AN EMPIRICAL STUDY OF AGRI-FRESH FOOD SUPPLY CHAIN QUALITY (AFSCQ) IN SELECT INDIAN INDUSTRIES

Ph.D. Thesis

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An Empirical Study of Agri-fresh Food Supply Chain Quality (AFSCQ) in Select Indian Industries

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by

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DECLARATION

I, **Man Mohan Siddh**, declare that this thesis titled, **"An Empirical Study of Agri-fresh Food Supply Chain Quality (AFSCQ) in Select Indian Industries"** and the work presented in it, are my own. I confirm that:

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This is to certify that the thesis entitled **"An Empirical Study of Agri-fresh Food Supply Chain Quality (AFSCQ) in Select Indian Industries"** being submitted by **Man Mohan Siddh (2012RME9547)** is a bonafide research work carried out under my supervision and guidance in fulfillment of the requirement for the award of the degree of **Doctor of Philosophy** in the Department of Mechanical Engineering, Malaviya National Institute of Technology Jaipur, India. The matter embodied in this thesis is original and has not been submitted to any other University or Institute for the award of any other degree.

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ABSTRACT

The agri-fresh food segment is a profitable venture for all farming activities as it provides ample employment opportunities and scopes to raise the income of the agricultural community. In developing countries, the agriculture industry is the backbone of the economy. As the contest intensified beyond a single organization into the supply chain; organizations, practitioners, consultants, and academics began to realize that it is not adequate, if they only give consideration to enhance performance throughout in-house practices within their industry. Due to the struggle for marketplace advantage, organizations have attempted to systematize and integrate supply chain concepts and practices into their business process. In the field of supply chain, quality plays a vital role as creation of quality-based culture could improve operational performance, customer satisfaction, and financial performance, etc., along with the supply chain partners. Supply chain quality is as a group of quality practices that give emphasis to continuous process improvement among supply chain stakeholders (organization) to improve performance and attain customer satisfaction through prominence in learning. The supply chain quality of agri-fresh food products, herein after referred to as Agri-fresh Food Supply Chain Quality (AFSCQ) includes the process and product quality from farm to delivery of the food products, i.e. from farm to folk. The AFSCQ is very complex due to the perishable nature of the product, high uncertainty in demand and cost, with increased consumer concern for food safeness, and dependency on climate conditions.

The AFSCQ has major impact on organizational sustainability as the AFSCQ practices sum up along the entire length of the supply chain. Distinctive from traditional performance measures, not only sales, return, and market share, etc., organizational sustainability consists of economic, social and environmental sustainability.

In this research, AFSCQ practices and dimensions of organizational sustainability were recognized by comprehensive literature review. Next, a conceptual framework that offers a complete depiction of essential practices of AFSCQ and distinct facts of organizational sustainability is suggested. This conceptual or theoretical framework of AFSCQ can be utilized as "a direction" for theory constructing and preparing a measurement instrument. Then, a conceptual model that identifies the direct, as well as indirect relationship among AFSCQ practices and dimensions of organizational sustainability, are proposed. After, an empirical investigation of

AFSCQ practices and Organizational Sustainability (OS), a conceptual model in select Indian industries is proposed. For an empirical investigation, the data was collected by the utilization of survey questionnaire from select Indian industries. The data collected for this study sustains the main necessity as the sample size is 369. The empirical investigation initiates with descriptive statistics of items of research constructs along with examining the profile of respondents and industries. Factor analysis (PCA) is utilized for data reduction and to extract research constructs concerned with AFSCQ practices and organizational sustainability. The Principle Component Analysis (PCA) including varimax rotation was used for extraction of the research constructs. PCA was performed with varimax rotation that produced eight constructs on the basis of eigen values (>1, Kaiser's criteria) which considered 61.951 percent of total variance.

