015) which deal with recycling, determined extrinsic motivations, specifically normative goals, to be the most influential driver of recycling, meaning there are mixed results, which need further clarification.

On the other hand, regarding pro-environmental behavior, due to intrinsic motivation being caused by hedonic goals, they might also have the opposite effect when it comes to pro-environmental behavior. For example, seeing an empty glass bottle in the kitchen might elicit a feeling of disorderliness, wanting to dispose of the bottle. However, properly disposing of an empty glass bottle takes effort, since it has to either be brought directly to the glass container, or stored somewhere in the house and performing such effort puts the individual in a negative state of mind. Throwing the bottle in the trash costs hardly any effort and removes the feeling of disorderliness in the kitchen (Lindenberg & Steg, 2007). Therefore, hedonic goals can both support pro-environmental behavior as well as cause the opposite, depending on the situation and the individual.

Concerning extrinsically motivated types of disposal behavior regarding household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles), there is a multitude of factors that can lead individuals to carry out a specific form of disposal (reduce, reuse, recycle, dispose) regarding their waste. Due to following normative goals, such as external, social pressure when it comes to the disposal of waste, individuals are likely to choose one form of disposal over another, to abide by the environmental rules of society and in order to avert negative judgment by their peers (Salem, Raab, & Wagner, 2020). For instance, when it comes to the process of recycling, people might lean towards adapting this form of disposal behavior to not be condemned by their social environment, such as family and neighbors, for not following the practice which is widely accepted as the “proper way of disposal” (Hormuth, 1999). Similar conclusions were made by Abott, Shasikantan and O'Shea (2013), who analyzed the effects of social norm, warm-glow and environmental concern related to the recycling behavior of British citizens. It was found that social norms have the strongest effect related to recycling, suggesting that in the context of households, it is more effective to rely on social norms as compared to other behaviors, to guide the desired behavior (Abott et al., 2013). Another factor that falls under the category of extrinsic motivation connected to the disposal behavior, are gain goals, such as economic incentives or sanctions. Regarding economic incentives, certain types of disposal behaviors are carried out either to avoid receiving a sanction, if the type of disposal used is not approved by the government, or to obtain a monetary reward for following a specific form of disposal behavior. One such form of disposal, that is used in order to receive a financial benefit, is for example the “Pfand” system in Germany, where people receive a monetary compensation when they return their empty tin-cans or plastic bottles. There is many studies investigating the impact of economic incentives related to disposal behaviors, such as for instance, Xu, Ling and Wu (2018) who tested two strategies, being economic incentives and social norms, to determine their influence on waste separation behavior in China. Both of the strategies increase separation behavior, therefore both of them are applicable, however, economic incentives were deemed to be more effective than the application of social norms, especially at an early stage of behavior promotion (Xu et al., 2018).

Naturally, there is many additional forms of intrinsic and extrinsic motivations influencing the disposal of household waste, which will be discovered and analyzed throughout the course of this literature review.

However, in order to determine the different forms and drivers of disposal behavior of household waste, intrinsic and extrinsic forms of motivation are just one theory that is used by scholars to find and identify influencing factors, but they are not the only theory applied to understand what drives peoples' behavior. Therefore, it is also necessary to include additional, underlying theories to find out which other factors and determinants lead to choosing a specific form of disposal behavior, such as the theory of planned behavior (TPB), which is another widespread framework used by researchers to explain the disposal behavior of individuals. The TPB will be introduced, explained and some examples for its relevance with respect to disposal of household waste will be given in the following.

### 2.3.2. Theory of Planned Behavior

One of the most influential psychological theories used to systematically analyze and explain people's motives, behaviors and actions is the theory of planned behavior (TPB; Ajzen, 1991). It is essentially an extension of its predecessor, the theory of reasoned action, made necessary due to its assumption of complete volitional control, meaning that an individual can decide voluntarily whether or not they want to perform a certain behavior (Armitage & Conner, 2001; Tonglet, Phillips, & Read, 2004). In reality however, it is often times out of the control of an individual to decide whether or not they can follow a certain behavior, since they are limited by factors such as a lack of resources, skills and opportunities. The theory of planned behavior takes these factors into consideration and as a result includes an additional measure, perceived behavioral control (PBC), which is a variable that states the individual's perception of their ability to perform the behavior at issue (Figure 3) (Tonglet et al., 2004).

