Re - Conceptualizing Health Consciousness as a Function of Nutrition Consciousness and Food Safety Consciousness in Context of Organic Food Consumption – A Structural Equation Modeling Approach

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Abstract - The purpose of the paper is to re - conceptualize and confirm health consciousness as a function of nutrition consciousness and food safety consciousness in context of organic food consumption. Samples were collected in India (Mumbai and Navi Mumbai) from November to December 2016 with a total of 749 returned effective questionnaires. The data was analyzed using structural equation modeling. The results show that food safety concern and nutrition consciousness have a significantly positive impact on health consciousness. Out of the two variables/ constructs, food safety has a greater bearing on heath consciousness. This study provides organic industry the understanding that the consumer health consciousness is more so determined by the safety aspect of the organic food than the nutritional fulfillment requirement. This nuanced understanding is necessary for the future development of organic food industry. The study is novel on two counts. Number one is the re-conceptualizing health consciousness as a function of nutrition consciousness and food safety consciousness and second testing the new conceptualization using structural equation modeling. The study results will provide a reference for practionners, academicians and policy makers the organic food promotion and education of organic food producers.

Keywords — Structural equation modeling, Food Safety Concern, Nutrition Consciousness, Health Consciousness, Organic Food

I. INTRODUCTION

In recent years, the importance of food safety incidents around the world have raised consumers' health awareness and caused organic food to become a focus of public interest. In view of increased consumer awareness and consciousness of personal health, a wave of studies aimed at identifying the organic consumer is underway. The literature aiming at identifying the organic consumer is extensive, yet researchers still do not have a fair grasp on exactly who that consumer is. One of the issues which merit further study is clearing the air around the concept of health consciousness. Health consciousness is determined majorly by two components - safety consciousness and nutrition consciousness and which weighs more is the core of this study's investigation.

Various studies concerning consumer behavior vis-a -vis organic products have been conducted in many European Union countries and the US. These studies are done by many researchers chief among them being Davis et al., (1995); Roddy et al., (1996); Hutchins and Greenhalgh, (1997); Reicks et al., (1997); Latacz Lohmann and Foster, (19970; Kyriakopoulos and Oude Ophuis, (1997); Thompson, (1998); Thompson and Kidwell, (1998); Michelsen et al., (1996); Worner and Meier-Ploeger, (1999); Santucci et al.,(1999); Govindasamy and Italia, (1999); Browne et al., (2000); Zanoli and Naspetti, (2001); Magnusson et al., (2001); Jones and Clarke-Hill, (2001); Wier and Calverley, (2002) Kyriakopoulos, (1996); Papastefanou et al., (1998); Zotos et al., (1999); Tzimitra-Kalogianni et al., (1999); Chryssochoidis, (2000); Chryssochoidis and Fotopoulos, (2000); Fotopoulos and Krystallis, (2001, 2002a, 2002b); Fotopoulos et al., (2003). A number of researches were conducted among consumers in various parts of India to find out about awareness levels, motivations and hindrances for organic food purchasing. The studies are carried by Garibay and Jyoti (2003),. Menon, Sema, and Partap (2010) Rao et al. (2006), Dholakia and Shukul (2012), and Doel Mukherjee (2012). In the extant literature health, Nutrition and safety is used interchangeably, the current research paper investigates what weighs more in health consciousness –nutrition or safety.

II. RESEARCH MOTIVATION AND PURPOSE

India is organic by default. India is bestowed with immense potential to produce all varieties of organic products due to its agro climatic regions. Despite the sweeping influence of chemical-based farming, traditional knowledge on sustainable farming practices still exists in India, and in

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remote areas of the country. India has experienced good growth in the organic business sector. Exports reportedly grew between 25 and 30 percent, whilst domestic markets grew even faster at about 40 percent. The organic food market in India is forecast to grow at a CAGR of more than 25% during 2015 – 2020. By 2025 the Indian Organic food business is likely to be an Rs 75,000 crores. Focus on both export and domestic markets are crucial for this to happen. Without increase in demand for organic products from domestic customers, farmers will not be encouraged to take up organic farming. Effective marketing of organic products in local, regional and national markets could make a major contribution to securing the livelihoods of smallholder producers, to strengthening small family farm structures and sustainable development of the country's food and agriculture sector. The motivation for this research is fill the gap in the literature for the entrepreneur and marketers from India who are currently exporting and not targeting the Indian markets.

