

FOOD WASTE: BEHAVIORAL INTENT OF INDIAN CONSUMER'S. YIELD OF FOOD SECURITY

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ABSTRACT

This current research analyzed data on the pretext of food waste, being initiated intentionally or unintentionally by Indian consumers that included sample of consumers being segmented through gender, household size, professional qualification, e-commerce benefit and age. Data was collected from 744 respondents (342 males & 402 females) through well drafted questionnaire and proportional odd regression model was used to rate the different phases of consumer food choices according to their usage and wastage. This model drafted relationship among the covariates (acquisition, storage & preparation) phases and their succeeding impact on food waste. At every phase, the influences of the previous phase on the current modeled phase was evaluated to caliber the impact of explanatory variables (socio-economic factors of consumers of developing nation India) on food waste by using proportional odd regression model analysis, which also tried to uncover the major drivers for food waste. It was evident from the findings that every phase with (categorized socio-economic variables) emphasized in revealing positive relationship of variables in lowering the frequency of food waste among consumers. On the contrary it has also been apparent that gender having e-commerce benefits seems to have elevated blend for food waste. For corporate these research outcomes can be outlined on specific food brands rather than on common food items to hasten their manufacturing by actually meeting supply and demand of the market.

Keywords: Food Waste; Indian; Consumer; Consumption; Food Security.

INTRODUCTION

To what extent do marketing and digital communications influence the buying intent which leads to food insecurity is a fascinating topic to explore. Marketers across the world intend to socialize right message to the right people at the right time to trigger their reaction which in turn result in final purchase or buying behavior. Traditionally, the corporate consumer exchange process was viewed as a chain of interactions in between corporate and consumers Zeithaml & Gupta (2006).

After receiving exposure through different media (offline or online) platforms, why do people look for repeated food alternatives which result in generous birth to negative environment results? Which type of behavioral intent explains these behavioral actions? These questions consider high complexity in context to domestic food waste.

Socioeconomic factors cannot be considered as the major setback for food waste (Farr-Wharton et al., 2014; Evan, 2012; Vermeir & Verbeke (2006) but individual stimulus and behavior pertaining to the specific food domain do impact consumer final purchase intent. In reality, when consumer's deal with an assortment of food items, their valuations have a tendency to embrace a succession of volitional factors like, status concerns, and food waste and food security. However, food purchase decisions are extremely inclined by deep-seated and repetitive judgments like emotions, values, hunger and habits Graham-Rowe et al. (2014). Verplanken & Orbell (2003). Loewenstein, 1996). The occurrences of food waste differ between countries and

their states. The phrases poverty and food insecurity are often used as synonyms, but it should be illustrious that they are not meant to be the similar phenomenon (Rose, 1999). Most of the time meager level of food waste has its association with consumers who fit in to low-income groups and other social groups linked with poverty, like ethnic minorities and single mothers (Coleman Jensen et al., 2014; Tarasuk et al. (2012). Increase in per capita income of consumers can be considered as tough associate of food waste, even though many poor families on meager side experience food insecurity and astonishingly richer families are highly rated for food waste Gundersen & Gruber (2001) and Rose, 1999). Underprivileged people might be food secure, if they balance their limited financial resources with elevated levels of knowledge, food literacy and understanding about how to acquire and plan cheap, high quality foodstuff. Furthermore, high end income groups may be food insecure if they are not in a position to control their expenses with priority, to transportation and mortgages Evans (2012).

Food Waste \subseteq Food Security

Food wastes which have an expression of unethical output of human intent and hardship of agriculture work relied on two most important factors i.e supply chain and sustainable consumption, which even has turned into two major challenges for economies which has resulted in the conception of aggrieved food waste . Foley et al. (2011) wasting food can be considered as waste of scant natural resources. There are numerous complex factors whose outcome is food waste; among these factors macro-environmental, social and situational are the key to impact food waste Qusted et al. (2013). Policy creators are in a situation to regulate certain macro environmental factors like food legislation, information and taxation but still, deep routed efforts are required to persuade consumer characteristics with multiple awareness campaigns. Interestingly, these advances have been argued to be comparatively more effective Chalak et al. (2016). Gutierrez-Barba and Ortega-Rubio (2013)). Accessible research on consumer characteristics & consumer households specifies that even in meager income household group, food is wasted due to several reasons. These reasons embrace deficit of capabilities or over-purchase Porpino et al. (2015), the aspiration to accomplish the caretaker function and endow with food abundance at home Porpino et al. (2016) in reference to other things.