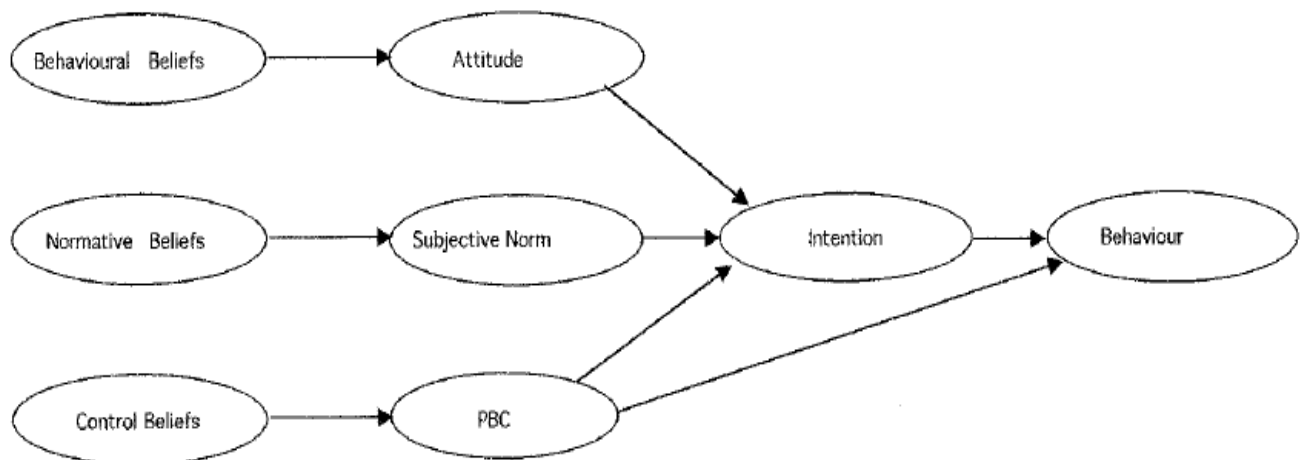


Figure 3: Theory of Planned Behavior.

Adapted from Ajzen, 1991.

In general, according to the TPB, the behavior of individuals is influenced by three different types of occurrences: beliefs about the results of the behavior or other attributes related to it (behavioral beliefs), beliefs about how other people will judge the behavior in a normative way (normative beliefs) and beliefs about the availability of elements which can either promote or hinder achieving the desired behavior (control beliefs) (Ajzen, 2002). These underlying beliefs are considered important drivers of the variables that form intentions, which then result in a certain form of behavior. In their corresponding accumulation, behavioral beliefs lead to a positive or negative “Attitude” towards the behavior, since the beliefs themselves are already associated favorably or unfavorably. As a result of this, individuals prefer behaviors that lead to mostly favorable results, while they develop negative frames of mind related to unfavorable outcomes (Ajzen 1991; Armitage & Conner, 2001). Normative beliefs, which are beliefs about the probability that an important reference group or person accept or condone a certain type of behavior, lead to perceived social pressure, which is classified as “Subjective Norm” (Ajzen, 2002). Control beliefs are determined by many different factors such as past experiences, information from third parties related to the difficulty of performing the action, experiences from acquaintances and family (Ajzen, 1991). They result in “Perceived Behavioral Control”, that is the perceived difficulty or ease with which a behavior can be carried out. In general, the more necessary resources, skills and information individuals possess and the fewer difficulties they see standing in their way when it comes to carrying out a behavior, the higher should their level of perceived behavioral control be.

When all three factors are combined, attitude (the evaluation of the behavior's possible outcomes), subjective norm (whether the social surrounding approves of or condones the behavior) and perceived behavioral control (the perceived ability to carry the behavior out), they form the behavioral “Intention” (Ajzen, 2002; Botetzagias et al., 2015). Intention is considered a direct driver of behavior and therefore, individuals are expected to behave according to their intentions as soon as they get the opportunity to do so, provided they possess a certain level of actual control (Ajzen, 2002). However, concerning many behaviors, there are limitations when trying to carry them out (such as limited skills, resources, opportunities, etc.), which makes it necessary to consider perceived behavioral control alongside intention when trying to predict a certain behavior. As long as the individual's judgment concerning the difficulty of the task is a fairly reliable, the PBC can be used as a



good estimate about the actual control of the task and thus as a predictor for the resulting behavior (Armitage & Conner, 2001).