III. OBJECTIVE OF THE STUDY

To study whether Nutrition consciousness has a higher bearing on Heath consciousness or Food safety consciousness has a higher bearing on Heath consciousness in the organic food consumption scenario.

IV. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

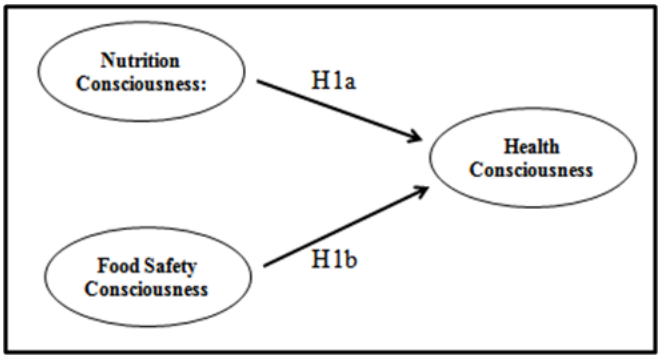
Nutrition Consciousness: Most studies find that respondents believe organic produce is more nutritious than conventional produce. Sparling et al. (1992) found most consumers view nutritional benefits of the two types of produce as the same, although 9 percent of retail produce buyers cite organic produce being more nutritious as the main reason they believe consumers purchase organic produce. Other studies such as Jolly and Dhesi (1989), Morgan et al. (1990) and Estes et al. (1994) found that both purchasers of organic produce and non-purchasers of organic produce as well as retail produce buyers believed that organic produce was more nutritious than conventional produce. The perception that organic produce is at least as nutritious, if not more so, than conventionally-grown produce seems to be widely held.

Food Safety Consciousness: Organic produce consumers are concerned about the effect of pesticides on their own health and the health of the environment. There are many studies which points towards this Goldman and Clancy (1991), Sparling et al. (1992), Morgan et al. (1990), Morris et al. (1993), Jolly and Dhesi, (1989); Jolly, (1991). Cook, (1992). Ott (1990) The Packer (1996).

Health Consciousness is getting mixed with either food safety or nutrition consciousness in many studies. Closely related to consumers' concern for pesticides is their concern for health and the food they buy. Health consciousness has been studied by Jolly and Dhesi (1989). Sparling et al. (1992), Tregear et al.,(1994). The Packer (1996), Suh, Eves and Lumbers (2012), Devcich, Pedersen and Petrie (2007), Roddy, Cowan and Hutchinson (1996), Lea and Worsley, (2005), Magnusson et al., (2001); Radman, (2005), Chinnici et al., (2002); Davies et al., (1995); Hutchins and Greenhalgh, (1997); Makatouni, (2002); Padel and Foster, (2005); Squires et al., (2001); Tregear et al., (1994). Tarkiainen and Sundqvist, (2005). Lockie et al., (2004), Kristensen and Grunert, (1992).

Almost every consumer research indicates "health" as a dominant motivation towards organic consumption. Von Alvensleben, (1997); Backer, (2004); Davies et al., (1995); Radman, (2005); Padel and Foster, (2005); Wier and Calverley, (2002); Zanoli et al., (2001); Zakowska, (2007). While keeping the health condition intact, avoiding the intake of chemical residues is also further motive that is mentioned in surveys. Especially less additive, pesticide, fertilizer and more vitamin and mineral content of fruits and vegetables is seemed to be responsible from own health protection attitude. Padel and Foster, (2005); Zanoli et al., (20040, Wier and Calverley,(2002), Zakowska, (2007), Tregear et al., (1994); Huang, (1996); Schlegelmilch et al., (1996); Hutchins and Greenhalgh, (1997); Wandel and Bugge, (1997); Magnusson et al., (2001); Squires et al.,(2001), Padel and Foster, (2005).