On the whole, it was evident that surge in income intensity and mounting middle classes are the major reason for surge in food waste Xue et al. (2017); Krishna et al., 1991).

LITERATURE REVIEW

Food security Household Management

Preceding research has highlighted that food security always initiate at the household level and can be termed as managed process which requires rigorous efforts to muddle through an inadequate supply of food and resources to acquire food. This process has observable set of stages which leads to increase in food insecurity (Wehler et al., 1992; Radimer et al.,1990). At the preliminary level, household consumers experience anxiety concerning their food situation, and then most of the time adjustment was evident in their budget expenditure which had direct impact on their food management. In the secondary level, adults at middle age lessen their food intake, but start protecting their children's food intake. In the final level, the children also start experiencing reduction in food intake which results in sharp decline of food security in household consumers. This has been evident in one of the survey being conducted by (Blumberg et al., 1999)

In fact, most of the studies have resulted in building positive associations between food

security & household program participation, which sometimes are treated biased. Even health shocks have direct linkage to food security which again leads to adverse economic outcomes of individual consumer. This literature has by and large focused on elderly consumers (Smith, 1999) despite the probable significance of health shocks could be categorized as a determinant of food security, another study conducted by Corman et al. (2014) found no relationship between infant health shocks and their family food security, but particularly low income consumers with disabilities cash strapped public assistance program, do have their count in food insecurity.

Moreover, meager studies provide well-built evidence of causal effects like nonparametric methods where Gundersen & Kreider (2009) applied these methods to substantiate food insecurity adverse impact on children's obesity & health condition, and inferred that past approximation of adverse impact of food insecurity on health were downward biased.

Food Waste an Integral Part of Food Security

Developed nations are critically facing issues related to food waste; countries like US have millions of consumer facing this hardship and can be considered as pointer of well-being. Both adult consumer and children living in households are at amplified risk of food security which could be termed as food waste and it has lead to physical health issues such as anemia & asthma, mind and behavioral issues among consumers Gundersen et al. (2011).

In recent times, Garg et al. (2015) collected data from birth cohort having association with early childhood longitudinal study, where it was evident that gloominess in mothers with 9 month old children, was having association with household where 50% higher food security, exists in next 15 months which has lead to food waste. Nayyar (2018) identified that products with resealable packaging are highly preferred in comparison to non sealable packaging and it has been evident resealable packaged products are higher in food quantity, so it may lead to food waste if stored for longer duration.

Food Waste Vs Mental Health

Numerous researches catered by Carter et al. (2011). Casey et al. (2004) and Siefert et al. (2000) have established positive relations between food waste & mental illness by using different datasets with different depression measures. Even Heflin & Ziliak (2008) evaluated an individual preset effect approach and originated some indication, which established sufficient verdict where emotional distress might be the foundation of food waste. Dahal & Fertig (2013) developed the casualty between spending behavior & mental illness which resulted in forecast of women hefty expenses on variety of consumer goods (food waste) which has direct impact on their mental health problems Coleman-Jensen et al. (2014).

For low-income group households, this situation might differ as they are not able to meet their expenses of food at some moment of time due to meager earnings in their budget cycle. We have come across of numerous studies that have explicitly tried to calculate mental illness effects on food waste which are causal in nature, despite being proved that the two have correlation, this current research tried to incorporate all possible reasons which directly or indirectly impact the amount of food waste among consumers Farr- Wharton et al. (2014).

Gap

We have tried to address this gap by estimating the socio-economic indicators from previous researches which seems to have been ignored, while formalizing attributes due to which food waste occurs. The hypothesized aspects, which we are not going to get touched in this research are

related to quality testing of ingredients which are used in making food and seems to be infeasible, as it requires some sort of laboratory-oriented results.

Objectives Framed

The intent of this research was to explore the insight characteristics of consumer related to food waste at home. The consumer characteristics here focused on consumer demographics and lifestyle that include attributes like family size, consumer profession, gender, e-commerce coupons, health awareness, visiting shopping malls that impact the level of food security in their routine life. More specifically, the research objectives to be explored in this current research are having linkage with the above said attributes of consumers.