The theory of planned behavior has been applied to a wide variety of different behaviors, across various fields of studies, since it has been introduced. The general findings support the predictive nature of the theory of planned behavior, including all three of its factors, attitudes, subjective norms and perceived behavioral control. Its validity as a predictor of intentions and behavior has also been proven multiple times through meta-analyses (e.g. Armitage & Conner, 2001) as well as literature reviews (e.g. Sutton, 1998).

The framework of the theory of planned behavior is also one of the most widely used theories when it comes to evaluating environmental behaviors (Botetzagias et al., 2015). Disposal of household waste calls for an extended amount of effort, since it puts the individual in a situation where they have to decide which type of disposal behavior (reduce, reuse, recycle, dispose) to apply. Furthermore, different ways of disposal have different requirements, such as sorting and storing the waste, until an opportunity for its disposal arises. A similar decision making process needs to be applied when different types of household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles) are taken into consideration, due to their various characteristics and available forms of disposal. Therefore, the disposal decision is highly intricate and many aspects need to be considered by individuals, who have different beliefs, attitudes, social norms and levels of perceived behavioral control for the diverse types of waste disposal (reduce, reuse, recycle, dispose) and their respective requirements. In this context, the TPB gives an underlying theory that allows to methodically identify the aspects that influence the disposal decision (Tonglet et al., 2004). Several studies related to this topic have been able to apply the TPB to identify the explanations of different environmental behaviors as well as disposal behaviors, such as food waste (e.g. Setti et al., 2018; Visschers, Wickli, & Siegrist, 2016), environmental behavior (e.g. Harland, Staats, & Wilke, 1999); composting (e.g. Taylor & Todd, 1997) and recycling behavior (e.g. Knussen et al., 2004; Tonglet et al., 2004; Oztekin, Teksoz, Pamuk, Sahin, & Kilic, 2017; Botetzagias et al., 2015).

### **Extensions of the Model:**

However, even though there is substantial support for the validity and importance of this theory, multiple authors have indicated that the TPB does not explain certain behaviors sufficiently and have therefore advised to include additional factors into the model to increase

its descriptive capacity (Tonglet et al., 2004). According to a review by Ajzen (1991) of his own theory, while discussing its sufficiency, it was stated that the TPB is open to the inclusion of additional factors, provided that they result in a significant contribution to the explanation of behavior (Ajzen, 1991). Three of the variables that are repeatedly incorporated into the model, across different studies, which are generally considered to increase the prediction of behavior through this model, are past behavior, moral norms as well as situational factors (Botetzagias et al., 2015).

### **Moral Norms:**

Morality refers to the individual's own assessment about the moral decency or indecency of performing a certain behavior. The inclusion of moral norms into the TPB can greatly improve the prediction of behaviors that are either socially unacceptable or which contain moral dimensions (Tonglet et al., 2004). There is increasing indication that moral norms explain a considerable amount of variance in pro-environmental behaviors (Botetzagias et al., 2015). Additionally, since disposal behaviors of household waste are likely to include aspects of moral norms and environmental responsibility, many studies dealing with the disposal types of household waste, which apply the TPB, incorporate moral norms as an additional factor into their model (e.g. Tonglet et al., 2004; Chan & Bishop, 2013).

### **Past Behavior:**

Even though in the original theory Ajzen (1991) argues that past behavior and past experiences are not an additional factor to the model of the TPB, since they merely contribute to the development of attitudes, subjective norm and perceived behavioral control, subsequent studies have illustrated that past behavior has a direct effect on intentions and thus behavior, separate from the three variables included in the model (e.g. Ouellette & Wood, 1998). To the extent that a specific behavior is repeated multiple times, constantly with the same outcome, the repetition of following the specific behavior can become habit. Concerning studies related to the disposal behaviors of household waste, also multiple studies have concluded that past behavior and past experiences need to be included in order to predict the actual disposal behavior of individuals (e.g. Boldero, 1995; Harland et al., 1999; Knussen et al., 2004).