As evident in the above discussion there is strong evidence that purchases of organic food is because respondents feel organic food are healthy, nutritious and safe. However there is no study which looks at health as a combination of nutrition and safety and tries to see which of the component is dominant in deciding heath. In the above studies there is limited evidence to show the measurement of health consciousness using appropriate scale and juxtaposing this heath consciousness with nutrition consciousness and food safety consciousness.



V. METHODOLOGY OF THE STUDY

The research is a quantitative study employing structural equation modeling to model the three constructs. A questionnaire was designed tested and then data was collected to test the hypothesized the model.

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Questionnaire design: The flow of the questionnaire follows the theoretical model flow as given in figure 1. The question was administered through Google forms. A questionnaire was constructed and it was scrambled while administering. This was done to avoid the feeling of repetitiveness. Details of the question and its reliability score using Cronbachs Alfa is given in the analysis of reliability and validity section.

Nutrition Consciousness (NC): Nutrition Consciousness is measured by four variables represented by V14, V15, V16 and V17. Initially individual construct Nutrition Consciousness (NC) was confirmed for their structure and relationship with the variables. Figure 2 given below shows the structure of the construct NC. The wording of the variables which measures the construct of Nutrition consciousness is as follows. V14 - Organic fruits and vegetables have more vitamins than non- organic fruits and vegetables. V15- Organic fruits and vegetables have more minerals than non- organic fruits and vegetables. V16 - Organic fruits and vegetables are good for health than non-organic fruits and vegetables. V17- Organic fruits and vegetables is high in fiber than non- organic fruits and vegetables.

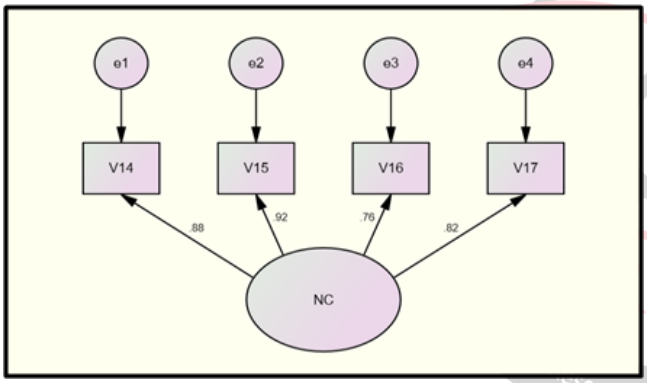

Figure 2

In this construct, the four items were submitted to a measurement model analysis to check validity and Reliability. The initial model fit indices represented by CMIN/DF = 3.59, GFI =0.99, CFI = 0.99, and RMSEA = 0.05. The indices value for CMIN/DF was found below 5 so this value can be accepted. Majority of path estimates were Figure 1 found nearer to 0.70. The convergent validity of the construct is tested using Variance Extracted (VE), Path

estimates and Reliability test. The entire path estimates more than 0.5 shows sufficient convergent validity. All the path estimates for construct is more than 0.5. The VE for the construct is 0.71 (the value of VE nearer 0.5 or more can be accepted). Similarly, the reliability of the construct is measured in the form of construct reliability (CR). The CR for this construct is 0.90 and is well above the acceptable range (acceptable range for CR is 0.7). Considering all the measures, the constructs shows significant convergent validity.

Food Safety Consciousness (FSC): Food Safety Consciousness is measured by four variables represented by V18, V19, V20 and V21.Initially individual construct Food Safety Consciousness (FSC) was confirmed for their structure and relationship with the variables. Figure 3 shown below shows the structure of the construct FSC. The wording of the variables which measures the construct of Food Safety Consciousness is as follows. V18- Organic fruits and vegetables are free from fertilizer residues. V19- Organic fruits and vegetables does not have pesticide residues. V20 Organic fruits and vegetables does not have additives and preservatives. V21- Organic fruits and vegetables are not subjected to radiations.

