The Impact of Supply Chain Visibility on Consumers' Purchase Intention of Organic Food

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Abstract— In the current world, information about food supply chains is demanded by consumers. The lack of information shared in the food supply chain is considered a significant issue faced by consumers. Driven by the need for supply chain visibility, this study was conducted to identify the impact of supply chain visibility of organic food on consumers' purchase intention. The study gathered and fulfilled information on the influence of visibility in the organic food supply chain information on consumer's purchase intention in Sri Lanka. The study adopted factors such as supply chain visibility, the quantity of information shared, accuracy of information shared, timeliness of information shared on consumers' purchase intentions. Based on this, a quantitative approach was taken to analyse data. The study shows that an increase in the quantity of supply chain information provided on organic food has a severe impact on the consumer's purchase intentions. It is identified that an increase in the quantity of information that consumers possess allows them to make well-informed decisions when it comes to purchasing organic food products. Furthermore, the study found that there is an increase in the timeliness of the information as a major impact on consumers' purchase intention, and even the availability and the ability to access necessary information can influence consumers' purchase decisions.

Keywords— organic food, supply chain visibility, purchase intentions, quantity of information shared

I. INTRODUCTION

A. Background of the Research

Today's domestic and international markets have become immensely competitive with the rise in globalization. Modern supply chain activities have become more complex, and a product often travels through vast networks. With increasing trends in the field of Supply Chain Management (SCM), there has been a growing demand for Supply Chain Visibility (SCV). According to Lamming, (2001) Supply Chain Visibility can be defined as, the extent to which actors within a supply chain can access or share information. Supply Chain Transparency (SCT) relies on supply chain visibility. According to Bhaduri & Ha-Brookshire, (2011) the demand for supply chain transparency has been increased, in part, by the improved awareness perceived by consumers and the advanced technology in communication. Driven by the demand for supply chain transparency, organizations such as Nike, H&M, and Nudie Jeans Co have already started providing supply chain information using modern technologies (Egels-Zandén & Hansson, 2016). Consumers' purchase intentions can be influenced by providing them with information about the products' supply network. But until recently, consumers did not have a clear view of the supply chains of the products they purchase and consume. According to Basha et al, (2015) purchase intention can be identified as the best predictor of actual behavior. Caridi et al, (2010) suggest that supply chain visibility can be measured by quantity, accuracy, timeliness, and usability of the information. The researchers conducted this study considering organic food products which comes under agricultural food products. To cope with the increasing demand for supply chain visibility, organizations adopt novel applications such as the blockchain and the Internet of Things (IoT). Montecchi et al, (2019) state that blockchain technology operates mutually distributed ledgers that have been built on a series of innovations used for organizing and sharing digital data. Further, they mention blockchain-enabled advanced traceability, certifiability, and verifiability can

enhance consumers' provenance knowledge. Internet of Things include Radio-frequency identification (RFID) tags, Global Positioning Systems (GPS), and Near Field Communication (NFC) sensors and these can be used to achieve more control of a product's information. Therefore, this study was conducted to explore the impact of supply chain visibility of organic food on consumers' purchase intention.

B. Statement of the Problem

Information about the origin of a product, supply chain participants contributed, and how it got delivered to the consumers used to be invisible. Recent scandals in the supply chain, make consumers question the reliability of information available on the products. Montecchi et al, (2019) state British and Swedish consumers of 'Findus beef lasagna' were stunned to discover the labeled protein contents of the products were nearly 100% horsemeat, not 100% beef. This scandal led consumers across the globe to demand Supply Chain Transparency, in the food industry. According to Bhaduri and Ha-Brookshire, (2011) when the supply chain is transparent and provenance knowledge is enhanced, consumers can be aware of risks that they cannot anticipate, beneficial impacts on society and the environment, and that can influence their purchase decisions. Moreover, they stated a lack of information in purchase decisions may lead consumers in purchasing the wrong product which they certainly do not want to purchase when the supply chain was not visible. Baralla et al, (2019) state that in the field of the Agri-food industry, consumers demand assurance of the origin, provenance information, and transparency. The lack of information problem led the researchers to explore the impact of supply chain visibility on consumers' purchase intention in the context of organic food products to give the consumers what they demand: supply chain visibility.

C. Research Objectives

1) Main objective:

To identify the impact of Supply Chain Visibility of organic food on consumers' Purchase Intention.

2) Specific objectives:

(i) To identify the impact of the quantity of information shared on consumers' Purchase Intention.