### **Situational Factors:**

While the factor of perceived behavioral control is usually obtained by asking individuals directly about their general level of confidence in being able to perform a certain behavior, often times situational factors, that are not long lasting, can influence an individual's choice of behavior in the moment (Tonglet et al., 2004). Regarding studies related to the disposal behavior of household waste, the different types of behavior (reduce, reuse, recycle, dispose) can be influenced by various situational factors such as inconvenience, time constraints, lack of storage space, insufficient access to disposal containers etc. Therefore, while individuals can generally feel to be in control of their behavior (PBC), in certain situations (e.g. if they are not at home), situational factors might lead to them straying away from their usual behavior. Due to this concern, several studies extended their model of TPB with situational factors while investigating the disposal behaviors of individuals (e.g. Boldero, 1995; Tonglet et al., 2004).

As far as the topic of this literature review is concerned, a plethora of relevant studies apply the theory of planned behavior as an underlying construct, explaining the various disposal behaviors (reduce, reuse, recycle, dispose) of different types of household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles).

For instance, Pakpour, Zeidi, Emamjomeh, Asefzadeh and Pearson (2013) conducted a study using the TPB to understand household waste behaviors in Iran. They extended the model by including the dimensions of past behavior, moral obligation, self-identity, intention and action planning. Their findings indicate that all eight considered dimensions significantly predict the behavior of households in Iran, with moral obligation being the strongest predictor in their study. This finding is consistent with previous studies and indicates that applying approaches which stress individuals' moral and intrinsic motivations, are important in household waste reduction and recycling behaviors (Pakpour et al., 2013).

Another example, from the significant studies for this review, that supports the relevance of the theory of planned behavior with respect to disposal behavior of household waste was illustrated by Botetzagias et al. (2015). The authors extended the TPB, incorporating moral norms and demographic predictors, to anticipate the recycling behavior of Greek citizens. Their findings exhibit that the strongest two predictors in their model are perceived behavioral control (PBC) as well as moral norms, whereas their second additional variable, demographic predictors, were found to be statistically insignificant in predicting peoples'

recycling behavior. As a result, they suggest an expansion in the already existing curbside recycling system as well as promoting recycling as the morally correct thing to do, in order to further improve recycling rates in Greece (Botetzagias et al., 2015).

### **3. Review of Literature and Propositions**

For the purpose of having a structured overview of the reviewed literature, an excel file has been developed explaining several of the most important contents of the literature, such as the data collection method used by the authors, the geographical area where the study was carried out, which type of household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles) is being studied, which type of disposal behavior (reduce, reuse, recycle, dispose) is being investigated, which are the determinants that influence the disposal behavior, what the authors' conclusions and recommendations are, what the areas for future research are, etc. Due to the sheer size of the table, it is not directly included into this expose, however, the excel file is uploaded separately, alongside the expose (See “Coding Literature Thesis Dominik Oles”).

After reviewing an initial set of literature related to the topic of this review, first insights on underlying trends were noticed with regards to determinants influencing the various types of disposal behaviors, as well as the different types of household waste. As a consequence of the initial observations, the following propositions are posed for the outcomes of this literature review, which after conducting the full analysis of all reviewed studies, will be deemed as either unrelated, corroborated or falsified (Mueller, 2016).

Due to recycling being an ubiquitously widespread standard and the high levels of presence of interpersonal relationships (e.g. with family, neighbors, social environment) in a household setting, people do not want to be assessed negatively by their peers in society for the behaviors they are following. This context induces feelings of obligation and perceived social pressure, leading to considerable amounts of social norm pressure (e.g. Abbott et al., 2013; Miao & Wei, 2013). This leads to the formulation of the following proposition:

*P1: Among several motives at work, normative goals (as in perceived social pressure)/ subjective norms are the prevalent driver of recycling behavior.*

Further, several reviewed studies dealing with waste reduction behavior, both in cross-border as well as in national settings, revealed that the participants following such actions, do so due to forms of altruistic motivation, not in pursuit of economic incentives or as a result of social norm pressure (Cecere et al., 2014; Pakpour et al., 2013). This seems that reduction behavior is a result of completely individualistic and personal motives, leading to the proposition:

