

Food Wastage in Households and Theories Underlying the Behaviour

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Abstract

Food Waste Index 2021 report reveals that people wasted 931 million tonnes of food material in the year 2019, out of which 61 % is contributed by households, 26 % by food services, and 13 % by retail; Indian households waste 50 kilograms of food annually per individual. The large quantities of food waste created by the worldwide food system is a critical issue that is getting major focus owing to its environmental and socio-economic impacts. Internationally, since visibility regarding sustainability, food wastage and impoverishment is on the high, the requirement to understand the behaviour patterns behind reducing food wastage and food insecurity is the need of the hour. In this paper, the authors make an attempt to list and analyse the theories behind the food wastage behaviour in households and to assist future research identify the antecedents of food wastage behaviour. The goal of this paper is to demonstrate a theoretical foundation for household food waste. The paper focuses on the Theory of Planned Behaviour (TPB) and Theory of Reasoned Action (TRA) majorly to explain constructs of behaviour.

Keywords

Theory of Planned Behaviour, Household Food waste behaviour, Theory of Reasoned Action, Theory of ERB

1. Introduction

According to the estimates of the Food and Agriculture Organisation (FAO) of the United Nations, around one third of the consumable food generated, meant for consumption by mankind is wasted internationally, corresponding to around 1300 million tons of food annually (Gustavsson et al 2011, Lipinski et al. 2013). Food wastage is becoming a prominent socio-economic regional, national, as well as global issue. The Food Waste Index Report 2021, released by the United Nations Environment Programme (UNEP) showed an estimate of 0.93 billion tons of food being disposed by households, restaurants and other food services in 2019 globally which corresponded to 17% of the total food available (Mohan 2021). The issue and spread of food waste is different from nation to nation and also individual to individual. The developing countries for example, in Sub-Saharan Africa record lower food waste when compared against the developed countries in Europe, USA etc. (Papargyropoulou et al. 2014). Around 21% of food available for consumption in U.S. was discarded by households in 2010 (Buzby et al. 2011). In 2019, FAO estimated around 690 million individuals being hungry and the food waste index report also hinted at a sharp rise of the number during and post-Covid-19 (Mohan 2021). A 2018 report underlines that the quantity of food wasted in India equals the total quantity of food consumed in the country of United Kingdom (UK). The weddings in India typically waste around 10% to 20% of the food and the food wasted per year adds upto approximately 14 billion USD. This not only highlights irresponsible consumption, but also throws a very concerning example of food wastage especially in a country, which performs extremely low on the global hunger index at a mere 94th position among 107 countries in the year 2020 (Hussain, Goyal 2021). In 2019-20, the amount of the food waste produced globally was almost equal to India's overall production of food grain, oilseeds and other agricultural products, combined. The report highlighted the fact that lion's share of this waste worldwide is derived from households, next by food channels and then retail channels (Mohan 2021). In India, the sudden enforcement of an unforeseen & extended lockdown in the background of the COVID-19 outbreak has led to refreshed attention on challenges such as starvation and food insecurity. Owing to an unexpected deprivation of income, the majority of India's poor population face challenges like growing food insecurity, mal nutrition and starvation. SOFI's (State of Food Security and Nutrition in the World) last published

report projects India as the nation with the biggest number of food insecure residents (Bansal 2020). Keeping in mind the impact on environment, it is evident that many resources get utilized in the production of food, which gets wasted at a later stage and the process through which the waste gets produced also leads to greenhouse gas emission which could have been evaded (Tonini et al. 2018, Scherhauser et al. 2018)

Enormous proportions of food material waste produced by the worldwide food system globally, happens to be an ongoing challenge which now draws renewed publicity owing to its socio-economic and environmental impacts (Papargyropoulou et al. 2014). As per the UN's mid-range forecast of population density, an additional 3 billion human beings are estimated to be fed before the closure of the current century (Fimeche 2013, Mavrakis, 2014). Such estimates escalate critical questions on ways to produce sufficient food to serve a growing population in an ecosystem which does not have infinite resources. In fact, reports by government agencies and academia acknowledge that the predicament of providing food to an ever growing population definitely needs to involve analysing and solving the challenge of food wastage (Boyle et al 2011). Wasting food is shown to have a major influence, not only on food security for the underprivileged but also on major factors like food safety, financial progress and the surroundings (Buchner et al. 2012; Geislar 2019). Large proportions of food getting wasted when around 800 million people or so in the globe suffer from starvation and malnutrition, is unacceptable and unfair and in a way, should force us to switch our cumulative and individual behaviour (Hossain 2017; Silva 2016). Food gets discarded at multiple levels of the food chain, be it collecting from fields, shipment, refining, or consumption in private homes, which is supposedly the largest contributor and is attributed to a compounded group of management behaviours (Wahlen & Winkel 2017, BIOIS 2010). During the time period from 2017 to 2019, India contributed to 22% of the global food insecurity issue. The population in India with no consistent access to food increased from 42.65 crore in the period 2014-2016 to 48.86 crore in 2017-2019 time period (Bansal 2020). Under the 2015 sustainable development goals (SDGs), UN claims that research needs to be prioritised to aid efforts to decrease food waste globally by as much as 50% by 2030. This target is extremely difficult to achieve if the investments in tackling food waste globally are not remarkably increased, with just 9 more years to go. This should be made a top priority not just for governments but also multinational organisations, private business firms and charitable foundations (Mohan 2021). In a nation like Qatar, where 90% of the food is imported, nearly 20 million kg of food gets wasted year after year that comes to around 1.7 kg of food material being wasted by an individual every day (Qatar Living, 2012).