Structural Equation Modeling (SEM) is utilized to examine the AFSCQ measurement model in Indian perspective. The AFSCQ model comprises of five constructs viz. Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Supplier Management (SM), Customer Focus (CF), Internal Management (IM) and Supply Chain Integration Management using IT (SCIMIT). It indicates a significant relationship between AFSCQ and TMLC_AFSCQ ($\beta = 0.757$; $p<0.001$), AFSCQ and CF ($\beta = 0.797$; $p<0.001$), AFSCQ) and SM ($\beta = 0.574$; $p<0.001$), AFSCQ and SCIMIT ($\beta = 0.738$; $p<0.001$), AFSCQ and IM ($\beta = 0.822$; $p<0.001$). This proves that all five practices or constructs positively influence the Agri-fresh Food Supply Chain Quality (AFSCQ). Thereafter the multifactor cogeneric measurement model is build up to examine the relationship between AFSCQ, Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS). The AFSCQ positively influences the ECS ($\beta = 0.337$; $p<0.001$) and SOS (($\beta = 0.241$; $p<0.001$) of an organization in Indian context. The hypothesis testing result ($\beta = .055$; $P<0.5$) does not support the relationship concerning AFSCQ to ENS of an organization in Indian context. This indicates that Indian firms do not give priority to environmental sustainability, thereby supporting the idea of sustainability through AFSCQ. Although Indian industry which relates to agri-fresh food have started implementation of AFSCQ practices, i.e., TMLC_AFSCQ, CF, SM, SCIMIT and IM, on the other hand these AFSCQ practices need to be interpreted further in terms of better economic, social and environmental sustainability from the Indian perspective. The results of empirical investigation reveal that Indian agri-fresh food industries are aware about AFSCQ.

Later, three multiple case studies were taken for better understanding of AFSCQ practices and organizational sustainability in select Indian industries and to strengthen the findings of study. The sources of information are focus interviews with the concerned entity. Interviewees were asked to judge the feasibility and the measurability of suggested AFSCQ practices and the dimensions of organizational sustainability and also given the opportunity to suggest new practices and/or to reject the proposed practices and to provide suggestions for better ways to measure the suggested practices. At last, cross case comparison of multiple case studies was evaluated. From the cross comparison of the case companies, the manufactured food company XYZ is greatly dedicated to AFSCQ practices and organizational sustainability. While frozen food company ABC of agri-fresh food products have less attention on environmental sustainability.

It is believed here that this work will benefit both researchers and practitioners. The suggested conceptual framework for AFSCQ and organizational sustainability assuages aspiring researchers to examine reliability and validity in other settings in order to set up a advanced and comprehensible set of AFSCQ practices and dimensions of organizational sustainability so as to remove the discrepancies in theory of AFSCQ, if any.

The findings of the study also contribute towards several managerial implications for practitioners. There are numerous issues that remained unattended, hence openings for future research are advised.

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LIST OF ABBREVIATIONS

AFSCQ	Agri-fresh Food Supply Chain Quality
AGFI	Adjusted Goodness of Fit Indices
AMOS	Analysis of Moment Structures
ASV	Average Shared Variance
AVE	Average Variance Extracted
CF	Customer Focus
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Composite Reliability
DEMATEL	Decision Making Trial and Evaluation Laboratory
DF	Degree of Freedom
DSM	Downstream Side Management
ECS	Economic Sustainability
EFA	Exploratory Factor Analysis
ENS	Environmental Sustainability
GFI	Goodness of Fit Index
IM	Internal Management
ISM	Interpretive Structural Modelling
LM	Logistics Management
MCDM	Multi-Criteria Decision Making
MLE	Maximum Likelihood Estimation
MSV	Maximum Shared Variance
NFI	Normed Fit Index
OS	Organizational Sustainability
PCA	Principal Component Analysis
PFSCQ	Perishable Food Supply Chain Quality
PM	Process Management
RMR	Root Mean Square Residual
RMSEA	Root Mean Square Error of Approximation

SCIMIT	Supply Chain Integration Management using IT
SCM	Supply Chain Management
SEM	Structural Equation Modeling
SM	Supplier Management
SOS	Social Sustainability
SPSS	Statistical Package for Social Science
TMLC_AFSCQ	Top Management Leadership and Commitment to AFSCQ
USM	Upstream Side Management

CHAPTER 1

INTRODUCTION

1.1. Overview

As the contest intensified beyond a single organization into the supply chain; organizations, practitioners, consultants and academicians began to realize that it is inadequate, if their only consideration is to enhance performance through the in house practices in their own industry. Robinson and Malhotra, (2005), stated the struggle for marketplace advantages, the organizations have attempted to systematize and integrate supply chain concepts and practices into their business process. Li et al. (2006) also discussed, that development and execution of Supply Chain Management (SCM) practices can increase customer value to achieve competitive returns in the marketplace. SCM has been well-regarded as the most important inter-organizational practice for achieving competitive advantage, specifically for alliances and associations including suppliers and customers (Rungtusanatham et al., 2003; Janvier-James, 2012). SCM emphasizes on interdependence among the organizations, functioning collaboratively to attain efficiency in supply chain goings-on (Shin et al., 2000; Narasimhan and Kim, 2002). Fruitful design and execution of supply chain decreases cost, enhances flexibility, improves quality, and ensure customer satisfaction; hence, a beneficial way to sustain competitive advantage (Li et al., 2006). Thus, SCM becomes progressively more important.