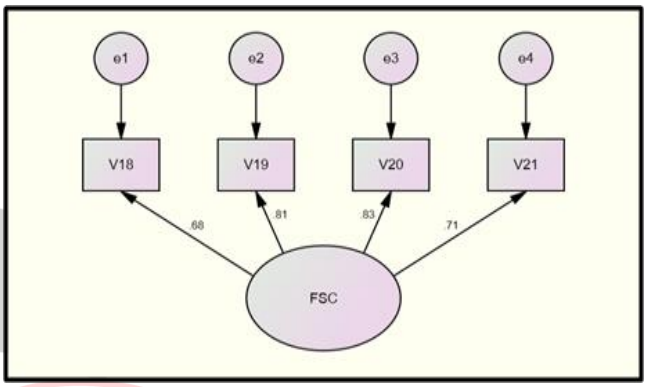

Figure 3

In this construct, the four items were submitted to a measurement model analysis to check validity and Reliability. The initial model fit indices represented by CMIN/DF = 0.59, GFI =0.99, CFI = 0.99, and RMSEA = 0.001. The indices value for CMIN/DF was found below 5 so this value can be accepted. Majority of path estimates were found nearer to 0.70. The convergent validity of the construct is tested using Variance Extracted (VE), Path estimates and Reliability test. The entire path estimates more than 0.5 shows sufficient convergent validity. All the path estimates for construct is more than 0.5. The VE for the construct is 0.71 (the value of VE nearer 0.5 or more can be accepted). Similarly, the reliability of the construct is measured in the form of construct reliability (CR). The CR for this construct is 0.84 and is well above the acceptable range (acceptable range for CR is 0.7). Considering all the measures, the constructs shows significant convergent validity.

Health Consciousness (HC): Health Consciousness is measured by seven variables represented by V44, V45, V46, V47, V48, V49 and V50.Initially individual construct Health Consciousness (HC) was confirmed for their structure and relationship with the variables. Figure 4 shown below shows the structure of the construct HC. V44. I consider myself to be very health conscious. The wording of the variables which measures the construct of Health Consciousness is as follows. V45 -I control salt intake, V46 -I exercise regularly, V47- I get my health check-ups done

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periodically, V48- I go to the dentist regularly, V49- I try to balance work and private time, V50- I try to reduce stress.

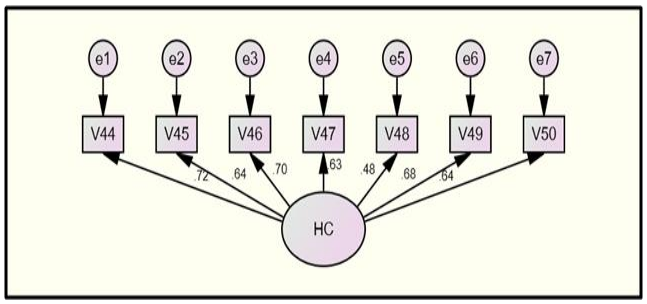

Figure 4

In this construct, the four items were submitted to a measurement model analysis to check validity and Reliability. The initial model fit indices represented by CMIN/DF = 6.26, GFI =0.87, CFI = 0.88, and RMSEA = 0.11. The indices value for CMIN/DF was found above 5 so this value cannot be accepted. Majority of path estimates were found nearer to 0.70 (Except V48). The convergent validity of the construct is tested using Variance Extracted (VE), Path estimates and Reliability test. The entire path estimates are near to 0.5 does not confirm convergent validity. All the path estimates for construct are more than 0.5. The VE for the construct is 0.41 (the value of VE nearer 0.5 or more can be accepted). Similarly, the reliability of the construct is measured in the form of construct reliability (CR). The CR for this construct is 0.82 and is well above the acceptable range (acceptable range for

CR is 0.7). Considering all the measures, the constructs shows significant construct reliability but lacks in fit measures. Hence Modification is required. After considering the modification indices, the results are improved and discussed below.

Health Consciousness – After considering the modification indices (as shown in figure 5 , the results of Fit Indices have been improved. The initial model fit indices represented by CMIN/DF = 2.92, GFI =0.98, CFI = 0.98, and RMSEA = 0.05. The indices value for CMIN/DF was found below 5 so this value can be accepted.