1.1 Research Objective

The objective of this paper is to examine the key theories and constructs underlying food waste behaviour and develop authors own conceptual framework.

2. Literature Review

The food wastage challenge has multiple implications to a country, both economic as well as social. In case of farmers, the impact of food wastage includes loss of investment and decline in profits and could potentially result in supply shortages thereby leading to economic losses (Gille 2012). The Food Waste Index Report, issued by UNEP (United Nations Environment Programme) in 2021 showed an estimate of 931 million tonnes of food being discarded by families, restaurants and other food outlets in 2019 globally which corresponded to 17% of the total food available (Mohan 2021). The estimates at the household level in South Asia highlight a food waste of 50 kg per year per person in India as against 82 kilograms in Afghanistan, 79 kilograms in Nepal, 76 in Sri Lanka, 74 in Pakistan and 65 kilograms in Bangladesh (Mohan 2021). Wastage of food can occur naturally during extreme climatic conditions, causing changes to the composition of food material physically or chemically, or conscious choice to throw away food (Buzby and Hyman 2012). In developed countries studies reveal that both retailers as well as private households contribute equally to the rise in food waste levels (Buzby & Hyman 2012). The SOFI report, which gets released every year show cases the most authentic assessment of starvation and food insecurity in the globe. From the year 2017, SOFI introduced 2 critical estimates of food insecurity: a traditional estimate termed the Prevalence of Undernourishment (PoU) & a modern estimate termed the Prevalence of Moderate and Severe Food Insecurity (PMSFI). PMSFI is measured on the basis of yearly surveys that gather data on occurrences of food insecurity for example food scarcity, missing lunches, and modifying diet variety. FAO of the United Nations introduced a benchmark for measuring food security called Food Insecurity Experience Scale (FIES), which is used by PMSFI for measuring prevalence rates globally. Both FIES and PMFSI estimates have been extensively used by nations across the globe and are universally-accepted standards of growth towards attaining the SDG Target 2.1 to completely put a stop to starvation and scarcity of food globally. In India it was found that by the year 2019, an additional 6.2 crore of population was facing scarcity of food, when compared to the same in the year 2014 (Bansal 2020).

Elements controlling consumer behaviour in households when it comes to consuming food and potentially leading to food wastage were studied (Aschemann-Witzel et al. 2015). It was discovered that buyers tend to scrap food items with insignificant visible defects or dates of expiry. Food wastage also tends to happen when consumers do not effectively plan shopping schedules ahead of time or during random instinctive shopping. Information campaigns and other government incentive mechanisms focussed at coaching consumers to adopt effective shopping habits are critical for minimising food wastage at households. A study conducted in five localities in Malaysia approximated a financial loss of about 23% of the total cost of the food bought, primarily because of the wrong schemes and operational practices in their restaurants not to forget the social practices followed with regards to consuming food (Papargyropoulou et al. (2019). In India during the time period 2014-16, 27.8% of the country's population were exposed to medium or extreme food insecurity, and the number increased to 31.6% in the period from 2017 to 2019. Also figures of population facing food scarcity increased from an average 42.6 crore in the time period 2014-2016 to a whopping 48.86 crore in 2017-19 (Bansal 2020).

Food waste and food insecurity varies a lot between developing and developed countries. Food in developing nations gets wasted mainly during upstream activities such as while producing and collecting the raw food material, transportation and stocking phases of the food chain, whereas in developed nations, it happens during the downstream journey through the food retail outlets and caterers and by household consumers (Parfitt et al. 2010, Mavrakis 2014). FAO reports highlight the fact that starvation and malnutrition is higher in developing countries, studies have revealed that people in well off communities are also exposed to food scarcity. In United States, about 14% (Coleman-Jensen 2012) and 5%–8% of population in Australia during the last 12 months are believed to have experienced food insecurity in some form or the other at least once (Law 2011, Temple 2008). A research on food wastage globally and financial sustainability reveals that food wastage influences the nation's financial sustainability and published recommendations to minimise food wastage (Huang et al. 2020)