Hypothesis

- H₁: Food waste at acquisition phase of food procurement has no relationship with shopping routine of consumers.*
- H₂: Food waste at acquisition phase of food procurement has no relationship with household size of consumers.*
- H₃: Food waste at storage phase of food procurement has no relationship with household size of consumers.*
- H₄: Food waste at storage phase of food procurement has no relationship with professional qualification of consumers.*
- H₅: Food waste at storage phase of food procurement has no relationship with age of consumers.*
- H₆: Consumer food waste at preparation phase has no relationship with household size of consumers.*
- H₇: Consumer food waste at preparation phase has no relationship professional qualification of consumers.*
- H₈: Consumer food waste at acquisition, storage & preparation has no relationship with gender having e-commerce benefits shared by corporate.*

METHODOLOGY

This current research analyzed data, on the pretext of food waste being initiated intentionally or unintentionally by Indian consumers being segmented through gender, household size, professional qualification, e-commerce benefit and age. Data was collected from 744 respondents (342 males & 402 females) through well-drafted questionnaire whose link was formulated using Google form stack which was then shared with consumers through different social media platforms like Facebook; LinkedIn and WhatsApp during the specified time period (December 2019- February 2020). On the contrary, numerous number of times it has been vivid that statistical data collected on food waste have to be considered as blurred and indecisive as this diverges significantly by classification of food waste and data resource used in its collection Bellemare et al. (2017) Xue et al. (2017).

(Acquisition, storage, preparation) phases of consumer preference (dependent variables) were collected (categorical dichotomous) format. These three “*phase variables*” were deliberated in relation to food waste behaviors among consumers. The acquisition phase variable termed as driver of household food waste was calculated using a five-item scale, whereas preparation phase variables were assessed on a single-item scale embracing over-cooked description. Contrary, distal explanatory factors illustrating socioeconomic conditions which can persuade consumers food choices were also studied (Table 1). The frequency of household surplus edibles measures the monthly occurrence of consumers food waste behavior on an ordinal scale (i.e., occasionally, always, or never) Gutiérrez-Barba & Ortega-Rubio (2013) Figure 1.

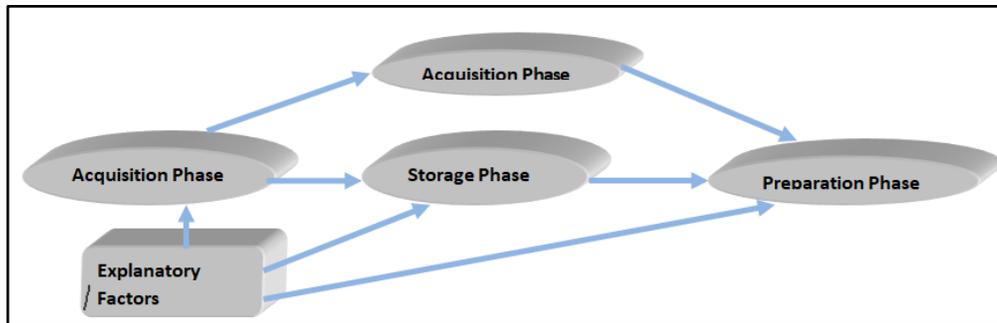


FIGURE 1
REGRESSION MODEL: PATH DIAGRAM FOR FOOD WASTE

RESEARCH TOOLS & APPROACH

(Wright, 1934; Mueller, 1996) drafted regression models after working for three continuous years on the ideology of path analysis methodology. Hosmer et al. (2013) has contributed towards the identification of major drivers of consumer's food choice cycle that has direct linkage to food waste. Here, proportional odd regression model was used to rate the different phases of consumer's food choices according to their usage and wastage. This model again drafted relationship among the covariates (acquisition, storage & preparation i.e independent and explanatory factors) and at last it was related to food waste (dependent variable). At each step, the influences of the previous phases on the role of the currently modeled phase are included.

In this particular research, two odds ratios to measure non-proportional explanatory factors response on food waste (response level) “occasionally” with “always” or “never,” whereas the second OR compared “always” with “never”. An odd ratio having value >1 indicated that correlation exists among the variables which again signified that explanatory factors has contributed towards frequency of food waste in comparison to reference category. For regression odds model, the goodness-of-fit is measured using general chi-square statistic and associated p-values, which ascertain to the avowed assumption and results in the significance term.

In addition to the same, this current research also ensnare under-researched questions which portrayed food waste issues in developing economies which thus contributed towards the exploration of consumer-related factors, causing food waste in emerging countries. Also, it has lead to the formulation of strategies for tackling food waste which leads in the improvement of the sustainable food consumption among consumers.