*P2: Intrinsic motivation/ hedonic motives that cause positive frames of mind (e.g. personal welfare, feelings of competence, positive emotions) are the dominant drivers for increasing reduction behavior.*

Several studies utilizing the TPB with regards to different forms of disposal behavior, included past behavior/ experience as an extension of the original model. From the sample of reviewed studies doing so, the conclusions are that the way individuals disposed of their waste in the past, being repetitive actions with usually the same outcomes, can cause a habit to form and therefore interpreted past behavior as an important predictor for behavior (e.g. Knussen et al., 2004; Tonglet et al., 2004). As a result of the initial observations the following proposition arises:

*P3: Past behavior (when included in the TPB) is an important predictor of all forms of disposal behaviors (reduce, reuse, recycle, dispose).*

Another finding, spanning across multiple studies after the initial review of a sample of literature, is related to the presence of both extrinsic, specifically economic incentives, as well as intrinsic motivations driving a certain form of behavior. It refers to the crowding out effect that occurs when financial incentives are present, which leads to a declining impact of the existing intrinsic drivers (e.g. Lindenberg & Steg, 2007; Xu et al., 2018). Due to this effect as well as the immediate benefit of financial incentives, as opposed to a delayed benefit for other forms of motivation, the following proposal is deduced:

*P4: When present, economic incentives/ sanctions are the dominant driver of all forms of disposal behavior (reduce, reuse, recycle, dispose).*

Until now, the presented propositions all suggested a positive effect of the mentioned variables regarding their influence on disposal behavior, enhancing the pursuit of a specific form. However, multiple findings have suggested the existence of at least one possible negative driver, which inhibits individuals' pursuit of the “proper type of disposal”. Actions that deteriorate the way an individual feels in a situation (ones that e.g. need exertion of effort, cause inconvenience, elicit negative emotions), might cause them to not perform them and instead opt for easier, more convenient options (Martin et al., 2006; Lindenberg & Steg, 2007). Therefore, it is proposed that:

*P5: Intrinsic/ hedonic motives that cause negative frames of mind (effort, inconvenience, etc.) are the main drivers for improper disposal behavior.*

## **4. Methodology**

A permanently growing amount of studies and literature leads to considerable amounts of similar findings, contradicting findings, or findings that deal with the same topic but conclude with different results. To be able to find the underlying, overarching bits of information, literature reviews are a necessary tool to get an overview (Seuring & Gold, 2011). Therefore, literature reviews are an useful method to incorporate the bodies of existing literature alongside with their various results, to give a better, more structured and more complete overview about a specific research area rather than just looking at individual studies.

When it comes to analyzing the forms of disposal behavior of household waste, there is a variety of factors to be taken into consideration. On one hand the drivers of certain forms of disposal behavior are influenced by the type of waste that is being disposed of (biodegradable waste, paper, plastic, metal, wood, glass, textiles). On the other hand, also the contrary factor is of considerable importance, namely different aspects seem to be playing an influence depending on which method of disposal is being utilized (reduce, reuse, recycle, dispose). In order to get an overview about all the different motivations that drive specific forms of disposal regarding both the type of waste that is being dealt with and the form of disposal itself, a literature review will be conducted in the sake of providing a summary of

the drivers of behavior concerning the different types of household waste as well as their forms of disposal.

#### **4.1. Data Collection Method**

To achieve the desired outcome the six steps of a structured literature review by Durach, Kembro and Wieland (2017) will be used: “(1) defining the research question, (2) determining the required characteristics of the primary studies, (3) retrieving a sample of potentially relevant literature, (4) selecting the pertinent literature, (5) synthesizing the literature and (6) reporting the results.”