3. Theoretical Foundations

Food wastage cannot be explained by any one isolated behaviour, but only through a blend of collective behaviours which may potentially raise or lower the probability of food getting disposed of. Food wasted at the customer end contributes to a large environmental & socio-economic impact owing to the decline of added value, the loss of natural resources and labour and energy, not to forget the cost of not able to feed the underprivileged, deprived of food (Aktas et al 2018). Thus it becomes important to study and analyse the elements connected with food wasting behaviour. End consumers happen to contribute majorly to wasting food and so various studies have investigated consumers' food wasting behaviour from various angles like elements influencing choice of food items, the impact of social influence and food purchasing practices on food wastage (De Boer et al. 2007, Comber & Thieme, 2013, Farr-Wharton et al. 2014).

Various theories make an effort to predict human behaviour. In this paper, we explore the Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA) and Theory of Environmentally Responsible Behaviour as critical theories to understand the various constructs leading to food wastage behaviour. The one which is applied in most research papers is the theory of planned behaviour (TPB) (Ajzen, 1991). Theory of Planned Behaviour issues a model to forecast human act, given the condition that the behaviour is deliberate. The theory maintains that three core constructs, namely, attitude, subjective norms, and perceived behavioural control, jointly constitute a human being's behavioural intent. TPB dictates that behavioural intent is the closest deciding factor of human behaviour (Nair, 2021). An individual's intention to perform something is based on 3 factors: 1. if the individual approves doing it, which is termed attitude; 2. if the individual feels committed to do it owing to social obligation, termed subjective norm and 3. if the individual is confident and fully in command of the behaviour, termed perceived behavioural control (Francis et al., 2004). The intention to perform an action or behaviour in sometime will lead to performing that behaviour in question. In other words, attitude is a way of feeling or acting toward a person, thing or situation, subjective norm refers to the perceived social obligation to enact the behaviour or not, perceived behavioural control is our perception of the ease or difficulty to enact the given behaviour (Francis et al. 2004, Ajzen 1991, Yzer 2012). Intention means the determination or plan or wish to do a specific thing; behaviour refers to the manner in which an individual behaves in response to a given situation (Fishbein and Ajzen, 1975, Sheeran and Webb, 2016). The TPB framework has been widely used since years to forecast human behaviour in various given circumstances.

As the first theory, the paper explores the Theory of Planned Behaviour as the conceptual model and attempts to expand TPB by adding new constructs like moral attitude, waste-preventing behaviour, shopping compulsion, the perceived ascription of responsibility and socio-demographic characteristics. Studies have demonstrated that attitude as well as perceived behavioural control are crucial indicators of intention to reduce wasting food, which

is the indicator of food wasting behaviour. Studies also highlight that perceived behavioural control is a straight indicator of food wastage behaviour.

Elements impacting food waste generation at consumer stage have become the subject of many recent research, still under progress and results being discussed and analysed (Mondéjar-Jiménez et al. 2016, Abdelradi 2018). Studies suggest food wastage as a complex behaviour and many reasons and a combination of behaviours contribute to food wastage behaviour. Hence, determining an appropriate conceptual model to describe this complex behaviour is required (Heidari 2018). With regard to this, a few studies have suggested a framework based on TPB for analysing food wasting behaviour. A TPB based model for studying food wasting behaviour was undertaken both in London and Canada, using multiple constructs like intent, attitude, perceived behavioural control, subjective norm, personal principles, consumer planning and shopping practices etc. (Van der Werf et al. 2019). Food wasting behaviour of youngsters from Spain and Italy using the TPB model was also undertaken by taking into account the following constructs: concern regarding wasting food, subjective norms, perceived behaviour control, shopping addiction, intent, friendly behaviour etc. (Mondéjar-Jiménez et al. 2016). Yet another study focussed on the impact of consumers' food wasting behaviour in the citizens of Romania using many drivers like moral attitude, absence of concern, subjective norms, perceived behavioural control, shopping practices, intent etc. (Stefan et al. 2013). However, using the TPB framework to analyse food wasting behaviour brings with it some limitations. For getting a stronger grip on food wasting behaviour, Abdelradi (2018) introduced a conceptual model for studying Egyptian consumers' behaviour when it comes to wasting food, based on multiple constructs, such as personality, religion, knowledge, reuse/reduction/recycling of waste, selection of food, food expenditure and materialistic values. Abdelradi demonstrated that these constructs have a major impact on food wasting behaviour and should be integrated into TPB for future research. To further analyse the intent of wasting food and behaviour, substantial number of studies including additional constructs and elements are required (Heidari 2018). Attitude is among the major indicators of behavioural intent for example, disposing food materials (Visschers et al. 2016). Persons having a better positive attitude happen to be more positive in behavioural intent and the other way round is also true (Taylor and Todd 1995). Human being's behaviour is likely to be influenced by social obligation or pressure from close friends or those important to the individual (Ajzen 1991). Perceived behavioural control has a major effect on intent corresponding to a particular behaviour for eg, food wastage reduction. Subjective norm also determines specific behaviour like intentional wastage of food (Stefan et al. 2013, Graham-Rowe et al. 2014)