RESULTS AND ITS INTERPRETATION

The respondents of this current research shown in Table 1 were equally spread in demographic attributes like gender; household size (having children 0;1;2;3;4;>4); professional qualification (primary, high, graduate, postgraduate & doctorate); e-commerce benefits (coupons, no coupons) and finally the age (17-33, 34-63, above 64) Table 1.

S. No	Distant Variable	Value	Total	Percentage (%)
1	Gender	Male	342	46
		Female	402	54
2	Household Size	0	115	15.5

		1	210	28.2
		2	197	26.5
		3	162	21.7
		4	55	7.4
		>4	5	0.6
3	Professional Qualification	Primary school	54	7.3
		High school	98	13.2
		Graduate	210	28.2
		Post Graduate	310	41.6
		Doctorate	72	9.6
4	E-commerce Benefits	Having coupons	455	61.2
		Not having coupons	289	38.8
5	Age	17-33	279	37.5
		34-63	381	51.2
		64+	84	11.3

Source: Primary data

Tentatively 70% of the sample embraces (graduation and post graduation) qualification, almost 20 percent of the sample possesses (high and primary) school education and meager 9.6 % of population were highly qualified having doctorate degree.

E-commerce benefits display that 61.2% of sample population have routine purchase intent while buying food items through various digital media meanwhile left 38.8% of sample cannot be evaded as they do consume food through different karyana and retails stores present physically in their surroundings Table 2.

Distant Variable	Category	Reference	OR	CI (95%)	p-value
Shopping listing	Occasionally	Never	0.39	(0.79-1.31)	0.0663
	Always		1.29	(0.66-0.79)	0.004
Gender	Male	Female	0.89	(0.89-1.00)	0.0563
Household Size	0	0	1.21	(0.96-1.21)	0.067
	1		1.32	(0.77-1.31)	0.077
	2		0.78	(0.73-1.11)	0.082
	3		1.43	(0.67-1.00)	0.057
	4		1.58	(0.48-0.84)	0.03
	>4		1.53	(0.33-0.71)	< 0.0001
Professional Qualification	Primary school	High/Primary school	1.11	(1.06-1.31)	0.077
	High school		1.33	(1.17-1.21)	0.063
	Graduate		1.75	(1.11-1.23)	0.085
	Post Graduate		1.44	(0.87-1.01)	0.059
	Doctorate		1.43	(1.05-1.43)	0.075
E-commerce Benefits	Having coupons	Having coupons / No Coupons	1.07	(1.06-1.45)	0.009
	Not having coupons		1.13	(0.87-1.21)	0.123
Age	17-33	33-63	1.23	(0.75-1.11)	0.057

	33-63		1.28	(0.76-1.09)	0.082
	63+		1.37	(0.63-1.03)	0.097

Odd ratio significant level (0.05); Goodness of fit: Chi square =169.0; p value <0.0005

While deliberating towards the association between accumulation of food waste and acquisition phase of food items, the model here emphasized the role of distal explanatory factors in creating specification for food purchase (Table 2). On one side, household size (4;>4) i.e with higher number of members can be considered as an active mind-set toward lower food waste characteristics of consumers. This even has been concealed while approving the routine/always framed shopping list by families, at the acquisition phase of buying the food items. This revealed that hypothesis’s HO1 & HO2 should be rejected which means that food waste at acquisition phase of food procurement has probable negative relationship with shopping routine and family size of consumers. Diverse consumer traits are responsible for aggrieved level of household food waste and choice of food while performing purchase intent at stores Jabs & Devine (2006) even consumer final buying decisions are highly impacted due to their purchase intent rather than media influence Nayyar & Batra (2020).

On the contrary, the deliberation of shopping work being upheld by nuclear families having (one, two or three members) irrespective of their age, gender, qualification and e-commerce special benefits being offered by copious ecommerce players are considered as the main constitutive explanatory variables that construct positive trend for food waste at acquisition phase Table 3.