In this specific case the research questions is “which are the determinants of solid waste and disposal behavior”. Regarding the required characteristics of the primary studies, they need to deal with at least one form of household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles), or at least one form of disposal behavior (reduce, reuse, recycle, dispose), as well as factors related to aspects which influence people's behavior when it comes to the disposal of their waste. Further, in order to retrieve sufficient literature that possibly falls under the required characteristics, the two most common approaches are (1) to search for relevant literature in the title, keywords and abstract of conducted studies, or (2) to look for literature in selected journals (Seuring & Gold, 2011). In this review, a literature search will be conducted based on key words related to the different forms of household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles), disposal behaviors (reduce, reuse, recycle, dispose), as well as determinants that influence the two earlier mentioned factors. The reason for choosing this approach is that concerning the topic of this study, the subject might be addressed across multiple, different journals and therefore focusing only on specific, selected journals might lead to overlooking a variety of relevant, important studies that were published across different journals (Seuring & Gold, 2011). In order to ensure the systematic nature of this literature review alongside with a high level of relevance concerning the selected literature, and for the study to be easily replicable, specific keywords were selected and multiple databases were considered to be able to select the most relevant ones. Further, criteria were defined regarding which scientific articles should be included as well as excluded, to reduce the corpus of literature to just the most relevant articles related to the topic. The database used to conduct this review of literature is “web of science”, while selecting the option to search across all subscribed resources. This approach enables to find the most comprehensive results, while looking across all available databases

of web of science, making it possible to find the most relevant results for studies related to the topic, across a broad field of scientific literature.

Due to the extensive, yet specific, nature of the studied topic, it was insufficient to select general keywords related to it, such as “solid waste”, “household waste”, “disposal behavior” etc., since the results were either too broad, not related to the topic, or literature from different fields of study. Therefore, a more intricate way of selecting keywords was necessary to find relevant literature. After an initial, general testing period, the best discovered query, utilizing a combination of suitable keywords was the following:

*waste AND [("dispos\* behavior") OR ("environ\* NEAR/3 behav\*") OR ("recycl\* behav\*")]*

Using this specific set of keywords in the web of science databases, the search yielded 766 results. After filtering for relevant types of documents, only including articles, reviews and meeting papers from the last 10 years, the amount of literature was reduced to 520 results. As the research is focused on human behavior, all technical documents are excluded (e.g. engineering, chemistry, archeology, logistics) as this is a social science focused research. Additionally, since this review is focused on the behavior of individuals and on the behavior related to household waste, articles dealing with the sectors of farming, fishing, corporate culture, energy consumption, water consumption, air pollution, construction and politics are excluded as well. Further, articles related to E-waste have also been excluded, since it is not a typical form of household waste and therefore not relevant for this review of literature. After conducting an initial exclusion of articles through means of analyzing their titles and establishing whether they deal with the above mentioned, excluded areas, the amount of literature was reduced to 282 results, without conducting any further text analysis. Since this review of literature focuses on the determinants of household waste and its disposal behaviors, the next step, to be able to confirm that the retrieved literature does in fact conform to all the relevant categories (e.g. ensuring it is indeed household waste, ensuring the papers make use of underlying theories explaining the behavior, etc.), the abstracts need to be read and thereby reflected on concerning their appropriateness for the studied topic (Seuring & Gold, 2011). Due to the extremely high concern for transparency and duplicability of the review process, all the later deemed relevant articles, filtered according to the aforementioned criteria, will be coded into a table to facilitate the detailed analysis of the retrieved literature under several different categories, such as title, authors, year of publication, publishing



journal, form of household waste, form of disposal behavior, type of motivation, etc. For instance, to have an easier and quicker overview about which underlying theories are used the most to explain their impact on different types of disposal behavior (reduction, reuse, recycling, disposal) and types of household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles).

To conclude, the factors relevant for the data collection method, in order to test the sample for a possible bias from the same group of authors, the software “Pajek” will be used to be able to determine if there is an over-representation of the same group of authors, quoting each other, or if certain subjects such as the same forms of disposal behavior, type of solid waste or form of motivation are being used more than others (Seuring & Gold, 2011). The software creates a form of visual map with all the different authors as well as other factors that are being dealt with in the selected studies. It then connects the different papers to authors and topics, which results in a visual representation about any existing connections between any of the inspected literature.

## **4.2. Type of literature review**

Looking back on Durach et al. (2017) and their six step, structured literature review, to be able to successfully synthesize the collected literature in a structured way, there is multiple different forms of literature reviews that can be conducted. The most popular four different types of literature reviews have different backgrounds on how they build or use theory in their analysis of the selected literature (Seuring & Müller, 2008). The mentioned four types of literature reviews are inductive, abductive, deductive-internal and deductive-external approaches. In the case of this literature review a deductive-internal review is applied (Seuring & Müller, 2008).