Other factors which impact the food wasting behaviour are the individual's financial attitude, planning routine if any, social relationships, excess of food, food choice motives (Aktas et al. 2017). Financial attitude mirror the cost alertness of the end customer and is known to favourably impact planning routines. In other words, cost-conscious households will have their requirement lists ready before proceeding for grocery shopping as seen in most Indian middle class households (Graham-Rowe et al. 2014, Visschers et al. 2016). Lifestyle changes have brought about a continuous process of dietary modifications amidst the modern working classes in India (Lohr & Dittrich 2007). Modern dietary habits have surfaced with changing preferences. The growing demand and acceptance of convenience foods or instant dishes is a major trend connected with globalization and as the middle classes grow wealthier (Osswald & Dittrich, 2012). An article published by the Associated Chambers of Commerce and Industry of India (Assocham) highlights a critical change in eating habits in cosmopolitan cities with around 86% of consumers opting for instant food owing to sharp jump in the number of families with double salaries and their lifestyle, standards, comfort levels and impact of western culture. Families in India prefer to prepare food that can be easily purchased and which provides convenience. With a variety of easily available convenience foods, the food wastage also goes unchecked. Planning is a critical component of the lifestyle instrument, related to food introduced and implemented by Scholderer *et al.* (2004), whose objective is to decrease the amount of excess food, which straight away contributes to wastage of food (Stefan et al. 2013, Stancu et al. 2016). Food surplus is often caused by buying more than what is needed due to discounted sales, promotions, offers and also impulsive shopping. Social relationships come into play while taking food in the presence of close friends or relatives either inside home or outdoors or restaurants etc (Scholderer *et al.*, 2004). In some culture, serving plenty of food is a part and parcel of hospitality and eating habits varies during particular time periods in a year such as during festivals etc. Social relationships, get together functions, close gathering with others could potentially end up in excess of food. Indian weddings waste approximately 10 to 20% of the food, creating a food waste of around 14 billion USD every year (Hussain, Goyal 2021).

TPB is majorly accepted by various studies, however there are also shortcomings of TPB, particularly the absence of emotional content in behavioural prediction is of concern. Some researchers contest the importance of consciousness in behaviour and advocate the importance of underlying attitude and also subconscious proceedings going on in the mind (Wegner, 2002, Greenwald and Banaji, 1995, Aarts & Dijksterhuis, 2000). In spite of the

mentioned drawbacks, TPB remains a very broadly trusted model to forecast behaviour in any particular situation. While TPB enjoys strong first hand support in describing environmentally pertinent behaviours, a concern remains that it does not significantly represent the importance of the sentimental and intuitive deciding factors of behaviour, such as emotions, habits etc (Klößner 2013, Russell & Fielding, 2010). TPB is based strongly on presumption that human beings always make logical and rational choices (Hines et al. 1986). Hence TPB may not be sufficient to predict all behaviours and behaviours are seen to be led by lots of automatic and emotional processes which includes practices, emotions and routines (Triandis 1977, Steg & Vlek, 2009, Quedsted et al. 2013).