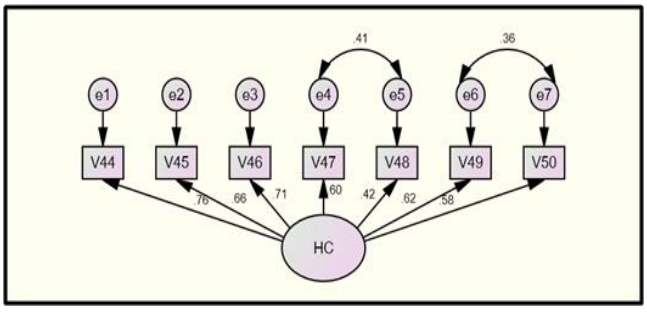

Figure 5

Sampling procedure and data collection - A pre-test typically involves a few experienced interviewers completing around 25-75 interviews. Oksenberg et al., (1991). This study distributed the pre-test questionnaires from 1-15 November 2016, and targeted the main food purchaser of each household. This study distributed 100 pre-test questionnaires, and 68 effective ones were returned, for a recovery rate of 68 per cent. The Cronbach's alfa of each dimension was greater than 0.7. The item-to-total-correction score was greater than 0.5; hence, the questionnaire had good internal consistency and reliability. Based on these results, this study formally administered the questionnaire.

The data collection was done in two phase. The first phase started in the month of November 2016. Organic Farmers Markets are held at Mahim Natures park (Sion) and in Bandra near St Andrews Church. Verbal permission was taken from Ms. Kavita Mukhi Organizer of Farmers Markets, to take responses from individual who patronize this market. Eighty nine responses were collected by intercepting organic fruits and vegetables consumer. Eighty nine responses were collected by visiting the farmers market on five Sundays. In the second phase reference of these consumers were used to further get responses of individual who were organic fruits and vegetables consumer. An online version of the questionnaire was made on Google forms. A link of the form was made and sent to individuals residing in Mumbai and Navi Mumbai. To increase the response rate the link was sent through Facebook message, Linkedin and Whatsapp. Pre tested questionnaire link was sent to approximately 1500 individuals email, Facebook and Whatsapp. Out of these only 749 responded.

Using structural equation modeling (SEM) analysis, the smallest sample requirement was 100-150 (Ding et al., 1995). Based on the estimations using the method of maximum likelihood, the sample variable and sample size ratio of 1:10 is the smallest requirement for sample size (Jackson, 2003). This original study contained 55 variables and 749 effective samples, which are greater than the above guidelines for minimum sample size for SEM. Again since 749 observations are covering 15 variables, the sample size per variable is more than 1: 10 stipulation.

VI. DATA ANALYSIS

Sample characteristics: The participants consisted of 299 women (39.9 per cent) and 450 men (60.1 per cent). The age group between 18 and 25 years old (38.1 per cent), followed by 26-33 (29.6 per cent) dominated the sample. In terms of qualification graduates and post graduates are the major groups. Graduates are 241 (32.2%) and Post graduates are (54.2%). The respondents are from Mumbai 404 (5309%) and Navi Mumbai (37.0%). Out of all the respondents 19 (55.9%) are single and 329(43.9%) are married.

Analysis of reliability and validity: This study proposes that Cronbach's α should be above 0.7 (Cronbach, 1951). The Cronbach's α coefficients for the dimensions are 0.871,

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0.775, and 0.829, respectively, all of which are higher than 0.7. Meanwhile, the composite reliability (CR) values for the dimensions are 0.909 0.82 and 0.84, respectively, and the higher the value, the higher internal consistency of variables. The average variance extract (AVE) is to state how much variance captured by the latent variable among other variables in the dimension. The higher AVE's values are, the observed variables can react more latent trait common factor between dimensions. AVE values for the dimensions are 0.71 0.41 and 0.57 respectively, as shown in Table I. The CR and AVE have reached the standard and correspond to the suggestion by Fornell and Larcker 1981 and Hair et al. 2009, CR is supposed to be higher than 0.7,

Analysis with SEM: Structural Equation Modeling for impact of Nutrition Consciousness and Food Safety Consciousness on Health Consciousness.