(ii) To identify the impact of the accuracy of information shared on consumers' Purchase Intention.

(iii) To identify the impact of the timeliness of information shared on consumers' Purchase Intention.

D. Significance of the Study

Concerning the supply chain of organic food, it also seeks to identify the types of information that are already available to consumers and to identify the supply chain information that consumers require. It is expected to truly give consumers a choice based on supply chain transparency, which will lead them to purchase the products that are sustainable, harmless for them and the planet, persuade organizations to reveal their supply chain claims and eliminate wrongdoings.

II. LITERATURE REVIEW

A. Supply Chain Transparency and Visibility

According to Saberi et al, (2019) Supply chain transparency relies on information sharing and visibility. Francisco & Swanson, (2018) states that the supply chain concept of transparency embodies, basically the idea of information readily available to end-users and firms in a supply chain. Trust and credibility highly influence the consumers' willingness to buy (Egels-Zandén & Hansson, 2016). Transparency is currently very important, and it can provide answers to many problems faced by both producers and consumers (Wulff, 2015). According to Saberi et al, (2019) supply chain transparency relies on information sharing and visibility. Francisco & Swanson, (2018) states that the supply chain concept of transparency embodies, basically the idea of information readily available to end-users and firms in a supply chain. Furthermore, Caridi et al, (2010) state that Supply chain visibility can be measured and tracked in terms of both quality and quantity. This research addresses those two areas regarding the supply chain visibility in organic food purchase intentions. There are three dimensions identified in supply chain visibility. Quantity of the

information shared, the accuracy of information shared, and the timeliness of information can be expressed as those dimensions. According to Caridi et al, (2010) the most desired topics of the information features to be considered in the supply chain visibility are the quantity of information, the accuracy of the information, and the timeliness.

Consumers have the urge to get information about the products they may purchase and then base their purchase decision on the information they receive. For example, consumers sometimes need assurance that fish products purchased are not farmed using illegal fishing methods (Francisco & Swanson, 2018). Novel technologies such as blockchain can ensure transparency, traceability, and security as a distributed digital ledger technology among supply chains (Saberi et al., 2019).

B. Purchase Intention and Supply Chain Visibility

Consumer willingness to purchase products can be influenced by trust and that trust comes with transparency and credibility (Egels-Zandén & Hansson, 2016). In buying intentions, information availability and supply chain visibility in products have a big role in the modern logistics world (Kim et al., 2008). Consumers can perceive risks when there is information that is hidden from them in a product's supply chain. This perceived risk can influence customers' purchase decisions and attitudes negatively towards the product (Montecchi et al., 2019). Because of the lack of information in buying, consumers face perceived risks. Consumers ask sellers to provide clear health-related information and visibility for the organic products they buy in a complex data environment (Yu et al., 2019). For example, consumers want to know whether a product is made using organic methods of production. If they do not get the information in the right manner or if they do not get information at all they will doubt their safety and their health. This reflects negatively on consumer buying decisions. This is where provenance plays a key role in supply chain transparency. The term provenance is defined as "information about the creation, chain of custody, modifications or influences about an artifact" (Montecchi et al., 2019). Knowledge about provenance means knowing how products were produced, manufactured, stored, and delivered to end consumers (Montecchi et al., 2019).

Information about food products has become increasingly important over the past few years. Positive attitudes toward the origins of the food they consume have not been sufficiently captured in most of the published literature knowledge about food purchasing behavior (Bu & Go, 2008). Motivation and dedication towards living healthy lifestyle influences the organic food purchases in consumers. Though premium prices are charged for organic food, the consumers who believe in healthy food, animal welfare, and environmental safety think organic food buying is beneficial in many ways (Iqbal, 2015).

III. METHODOLOGY

A. Research Design

The quantitative research method was adopted in the study. The researchers gather data using an online questionnaire to gain more information about the impact to supply chain visibility of organic food. The research philosophy that the researchers have chosen to follow is positivism, which depends on quantifiable observations that are gathered using surveys, that were conducted to collect quantitative information about the impact that a visible supply chain has on consumers' purchase intentions. While following a deductive approach, researchers have collected and analyzed the data gathered and decide whether the data supports or rejects the hypotheses that have been formulated based on the literature.