3.1 Theory of Reasoned Action (TRA)

TRA was launched to analyse relationships between attitudes, intentions and behaviours in a better fashion (Fishbein, 1967). As per the Theory of Reasoned Action (TRA), a human being's behavioural intent is the result of the individual's attitudes and beliefs (Ajzen & Fishbein, 1980). A behaviour is the aggregate of a person's beliefs regarding the behaviour plus the beliefs of those in his or her social circle, which results in a bigger inspiration, or intent to act. According to TRA, behavioural intent is a direct antecedent to behaviour and behaviour is completely under volitional control (Fishbein & Ajzen, 1975). TPB was developed in response to feedback that TRA does not give a reason or explanation for situational events or elements which prohibit action (Ajzen, 1985, 1991). TPB also takes into account the intent, attitude and beliefs. TPB advocates that behaviour gets majorly influenced by 3 kinds of beliefs & attitudes: behavioural, normative & control and moreover intent (Ajzen, 1985). Icek Ajzen detailed the TPB theory for the purpose of enhancing the predictive capability of TRA. Ajzen suggested to include perceived behavioural control in TPB, which was not a component of TRA. TPB has been effectively made use of in studies in variety of human domains to analyse the connection between beliefs, attitudes, behavioural intentions, and behaviours. TRA was first proposed in 1980 by Martin Fishbein and Ajzen and TPB was later developed out of TRA. TRA states that if an individual gauges the suggested behaviour as favourable, and if he or she believes people who matter would like him or her to perform the behaviour, the intent or inspiration to perform the act will be greater and the person shows more probability to do the behaviour. Attitudes and subjective norms are majorly connected with behavioural intention, which itself is connected with actual behaviour. However studies show that this is always not the case; behavioural intention does not always conclude in actual behaviour. This is due to the fact that behavioural intent cannot be the only determinant of behaviour especially when the person does not have a complete control over the behaviour. Hence Ajzen introduced TPB by adding an additional component called perceived behavioural control, to TRA. Thus he was able to extend TRA to better predict actual behaviour. Perceived behavioural control means the ease with which a person can carry out any given behaviour. It represents the perception of the individual's own capability to carry out the behaviour, which differs according to the environmental circumstances along with that particular behaviour. According to TPB, the probability of human beings to perform specific behaviours are much more when they are confident about their ability to perform them successfully. Both theories, TRA and TPB focus on theoretical constructs related to inspirational elements as deciding factors of the probability of performing certain behaviours. Both TRA and TPB are based on an underlying theory that the prime indicator of behaviour is intention, which is decided by factors such as attitude, social and normative perceptions regarding the behaviour. TPB has incorporated a supplementary construct named perceived command over performance of the behaviour. Fishbein and co-workers, recently have extended TRA and TPB to involve more constructs from alternative and crucial theories explaining behaviour and suggested an Integrated Behavioural Model (IBM) or the Integrative Model (IM) (Montano, Kasprzyk 2015). The Integrated Behavioral Model, as the name suggests, is a union of 2 theories, the Theory of Reasoned Action plus the Theory of Planned Behavior. Fishbein and Ajzen proved the criticality to assume a large degree of correlation between weights

of attitude, norm, perceived control, intent and behaviour with regards to action, target, context and time.

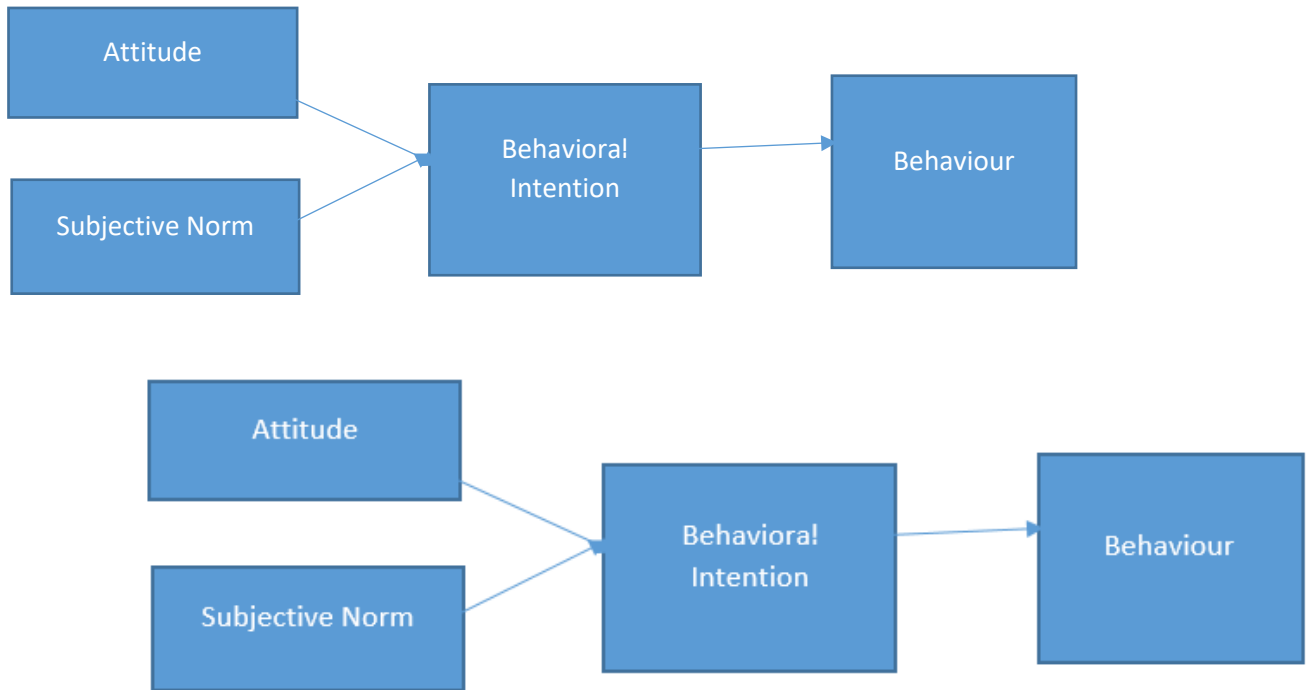


Figure 3.1.1: Constructs of TRA (Fishbein, M., & Ajzen, I. (1975))