The concept of SCM has grabbed the attention of academicians, scholars and business managers. A lot of organizations have commenced upon, recognizing that SCM is essential for sustainable competitive advantage of their products and services in the crowded marketplace. Despite of the importance of supply chains and their role in enhancing sustainable competitive advantage of the organizations, a little attention has been given to the quality issues in the supply chains. Latest product recalls and the vulnerability of supply chains to risk and disruption shows that quality issues have not been completely recognized across the supply chains (Zhang et al., 2011). However, at the organizational level, quality management is defined in terms of quality practices such as top management leadership and commitment to quality, customer focus, quality of

human resources and quality of information and information technology etc., our consideration about the quality practices at the supply chain level is still limited.

In the field of supply chain, quality plays a significant role. Kaynak and Hartley (2008) stated that the creation of quality- based culture could improve operational performance, customer satisfaction and financial performance etc., along with the supply chain partners. Setting up of quality based culture can improve sustainability such as economic, social and environmental sustainability along with the supply chain. A number of researchers have advised to integrate quality and supply chain. So it is required to have a more focused approach in assessing quality issues within the internal and external supply chain contexts. This calls for more research to focus on the concept of quality within supply chains known as supply chain quality, i.e. to move beyond the scope of an organization and address quality within a network of firms (Sitkin et al., 1994; Ross, 1998; Foster, 2008; Foster et al., 2011).

Supply chain quality is defined as the set of practices that emphasize on continuous process improvement among partners (firms) in the supply chain in order to enhance performance and achieve customer satisfaction through prominence in learning (Mellat-Parast, 2013). These definitions are limited to services and manufactured products with little attention being paid to perishable food products. Siddh et al. (2015) stated that perishable food products constitute a major part of the world economy and are the source of resources for many food industries. The cost of various food items as well as perishable food products has shown a serious increase across the world. Since 2004, research in the field of perishable food supply chain quality is increasing rapidly due to high potentiality that perishable food supply chain quality will acquire more consciousness in future. So there are ample research opportunities in the field of perishable food supply chain. Siddh et al. (2015) also examined that most of the research articles and their issues are from developed countries and less attention is being paid to research in developing countries. So researchers can directly pay their attention to perishable food supply chain quality issues in the developing countries in future. It has also depicted that research toward "agri-fresh" as fruits and vegetables are perishable products is dominant. Shukla and Jharkharia (2013) also stated that agri-fresh food produce include fruits, vegetables, etc. The supply chain quality of agri-fresh food products, herein after being referred to as Agri-fresh Food Supply Chain Quality (AFSCQ) includes the process and product quality from farm to delivery of the food products,

i.e. from farm to folk. While Agri-fresh Food Supply Chain Quality (AFSCQ) is distinct and peculiar in some aspects which makes the management of such supply chain typical and difficult. AFSCQ indicates a group of organized practices or exercises that stress upon advancement of continuous process improvement among supply chain stakeholders in order to enhance sustainable performance or organizational sustainability and protect shelf-life of the agri-fresh food product.

The AFSCQ is more complex as compared with the supply chain quality of non-perishable products due to short shelf life of the food products, food product safety and quality standards to be followed (Vorst and Beulens, 2002), high uncertainty in demand & cost and dependency on climatic conditions (Salin, 1998). Winter and Knemeyer (2013) focused on the integration of sustainability and supply chain quality. According to Han et al. (2013), the implementation of PFSCQ practices is not only about the inside practices, which are limited within an organization, but the outside practices as well, where cross organizational limits are integrating an organization with its suppliers and customers. Manzini et al. (2014) highlighted that interdependency of implications and decisions on food quality and environmental sustainability of supply chain processes and activities. Darkow et al. (2015) also examined the management of food supply chains in complex and volatile business environments, where the sustainability requirements of customers and legislations are increasing. Bisogno (2016) discussed that food supply chain advance the sustainability of interest in relation of money but also taking into consideration the social and environmental aspects. AFSCQ has a major impact on organizational sustainability as economic, social and environmental sustainability. Mahajan et al. (2017) also observed that limited research study has been conducted on food supply chain quality.