The Model under Study as shown in figure 6

- The model of the Health Consciousness has 3 factors, as indicated by the ellipses.
- There are 20 observed variables, as indicated by the 15 rectangles.
- The observed variables load on the factors in the given pattern:
- Each observed variable loads on one and only one factor.
- Errors of measurement associated with each observed variable are also shown in the figure.
- • The three factors are Nutrition Consciousness (NC), Food Safety Consciousness (FSC) and Health Consciousness (HC).
- The three factors are initially confirmed for their scale reliability and construct validity.
- • It is hypothesized that Nutrition Consciousness (NC) and Food Safety Consciousness (FSC) have positive impact on Health Consciousness (HC).

Estimated Model: The estimated model is shown below as figure 6

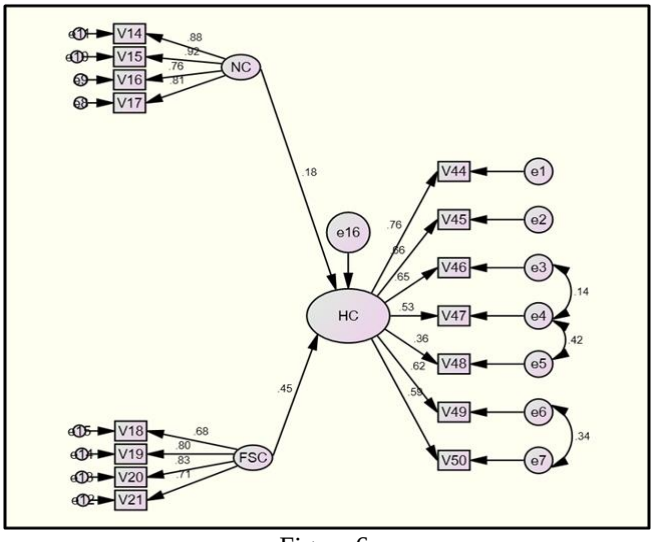

Figure 6

To verify the goodness of fit in this study, the model is conducted by the following indicators: χ 2, the value of χ 2 and degree of freedom (χ2/df), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), root mean square error of approximation (RMSEA), and comparative fit index (CFI). Recommended values for model fit are based on Hair et al.(2000), Ullman (1996). On the basis of all model of-fit results, it can be concluded that the hypothesized model fits the sample data extremely well.

RMSEA Values ranging from .05 to .08 are deemed acceptable. An empirical examination of several measures found that the RMSEA was best suited to use in a confirmatory or competing models strategy with larger samples (Rigdon, 1996).

Absolute Fit Measures		
Test	Recommended Value	Model Under Study
χ2	p> 0.05	p=0.000
CMIN/DF	< 5	4.69
RMSEA	<0.10	0.08

Relative Fit Measures		
Test	Recommended Value	Model Under Study
CFI	>0.90	0.91
NFI	>0.90	0.91
RFI	>0.90	0.90
IFI	>0.90	0.90

Parsimonious Fit Measures		
Test	Recommended Value	Model Under Study
PCFI	>0.50	0.65
PNFI	>0.50	0.64

χ2 = Chi- Square Test, CMIN/DF = Chi square test / Degree of freedom, RMSEA = Root Mean Square Error of Approximation, CFI = Comparative Fit Index NFI = Normed Fit Index, RFI = Relative Fit Index, IFI = Incremental Fit Index, PCFI= parsimony Comparative Fit Index, PNFI= Parsimony Normed Fit Index

Empirical results: Hypothesis testing result are as follows

- Null Hypothesis: Nutrition Consciousness (NC) has no significant impact on Health Consciousness.
- Alternative Hypothesis: Nutrition Consciousness (NC) has a significant impact on Health Consciousness.

Hypotheses	**Relationship**	**Regression**	**P**	**Support**
H1	NC → HC	0.146	0.00	Yes

The table above shows the result of the hypothesis testing. It was hypothesized that Nutrition Consciousness has

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significant positive impact on Health Consciousness. The regression co efficient was found positive (0.146) and significant. The p value is found less than 0.05. Hence it can be concluded that the regression coefficient is statistically different from 0. Hence it can be concluded that Nutrition Consciousness has significant positive impact on Health Consciousness.