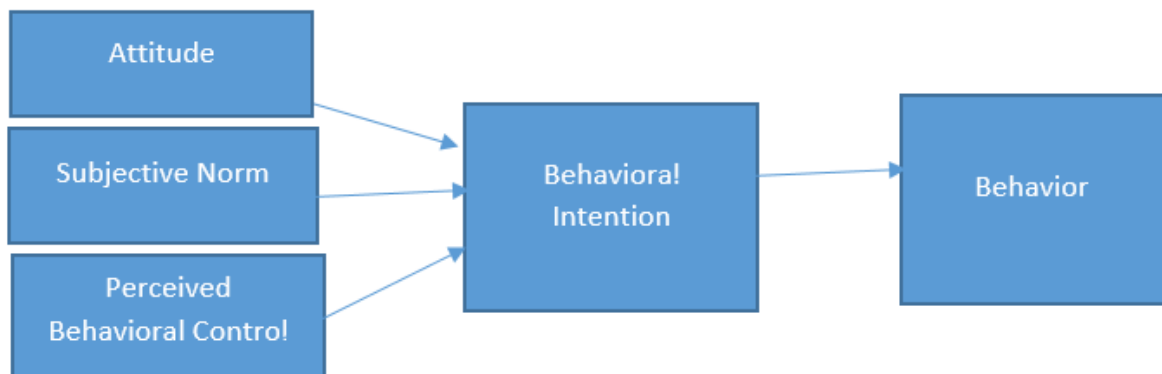


Figure 3.1.1: Constructs of TPB (Ajzen, I. (1991))

3.2 Theory of Environmentally Responsible Behaviour (ERB)

Environmentally Responsible Behaviour (ERB) refers to the action, person or group, aimed at solving issues and problems related to our environment (Sivek & Hungerford, 1990). Environmentally Responsible Behaviour is identified by a blend of self-regard as well as care for other humans, living beings or ecosystem (Bamberg & Moser, 2007). ERB encompasses both generic activities such as discussions on environmental issues and encouraging relatives and friends in the social circle to behave in an eco-friendly and environmentally responsible fashion and also certain actions such as engaging in activities like reuse, recycle, use of environmentally favourable & sustainable goods, saving power by switching off electric appliances and exploring renewable energy sources for eg solar energy, hydro and wind power (Thogerson 2007; Vaske & Kobrin, 2007). In fact, environmental education ultimately aims to reduce negative environmental impacts by strongly impacting values, attitudes, and behaviours of people favourably (Hines, Hungerford & Tomera, 1986). Matre has suggested education on conservation that only coaches individuals about the environment and does not encourage to modify their life styles cannot be called environmental education. Studies seem to reveal that lengthier solutions impact behaviour much more heavily than that of shorter duration and also real life based projects come with a stronger constructive impact than only theory elements (Bogner, 1998; Zelezny, 1999, Zint et al. 2002). In this regard, an ERB model was proposed which covers both cognitive and affective variables (Hines, Hungerford, & Tomera 1986). Major components of this model covers broader knowledge of environmental affairs, attitude, information

regarding and skills in implementing strategies and intention to act. Cognitive variables refer to the cognitive knowledge of conservation challenges along with the skills in conservation strategies (Hines et al., 1986.) In order to further elaborate the correlation of variables in detecting and making a difference to environmentally responsible behaviour, 3 variable levels were further identified: entry-level, which refers to information of a broader concept; ownership stage which means thorough knowledge; and empowerment stage which indicates detailed knowledge about skills and strategies to be implemented (Hungerford & Volk, 1990). Knowledge is considered an entry-level variable and acts as a precondition to other factors, favouring a person to develop required antecedents and acquiring skills which would lead to an intent to behave in environmentally accountable manner (Hines, Hungerford, & Tomera, 1986; Hungerford & Volk, 1990). However knowledge of action skills have a stronger influence on environmentally responsible behaviour when compared to general knowledge of environmental issues (Hwang et al. 2000)

In the background of environmental behaviour research it was proven that TPB did not possess predictability for those routine acts that recurred over regular periods (see also Klöckner and Blöbaum, 2010). Studies have revealed that previous behaviours or habits, are specifically critical in predicting present or upcoming behaviour (Triandis 1977). For example, creating and disposing food waste can potentially be a recurring and often habitual behaviour. Habits are defined as comparatively steady behaviours, reinforced previously and are executed without intentional consideration, and occur automatically, as compared to conscious deliberate decisions (Verplanken & Holland 2002)

Habits are expected to contribute significantly in wasting food. The probability of food wasting behaviour, having a strong habitual element is high, considering the frequency and automaticity of food waste (Darnton et al., 2011). There is also an argument that food wasting behaviour has a noticeable persistent and striking emotional element (Quested et al. 2011). According to the theory of interpersonal behaviour, emotions play a major part in determining food wasting behaviour (Triandis, 1977). Since 1977, TIB has identified emotion as a critical determinant of behaviour, however the contribution of emotion has been majorly ignored. Studies on environmentally pertinent behaviours has been majorly focusing on the other rational drivers recognised by TPB which includes attitude, subjective norm, and perceived behavioural control (Ajzen, 1991). This is indeed amazing given the major impact of emotion on making decisions and its capability to influence behaviour (Triandis 1977, Graham-Rowe et al. 2014).