### **Deductive-internal**

A deductive-internal approach uses the research domain's theoretical background as its starting point and the theory is applied to analyze the topic in itself, or is used as a foundation to analyze topics outside of its domain. Referring to this particular study, using this approach, the theoretical background of human behavior is utilized to analyze the determinants of disposal behavior of household waste. Different motivations are discussed across papers that lead individuals to dispose of their waste in the way they do. These different forms of motivation (e.g. intrinsic and extrinsic) integrate both different types of household waste

(biodegradable waste, paper, plastic, metal, glass, textiles) as well as different disposal behaviors (reduce, reuse, recycle, dispose), which enables grouping of those different forms under the types of motivators that drive the specific form of behavior (Seuring & Müller, 2008). It is possible to speak of this methodology as inherently deductive, since the specific forms of categories (for waste, behavior and motivation) are introduced in the very beginning (Seuring & Müller, 2008). Therefore, as the starting point, the theoretical background of the determinants that drive peoples' behavior, such as intrinsic and extrinsic motivators, or the TPB, is given, as well as a sub-categorization of the types of household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles) and disposal behavior (reduce, reuse, recycle, dispose). The emerging connections between the types of motivators and household waste as well as disposal behavior will be illustrated using “Pajek”, to give an overview of all the different factors influencing each other and a visual summary on which those are. By using this tool it is possible to see whether there is multiple underlying theories that drive different forms of waste or disposal practices and subsequently a table is developed to present the number of papers adopting each of the respective theoretical approaches (Seuring & Müller, 2008).

## **5. Contributions to Research and Limitations**

### **5.1. Contribution of the paper**

Due to the earlier mentioned scattered, existing literature connected to this topic, the aim of this thesis is to conduct a systematic, structured and reproducible literature review, in order to be able to identify, evaluate, and interpret the existing body of recorded academic studies (Seuring & Gold, 2011). The desired contribution is to give an overview on which types of motivators and determinants drive different types of disposal behavior (reduce, reuse, recycle, dispose) for diverse types of household waste (biodegradable waste, paper, plastic, metal, wood, glass, textiles). The aim is to conduct a structured review and present the findings in a systematic manner to give a clear insight on which determinants are the ones driving a specific form of behavior. The findings can be used in further research to be developed more in depth and potentially find underlying trends regarding which of the determinants have the strongest influence on which type of waste or disposal behavior. Those findings could further

be used practically, to get people to practice the desired disposal behavior regarding type and waste, by using the most effective, representative motivational determinants to, for instance, develop promotion and knowledge campaigns.

## **5.2. Possible Limitations**

Even though this literature review will be conducted in a structured and replicable manner, there is still some possible limitations present. Since this is merely the Expose, for now only a limited amount of motivational theories, which are used across the retrieved studies (intrinsic and extrinsic motivation, TPB), were included in the theoretical framework. Even after the inclusion of further, relevant theoretical frameworks, additional theories may exist that explain which determinants influence the disposal behavior of solid waste, which have not been considered in the thesis. When it comes to the examined, underlying theories that explain the determinants of the disposal behavior, some researches might not use any of the described models, but a different one, and therefore a grouping into a distinct form of motivational theories, alongside other studies, might not be possible. Additionally, it is possible that some of the reviewed studies, even though they have relevant conclusions, might merely focus on explanatory research, which would mean that the findings are not generalizable and cannot be included in this review. Furthermore, there might not be sufficient conducted studies regarding specific types of household waste and/or disposal methods, which would mean that those categories will not have any other findings that they can be compared to. However, even if this would be the case, with all other factors being relevant for this study, an exclusion of such articles from this literature review would not be carried out, since those categories would open up possibilities for future research.

## **6. Plan of Work**

16.11 – 23.11	Reading of abstracts of found literature, to ensure the studies are related to the topic and to limit the number of studies considered for this literature review
24.11 – 24.12	Careful analysis of the findings, coding of qualified literature and transferring information from the coding of the literature to the actual thesis and conclusion
27.12 – 13.01	Time for corrections, proof reading and finalization

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