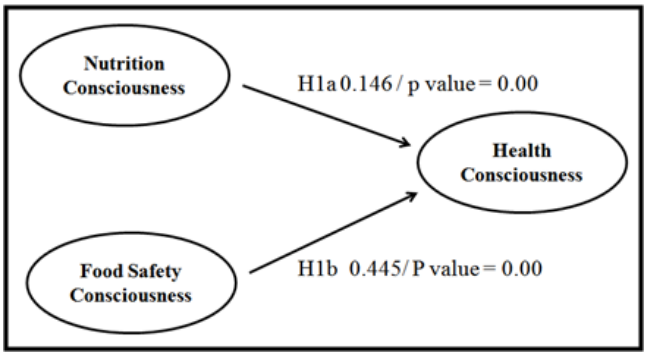
- Null Hypothesis: Food Safety Consciousness (FSC) has no significant impact on Health Consciousness (HC).
- Alternative Hypothesis: Food Safety Consciousness (FSC) has a significant impact on Health Consciousness (HC).

Hypotheses	Relationship	Regression	P	Support
H1	FSC → HC	0.445	0.00	Yes

The table above shows the result of the hypothesis testing. It was hypothesized that Food Safety Consciousness (FSC) has significant impact on Health Consciousness (HC). The regression co efficient was found positive (0.445) and significant. The p value is found less than 0.05. Hence it can be concluded that the regression coefficient is statistically different from 0. Hence it can be concluded that Food Safety Consciousness (FSC) has significant impact on Health Consciousness (HC).

Hypothesis	Support yes/no
Food Safety Consciousness (FSC) has significant impact on Health Consciousness (HC).	Yes
Nutrition Consciousness (NC) has significant positive impact on Health Consciousness (HC).	Yes

The finding shows that Food Safety Concern, and Nutrition consciousness are significantly positively related. Comparing the important effects of each independent variable on dependent variable, according to Table V, the standardized ß coefficient shows that the effect of Nutrition Consciousness on Health Consciousness 0.146, which is significant. The standardized ß coefficient of Food Safety Consciousness on Health Consciousness is 0.445.



VII. CONCLUSION

Health consciousness, nutrition consciousness and food safety consciousness are considered same. However these are difference. As shown in the theoretical framework, nutrition consciousness and food safety consciousness are subcomponents of heath consciousness and Food safety consciousness weighs heavily of health consciousness as compared to nutrition consciousness. Based on the results, this study discusses the theoretical and practical implications and provides specific suggestions, as outlined below.

Theoretical implications: There are many studies in the organic food literature which investigates the determinant of organic food adoption. These studies indicate food safety and health consciousness as parameters in the organic food consumption Nina Michaelidou and Louise M. Hassan (2007). The present study looks at the health consciousness in a more atomic way and tries to postulate that Nutrition consciousness and Food safety consciousness as a subset variable of health consciousness and food safety is a stronger determinant of health than nutrition consciousness. This is I tune with the philosophy that human are more motivated towards any behavior which leads to avoidance of pain than achieving some gain.

Practical implications: Although the definition of organic farming varies across countries, it mainly aims to improve the quality of food in terms of making it safer and nutritious, increase biological diversity and soil activity, and reduce environmental pollution. These benefits could be classified as altruistic and egoistic. In the context of a developing economy it is the egoistic goal and not the altruistic goal which would be more important. These goals can be accomplished by reducing the use of pesticides and chemical fertilizers. Environmental protection and animal welfare are the starting points of development in organic farming.

Also in the study it is seen that safety of organic food weighs more than the nutrition component. This study explores the factors the interconnection amongst the two variables Nutrition Consciousness Food Safety Consciousness on the third variable Health Consciousness from the consumers' perspective, and provides suggestions to practionners academia and the regulators of and organic food ecosystem. This finding can be used by marketers in developing the organic food industry.

Suggestions: The development and growth of the organic food industry depends on cooperation among the stakeholders of the ecosystem. The paper makes a limited but powerful suggestion that the marketers should use safety of the organic food as an argument to further the agenda of organic food consumption rather than the nutrition agenda.

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