Distant Variable	Category	Reference	OR	C.I. (95%)	p-value
Acquisition stage	Yes	No	1.45	(0.72-1.33)	0.0001
Shopping listing	Occasionally	Never	0.38	(0.74-1.22)	0.0633
	Always		0.29	(0.26-0.49)	0.074
Gender	Male	Female	0.49	(0.29-1.01)	0.0566
Household Size	0	0	0.21	(0.96-1.21)	0.057
	1		0.22	(0.87-1.11)	0.077
	2		0.78	(0.73-1.11)	0.082
	3		1.23	(0.67-1.00)	0.004
	4		1.68	(0.48-0.84)	0.002
	>4		1.43	(0.33-0.71)	.0000
Professional Qualification	Primary school	High/Primary school	1.11	(1.06-1.31)	0.077
	High school		1.33	(1.17-1.21)	0.063
	Graduate		1.75	(1.11-1.23)	0.085
	Post Graduate		1.54	(0.97-1.21)	0.049
	Doctorate		1.63	(1.12-1.42)	0.032
E-commerce Benefits	Having coupons	Having coupons / No Coupons	1.07	(1.06-1.45)	0.009
	Not having coupons		1.14	(0.77-1.11)	0.123
Age	17-33	17-33	1.53	(0.45-1.31)	0.057
	33-63		1.78	(0.86-1.19)	0.002
	63+		1.57	(0.93-1.44)	0.001

Odd ratio significant level (0.05); Goodness of fit: Chi square =189.0; p value <0.0005

The results from (Table 2) i.e the acquisition phase of the research had emphasized on probable relationship with food waste and shopping routine & household size of consumers. (Table 3) here configured the association between storage phase for food waste with special regards to role of distal explanatory factors in creating specification for food storage. While approaching the inner findings across the storage phase of this research, significant constructive relationship have occurred between food waste drivers and distal explanatory variables like household size (3;4;>4); professional qualification (postgraduate & doctorate) & age (33-63, 63+), this revealed that hypothesis's HO3; HO4 & HO5 should be rejected which means that food waste at storage phase of food procurement has probable negative relationship with household size; professional qualification & age of consumers. There's always existed fictional gap linking the initial phase of food choice and projected outcome i.e (food waste). As consumers buying intent had always been projection based so during the storage time exact level of food waste could be chalked out (Read and van Leeuwen, 1998) Table 4.

Distant Variable	Category	Reference	OR	C.I. (95%)	p-value
Storage Stage	Yes	No	1.29	(1.29-1.61)	0.0089
Acquisition Stage	Yes	No	1.29	(1.29-1.61)	0.0002
Preparation	Always	Unlikely	0.89	(0.76-1.09)	0.089
Gender	Male	Female	0.89	(0.89-1.00)	0.0563
Household Size	0		1.21	(0.96-1.21)	0.067
	1		1.32	(0.77-1.31)	0.077
	2		0.88	(0.23-1.31)	0.064
	3	2	1.43	(0.63-1.10)	0.000
	4		0.68	(0.48-0.84)	0.002
	>4		0.63	(0.33-0.71)	< 0.0001
Professional Qualification	Primary school		1.11	(1.06-1.31)	0.077
	High school	High/Primary school	1.33	(1.17-1.21)	0.063
	Graduate		1.23	(1.06-1.45)	0.004
	Post Graduate		1.44	(1.27-1.84)	0.056
	Doctorate		1.43	(1.05-1.43)	0.089
E-commerce Benefits	Having coupons	Having coupons / No Coupons	1.75	(1.16-1.23)	0.085
	Not having coupons		1.13	(0.87-1.21)	0.123
Age	17-33		1.23	(0.75-1.11)	0.057
	33-63		1.28	(0.76-1.09)	0.082
	63+	33-63	1.37	(0.63-1.03)	0.097

Odd ratio significant level (0.05); Goodness of fit: Chi square =255.0; p value <0.0005

The results from (Table 3) i.e the storage phase of the research had emphasized on probable negative relationship with food waste and household size, age & qualification of consumers.

While coming across the preparation phase (Table 4), significant negative relationship seems to have occurred between food waste drivers (explanatory variables) and household size (3;4;>4) & professional qualification (Graduation) which depicts food waste frequency has

declined while cooking the food items purchased and stored in the earlier stages, this revealed that hypothesis's HO6 & HO7 should be rejected which means that food waste at preparation phase of food procurement has probable negative relationship with professional qualification and household size of consumers.

But it has also been evident, that gender having e-commerce benefits seems have elevated blend for food waste which might have occurred due to long working durations and higher stress level in their routine life and food waste might have been their least priority, this revealed that hypothesis HO8 should be accepted which means consumer food waste at acquisition, storage & preparation has positive relationship with gender having e-commerce benefits shared by corporate.