B. Conceptualization of the Study

The conceptual model, illustrated in figure 1 was developed based on the literature review. Figure 1 depicts the influential factors of supply chain visibility on consumers' purchase intention in the context of organic food. The quantity of information shared, accuracy of information shared, and timeliness of information shared are the core variables related to supply chain visibility.
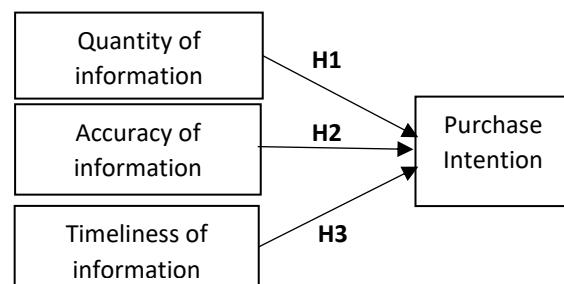

Figure 1. Conceptual Model
Source: Constructed by authors

C. Hypotheses of the Study

The following hypotheses were developed based on the conceptual framework depicts in Figure 1.

H$_1$: The quantity of information shared will influence the consumers' purchase intention.

H$_2$: Accuracy of information shared will influence the consumers' purchase intention.

H$_3$: Timeliness of information shared will influence the consumers' purchase intention.

Table 1 illustrates the indicators for each variable selected for the study and its references.

Table 1. Operationalization of the conceptual framework

Variable	Indicators	References
Quantity of information shared	Usefulness	(Caridi et al., 2010)
	Usability	(Caridi et al., 2014)
Accuracy of information shared	Authenticity	(Montecchi et al., 2019)
	Integrity	(Montecchi et al., 2019)
Timeliness of information shared	Accessibility	(Caridi et al., 2010)
	Availability	(Caridi et al., 2010)
Purchase Intention	Health Consciousness	(Voon et al., 2011)
	Environmental Consciousness	(Voon et al., 2011)
	Subjective norms	(Voon et al., 2011)
	Cost	(Voon et al., 2011)

Source: Constructed by authors 2020

D. Population and Sample

The population selected for this research is the customers that have bought organic food/ that are currently buying organic food or potential buyers of organic food in Sri Lanka. To be more specific, the customers would be the people aged over 18 years to 60 years. A sample of 173 respondents was taken from the Western province based on the convenience sampling method.

E. Data Collection

To support the quantitative research method, a questionnaire was conducted online. A survey method was selected to collect the quantitative data. The questionnaire has been distributed to 400 potential respondents.

F. Data Analysis

Data analysis of the research has been done with the responses of 212 respondents at the beginning but towards the end, after data screening, the respondent amount decreased to 173. Data analysis was conducted using IBM SPSS Statistics version 26.0. The parameter estimation and model fitting have been explained in section four.

IV. DATA ANALYSIS AND DISCUSSION

A. Data Screening

The questionnaire has been distributed to the organic food consumers in the Western province where the researchers managed to collect 212 respondents. After data screening the sample was decreased to 173 respondents.

B. Reliability

The reliability of the constructs was tested using Cronbach's alpha. Table 2 depicts the Cronbach's alpha values for the four constructs. The Cronbach's alpha value of the purchase intention construct is 0.792 and the Cronbach's alpha value is 0.842 for the *quantity of information shared* construct. Accuracy of information shared construct has a Cronbach's alpha value of 0.764. According to Table 2, the reliability of the timeliness of information shared construct is at an acceptable level.

C. Demographic Information of the Sample Tested

Most of the respondents are females which gives a percentage of 64.7% and male respondents were 34.7%. The remaining 0.6% preferred not to mention the gender. Most of the respondents are between the age of '21- 30' years which represents 70.5% and the lowest respondents are from the age of 'above 50' which represents 2.3%. The age 'below 20', '31-40', and '41-50' represents 13.3%, 9.8%, and 4% respectively. Colombo district has the highest percentage value of respondents

(68.2%) and percentage for the Kalutara was 13.9% and for Gampaha district was 17.9%.

Table 2. Cronbach's alpha values for the constructs of the study

Variable	No. of items	Cronbach Alpha
Purchase intention	4	.792
Quantity of information shared	2	.842
Accuracy of information shared	2	.764
Timeliness of information shared	2	.518

Source: Survey data 2020

D. Sufficiency of Information and Required Information

According to the findings of the research, information about the price, product name, and the net weight of organic products, as well as the manufacturer's details, is readily available to the customers, this being due to the fact that this information is necessary for a product to have to be able to enter the market, after analyzing the date it can be seen that what consumers lack is the nutritional information. Increasing the information regarding the nutritional value of the product is likely to increase the impact it has on the consumers purchase intentions. Among the 174 respondents, 133 people want further information about the eco-friendly and sustainable efforts that a company undertakes, most of the respondents give more value to the eco-friendliness than a company's CSR efforts. Consumers require more information about the origins of the product, the product shelf life, and general information about the product and how it is handled rather than the ethical aspects of the product or company.