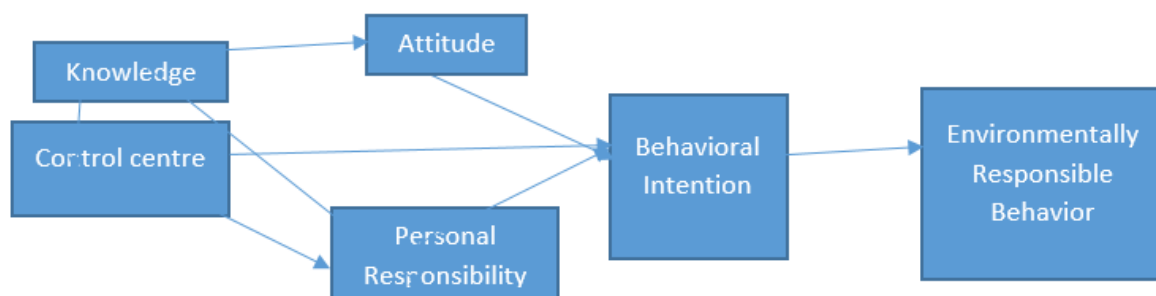


Figure 3.2: Constructs of ERB (Hines, Hungerford and Tomera (1987))

4. Discussion leading to author's conceptual diagram

Food plays a critical part in the economic, social, political and cultural lives of every nation. The citizens of every nation can help substantially to economic, socio-political and environmental sustainability by embracing and rejecting certain behaviour patterns with regard to food. Hence, it is crucial to analyse and acknowledge the motivational elements, structural components and processes which aids or come in the way of reducing food waste behaviour. Therefore it is critical to study and understand the theories behind food wastage behaviour and ways to change them constructively. TPB by Ajzen seems more significant owing to its equitable way of calculating the components of food waste reduction or avoidance behaviour in particular. TPB variables such as outlook, subjective norm, viewed behaviour control and intent & additional constructs of shopping compulsion, the viewed recognition of responsibility, moral outlook, and waste-prevention behaviour helps coming up with a hypothesized model, which can further improve the descriptive capability of the framework to measure the intention to decrease consumer food waste. Past research has analytically verified the relationships of attitude with regards to wasting food and perceived food wasting control behaviour with an intent to minimize food wastage. Perceived behavioural control definitely affects the subjective norm in a positive fashion. Subjective norm too plays a

moderating part in link between viewed ascription of responsibility, attitude, and moral outlook to intention to minimize consumer food waste.