Gender specific dissimilarities while handling food and preparation of the same have been accounted Hartmann et al. (2013). Due to high end complexity in the consumption behavior; lifestyle and societal pressure, sustainable transform has been evident in the food sector which required peculiar policy Beverland (2014). Reisch et al. (2013) as it has lead to changed dietary selections and with mounting middle class segment in developing nations De Koning et al. (2015) food waste has been termed as major social issue of this era. Even, triggered over purchase by consumers due to best offers offered by retailers has been an area responsible for high frequency of food waste Aschemann-Witzel (2018).

CONCLUSIONS AND DISCUSSIONS

Consumer purchase intent has appeared as one of the major critical attribute that has resulted in the invention of food waste in different households; even it has become progressively more vital during the time period of survey conducted on different consumers. The current research at the initial stage tried to caliber the distal explanatory variables of consumers of developing nation India, where impact of consumer socioeconomic variables by using proportional odd regression model was used to evaluate the major drivers for food waste. During acquisition phase consumers with bigger household size i.e (4;>4) & routine/always framed shopping list were considered having active mind-set toward lower food waste characteristics in comparison to shopping approach being upheld by nuclear families. Even special benefits offered by copious ecommerce players can be considered as major constructs for generating positive trend for food waste by nuclear family. During the storage phase constructive relationship have occurred between the food waste and explanatory variables like household size (3;4;>4); professional qualification (postgraduate & doctorate) & age (33-63, 63+) which signified fictional existential gap during the initial phase of food choice and its projected outcome i.e (food waste). Numerous examples were demonstrated in due course of study where information on food choice and its storage if done by valuing consciousness of individual with inclined approach can result in lowering the frequency of food waste. □□

Also, there has been substantiate evidence from numerous research work that whenever purchase intent has occurred in bigger retail stores rather than at small kariana stores bulk buying behavior has occurred which has resulted in greater food waste or storage of food products, so finally at preparation phase range of consumer characteristics have been identified with besieged recommendations which can control the range of food waste by considering household size (3;4;>4) & professional qualification (Graduation) which depicts food waste frequency has declined while cooking the food items purchased at storage and acquisition phase.

Also, consumer targeted nudging being upheld by corporate have been evident in the research where gender having e-commerce benefits seems have elevated blend for food waste which might have occurred due to long working durations and higher stress level in their routine life and food waste might have been their least priority.

MANAGERIAL IMPLICATIONS

Private or public organizations who are policy creators should work towards evasion and diminution of food waste by enforcing stringent measures and effective initiatives related to sustainability of food and supply chain sectors, especially involved in manufacturing, storage and delivery channels. Even for consumers irrespective of their 'dislike' or 'interest' same policies should be implemented on global scale. Marketers have to become an eye opener for consumers and provide candid information on food waste and quantity of food to be procured at the time of buying which will lead to higher trust level and longer association with customers which by and large will lower the waste frequency of food items. E-commerce players while selling food options through their online platform are required to deliberate on health issues by associating quantity to be consumed by consumer related to particular food item, this will lead towards the reduction of food waste as majority of the Indian consumers are digital due to cheaper internet facilities available by corporate in telecom sector.

Supermarkets and karyana stores have to promote the consequences of food waste by directly provoking the deficiencies which may erupt for below poverty line people in the form of surge in the pricing of essential products which indirectly will impact the pocket of customer in coming future. Even, special educational programs or campaigns should be held in order to create awareness for food waste among students of schools and higher institutions.

SCOPE AND LIMITATIONS FOR FUTURE RESEARCH

This current research has revealed the relationship of distal explanatory (demographics) variables for food response (waste). Numerous number of times it has been vivid that statistical data collected on food waste have to be treated as blurred and indecisive as this diverge significantly by classification of food waste and data resource used in its collection Bellemare et al. (2017). Xue et al. (2017). Here, targeted customers might have prior activation of cognitive mindset for food items which might have changed their actual response as categorizing of specific food products in the questionnaire was not feasible due to the availability of numerous options of food in the environment. Limitation related to macro environment cannot be ignored as the time frame was covid-19 free when data was collected from the respondents. Also, the mindset of respondents cannot be uncared while filling the online Google form stack as we all know in busy schedule the presence of mind has some ambiguity due to work pressure or personal life issues of respondents.

Addition of specific food items in questionnaire and special warnings if printed on food products on health issues will result in different way of prediction related to food waste. If buying quantity can be mentioned on food products related to household size, higher trust level can be incurred by specific brand manufactured and long term retaining of customer if feasible. These research outcomes can be outlined on specific food brands rather than common food items which can be valuable for companies to hasten their manufacturing by actually meeting supply and demand of the market.

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