E. Model Testing

The parameter estimation of the proposed model was performed using ordered logit regression method. Nagelkerke R square was 0.569 which suggested that 56.9% variance in the outcome variable is explained by the independent variables. Information shared and the timeliness of information shared have significant impact on the purchase intention of the customers.

F. Discussion

a) Supply Chain Visibility: According to Lamming, (2001) Supply Chain Visibility is the extent to which actors within a supply chain can access or share information. Furthermore, visibility can be measured using a few factors such as the quantity of information shared, accuracy of information shared, and timeliness of information shared as it is shown in the research. When the factor information is given visibility of the supply chain can be seen, therefore the purchase decision will be done with a great amount of knowledge.

b) Quantity of Information Shared (H_1): The quantity of information shared will affect the purchase decision of the customer. Caridi et al, (2010) have described that the quantity of information shared is one of the most important dimensions for the purchase decision. The more quantity of information is shared the more knowledge consumers have for their purchase intentions which will affect the consumers' decision significantly. To affect a consumer's purchase intention, the quantity of information is a significant and crucial factor.

c) Timeliness of Information Shared (H_3): Timeliness of the information shared will affect the purchase decision of the customer. Caridi et al, (2010) have said that timeliness of the information shared is an important dimension of the study. This factor will affect the purchase intention of consumers. When more information is shared on time or updated on time the purchase intentions of the Sri Lankan customers will increase as the consumers hold more information than before.

V. CONCLUSION AND RECOMMENDATIONS

A. Conclusion

1) The impact of the quantity of information shared on purchase intention: According to the result of the study, it is shown that an increase in the quantity of information provided about organic food and the supply chain practices, will most likely lead to an increase in the Sri Lankan consumer's purchase intentions. It can be concluded that an increase in the quantity of information that Sri Lankan consumers have allows them to make well-informed decisions when it comes to purchasing organic food products. For example, when it comes to buying organic food like vegetables, knowing where it is grown if any chemical has been used and if yes what they are, what packaging, distribution,

and warehousing methods have been used, all this information, as well as any other information that the manufacturers are willing to provide, will help the consumers decide whether they want to purchase the organic vegetables.

2) The impact of timeliness of information shared on purchase intentions: Timeliness of the information provided refers to the time expectation regarding the availability and the ability to access the necessary information needed to influence consumers' purchase decisions. Based on the results of the research it is found that an increase in the timeliness of the information impacts Sri Lankan consumers purchasing intention. When the information about the organic food products is available to the customers when they need it and it is ensured that the information provided is up to date, the trust that the consumers have is highly likely to increase, further, it allows the consumers to make more knowledgeable decisions when it comes to purchasing organic foods.

B. Implications

By looking at the findings of this study the researchers can conclude that supply chain visibility has significant impact on consumers' purchase decision. Therefore, sharing information about supply chain practices is of immense importance due to the increase in the need for information about organic food products. The insight gained from this study is beneficial for not only consumers of organic foods but also various major companies that are making supply chain information visible to consumers. Findings of the study may help the manufacturers and marketers of organic foods to identify what factors impact consumers purchase intentions the most and help them come up suitable strategies for conveying the necessary information.

C. Limitations

Due to practical limitations to perform, the researchers have narrowed down the scope of the study by considering only organic food products in the local market whereas, the whole food supply chain has not been observed. Therefore, the findings of this research would be limited to the organic food supply chain. The sample that has been targeted in this research is only the Western province including Colombo, Gampaha, and Kalutara whereas the other provinces are not considered in the study. This research gives information on a handful of the population. As mentioned in the previous sub-sections, to improve supply chain visibility, an organization should adopt novel technologies such as blockchain, Global Positioning System, and Radio Frequency Identification tags. However, this study would not consider the practicability of implementation of those technologies, and that would also be a limitation of this study.

D. Recommendations for Further Research

The findings of this study can serve as a base or foundation for further researchers to build up upon with regards to the supply chain visibility of not only organic food but also Fast-Moving Consumer Goods (FMCGs), regarding the accuracy, timeliness, and quantity of the information that is made available to the consumers and how it affects their purchasing intention. Further studies can be conducted to provide or recommend technologies that will enhance the visibility of the supply chain.

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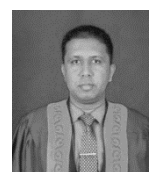
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