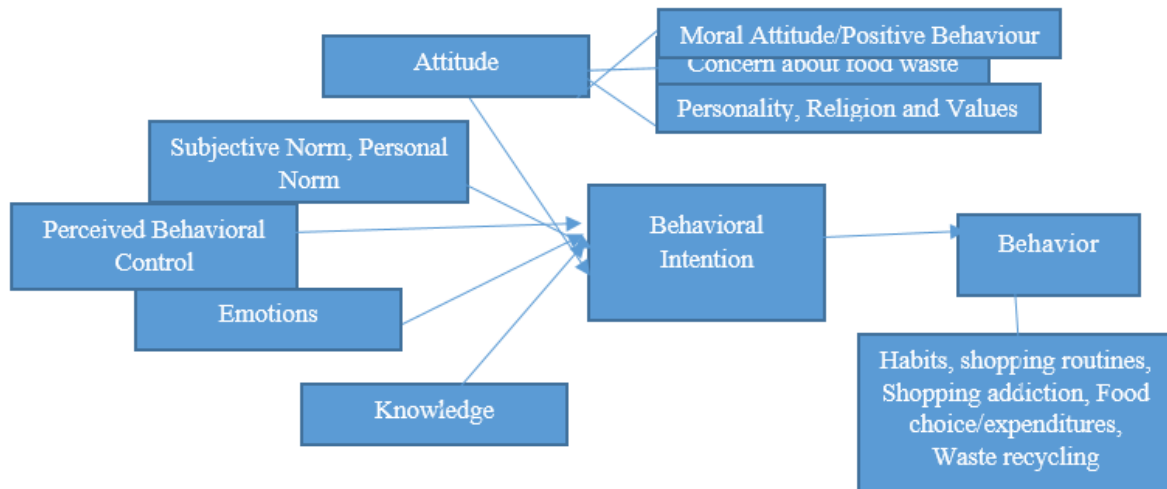


Figure 4.1 Conceptual model of the different constructs of food waste behaviour

As stated earlier, food wastage can only be explained via a mixture of multiple behaviours which impacts the probability of food being wasted. With this regard, the paper attempts to extend the theories of TPB, TRA and ERB by adding a series of new constructs like personal norms, household planning habits, moral attitude/positive behaviour, concern about food waste leading to waste-preventing behaviour, shopping addiction, waste reuse or recycling, food choice, food expenditures, personality, knowledge, values and even socio-demographic characteristics to an extent in order to explain food waste behaviour. Intuitive and emotional elements of behaviour, particularly habits, routines and emotions also play a major part in determining food waste behaviour in households. Knowledge on the ecological impact of food wastage and on the percentage of population under poverty and mal nutrition can make a huge impact on the food wastage behaviour. Available modes and methods of food waste reuse/recycling can also positively impact food wastage behaviour. Personality, religion and values also seem to have an impact on the food wastage behaviour of an individual and his or her household. These parameters have a major influence on food wasting behaviour and should be included in TPB in future research. The conceptual model as described in figure 4.1 using multiple constructs of food wastage behaviour was developed and can be used as a base for future studies to determine and analyse the complex food wastage behaviour. The study focuses on the combination of multiple constructs gathered from TPB, TRA and ERB as well as new constructs to describe the complex food wastage behaviour in households. Both TPB and TRA have limitations specifically for ignoring emotional element in prediction of behaviours and ignores constructs like habits and routines in predicting behaviour. While negative attitude and negative in behavioural intention may be harder problems to solve, constructs like household shopping routines, financial attitudes, social pressure, habit of convenience foods, food waste recycling, environmental and social impact of food wastage etc can be dealt with creating more awareness on the topic socially and recommending policies by various government agencies.

4.1 Limitation and Future Research

The household consumers are probably ignorant of socio-economic and environmental effects of food wastage or avoid acknowledging the seriousness of the issue to show genuine concern. Underlying theories and the implications prescribed in this paper to keep away from food wasting behaviour could contribute slightly in order to successfully ensure our national goal of sustainability is met. Further analysis of the variables and factors affecting consumers' food waste behaviour can contribute to developing plan of action and recommending policies for minimizing food waste. In developing nations with very little or below par self-sustainable ways of producing food, food waste behaviours themselves should be mandatorily added in continuous analysis on the durability and adjustability of food consumption and food wastage chain systems. Further research to record the distinctive temporal, emotional, social, and environmental factors inspiring individuals to donate food is also the need of the hour. The resultant information can help develop strategies for potentially targeting and motivating individuals and firms belonging to food related industry to donate food. It could also disclose hidden issues when it comes to donating food and underscore the requirement for alternate methods to address food waste and food insecurity.

5. Conclusion

TRA, TPB and a couple of other theories and frameworks explaining behaviours are frequently applied to understand health behaviours including Social Cognitive theory, the Health Belief model, and theory of subjective culture (Glanz et al 2008). Constructs used by these theories might look identical or complementary, focus should be placed on their differences (Weinstein, 1993). Consensus was reached concerning behavioural constructs likely to be important in predicting and changing behaviours. These constructs included intention, expertise, expected beneficial as well as obstructive outcomes, social regulating obligations, emotional feel, self-efficacy and ecological restrictions (Fishbein & Ajzen, 2010). Employing an Integrated Behavioural model which includes constructs of TRA, TPB and other influential theories is strongly recommended to analyse the food wastage behaviour. The most crucial deciding factor of behaviour in IBM is intention to carry out the behaviour, as in the case of TRA/TPB. A human being is not very likely to perform a behaviour if there is not much motivation. The individual needs not only a strong behavioural intent to carry out the behaviour but also should possess the necessary knowledge and skills. Equally important is to ensure minimum or nil environmental restrictions which could make performing the particular behaviour tough (Triandis, 1980). Last, behaviour must be noteworthy to the individual (Becker 1974). Experience in enacting the behaviour tend to make it routine, such that intent becomes less critical in deciding behavioural performance (Triandis, 1980). Hence, the probability of food wastage behaviour is high when and if an individual has a solid intent to perform it as well as possess the knowledge and skill with no major environmental constraints to block the behaviour, also the behaviour is salient, and the individual has performed the behaviour before. More of these constructs and their interconnections are critical to be considered while planning for interventions to reduce food wastage. The paper may be used to spread understanding on food waste impacts, and help change behaviour of consumers in reducing excess food in households. It becomes extremely crucial to help reduce excess food wastage towards the tail of the food chain because it is directly proportional to the loss of the maximum value-add after food has gone through all the individual stages of the food chain.

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