1.2. Need for study

Agri-fresh food products compose a significant position of the world economy as well as these are the supplies for various food processing industries. Aggarwal and srivastava (2016) also discussed that the food industry is the strength of the economy in the developing country. Inside agri-fresh food supply chains, raw food stuffs are transformed through packaging, distribution and related services. In this process, it is very important that not only product quality is ensured

but agri-fresh food supply chain quality (AFSCQ) is maintained as well. Siddh et al. (2015) also discussed that research towards agri-fresh food supply chain quality is dominant in the developing countries because of the agri-fresh food segment is perhaps a profitable venture of all farming activities as it provides ample employment opportunities and scopes to raise the income of the agricultural community. Bisogno (2016) stated that food supply chain advanced the sustainability of interest in relation of money but also taking into consideration the social and environmental aspects. AFSCQ has a significant impact on organizational sustainability throughout the practices along the entire supply chain that cover upstream side quality (Supplier management), internal quality or internal management (Process control or process management and logistics management) and downstream side quality (Customer focus) activities. Organizational sustainable performance or organizational sustainability covers economic, social and environmental sustainability. According to Han et al. (2013), the implementation of AFSCQ practices is not only about the inside or internal practices, which are limited within an organization, but the outside practices as well, where cross-organizational limits are integrating an organization with its suppliers and customers.

Conversely, for this successful supply chain integration, information plays a very important role (Bosona and Gebresenbet, 2011; Beulens et al., 2005; Louw et al., 2008; Sigala, M., 2007; Zhang and Aramyan, 2009). Insufficiency of information or monstrous information passed from one end of the supply chain to the other end can cause significant problems, including poor customer service, unnecessary inventory investment, lost revenues, ineffectual transportation, and inefficient production schedules. Therefore, supply chain integration using information technology is necessary to keep more macro regulation for quality integration in the complete supply chain network essentials to be fully considered in the supply chain quality studies.

Moreover, earlier studies were mainly focused on the direct relationships, and consequently there is an insufficiency of examining interactions among supply chain quality practices. According to Siddh et al. (2015), it is not comprehensive if a research framework or model does not show the relationship among supply chain quality practices. Henceforth there is a pressing requirement in advancing the field of AFSCQ on organizational sustainable performance or organizational sustainability. Meanwhile, earlier research frameworks or models do evaluate the relationship between supply chain quality practices and financial measures, but from a certain dimension of

organizational sustainable performance or organizational sustainability. Mahajan et al. (2017), also observed that limited research study has been conducted on food supply chain quality. In summary, the AFSCQ literature draws attention on adopting a balanced methodology, as well as using leading and lagging constructs in a coordinated way. Moreover, the adoption of critical organizational sustainability measures should be aligned with organizational top management goals.

From the above discussion, the research gaps are summarized as follows: (i) Lack of a research framework and a model covering upstream side, internal and downstream side activities of agri-fresh food supply chain to improve organizational sustainability. (ii) The role of information or information technology among supply chain quality practices has not been completely explored yet. (iii) The mutual interactions among supply chain quality practices have not been analyzed yet. (iv) Various dimensions of organizational sustainability have not been yet evaluated simultaneously.

It is expected that by addressing diversified aspects of supply chain quality practices as well as investigating the direct and indirect effects of AFSCQ practices on various organizational sustainable performance simultaneously, this study will provide a conceptual framework for theory building in AFSCQ practices and organizational sustainability.

This improved understanding of supply chain quality and the proposed conceptual framework will enable managers of agri-fresh food supply chain to strategically facilitate a dynamic exchange of resources to maintain and enhance supply chain quality so as to improve the overall yield of supply chain. This research highlights the importance of key practices of AFSCQ. Further research of AFSCQ practices and organizational sustainability is empirically established and validates their applicability in the select Indian industries.

1.3. Objectives of research

The objective of research in this thesis is to carry out an empirical study of Agri-fresh Food Supply Chain Quality (AFSCQ) in select Indian industries. So the formal research objectives pertaining to this thesis work can be stated as follows:

- Proposition of a conceptual model to study the relationship between AFSCQ practices and various dimensions of organizational sustainability.

- An empirical investigation of proposed conceptual model to study the relationship between AFSCQ practices and organizational sustainability in select Indian industries.

- Validating the results of empirical investigation using case study approach in select Indian industries.

It will be achieved by carrying out the following: First, AFSCQ practices and various dimensions of organizational sustainability were identified, based upon structured literature review. It involves selection of a representative sample of articles followed by classification of research articles on the basis of content of AFSCQ such as AFSCQ practices and various dimensions of organizational sustainability as economic, social and environmental sustainability. Based on them, the measurement scales of organizational sustainability were designed. In the next stage, structured interviews of academicians with practiced experience in this area had been conducted. These conversations were documented and examined before performing some advancement in the research frameworks or models. Q-sort method was then employed to evaluate conformity of the research models. In this practice, some senior managers were requested to review the research models in order to enhance their overall quality. Based upon the opinion of these experts, research conceptions were modified, and then, the official research model was proposed to investigate the relationship between AFSCQ practices and organizational sustainability. An empirical investigation involves checking of reliability and validity for AFSCQ structural model in select Indian industries. Results from the empirical analysis, give evince to strengthen the relationship between AFSCQ practices and organizational sustainability. Afterwards, for validating the results of empirical investigation using case study approach in select Indian industries.

1.4. Organization of the thesis

The thesis is organized into six chapters. Chapter 2 covers a structured literature review of existing literature on Agri-fresh Food Supply Chain Quality (AFSCQ) over a period of 23 years. The purpose is to identify the existing state of work, gaps in current research, and future

directions in the field of AFSCQ. Chapter 3 takes in consideration the integration of quality and agri-fresh food supply chain that remains inadequate in the literature and lays down the foundation of a comprehensive framework for managing AFSCQ or presents the conceptual model of agri-fresh food supply chain quality (AFSCQ) to improve organizational sustainability. In Chapter 4, an empirical investigation of AFSCQ and organizational sustainability in select Indian industries is carried out. Description of the case studies, developed for validation of empirical results in Chapter 5. The summary of the work done, managerial implications, and scope for future work is presented is in Chapter 6.

1.5. Conclusion

This chapter presents the overview of the Agri-fresh Food Supply Chain Quality (AFSCQ) followed by organizational sustainability, i.e. economic, social and environmental sustainability. Also, this chapter provides definition of AFSCQ, the need of AFSCQ in Indian agri-fresh food industry and the objectives of the research. Organization of the thesis is presented at the end of the chapter. The detailed literature review will be discussed in the next chapter.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

The agri-fresh food segment is perhaps a profitable venture of all farming activities as it provides ample employment opportunities and scopes to raise the income of the agricultural community. In the last decade, there were dramatic changes in the supply chain of agri-fresh products. Agri-fresh food products compose a significant position of the world economy as well as they are the supplies for various food processing industries. Inside agri-fresh food supply chains, raw food stuffs are transformed through packaging, distribution and related services. In this process, it is very important that not only the product quality is ensured but the supply chain quality should be maintained as well. The supply chain quality is defined as a set of practices that emphasize on continuous process improvement among partners (firms) in the supply chain, in order to enhance performance and achieve customer satisfaction through prominence in learning (Mellat-Parast, 2013). The Agri-fresh Food Supply Chain Quality (AFSCQ) is distinct and peculiar in some aspects which make the management of such supply chain typical and difficult. In order to review these characteristics of the AFSCQ, a review is carried out in this chapter. AFSCQ indicates a group of organized practices or exercises that stress upon advancement of continuous process improvement among supply chain stakeholders in order to enhance sustainable performance and protect shelf-life of a product.

The AFSCQ is more complex as compared with the supply chain quality of non-perishable products due to short shelf-life of the product, food product safety and quality standards to be followed (Van der Vorst and Beulens, 2002), high uncertainty in demand and cost and dependency on climatic conditions (Salin, 1998). Cheng et al. (2014) discussed the effectiveness of supply and demand information visibility of perishable food supply chain trading. Zhong et al. (2013) proposed an RFID-enabled real-time advanced production planning and scheduling shell to coordinate different decision makers across production processes. Tanik (2010) emphasized on the advantages of using systematic quality enhancement tools in each element of the supply chain in food production. Aramyan et al. (2013) analyzed the adoption of an animal welfare valuation system in European agri-food supply chains for enhancement of supply chain quality.

In recent years, supply chain quality practices and their significance to management practices have received more attention (Mellat-Parast, 2013).

A review concisely illustrates the literature. Soni and Kodali (2011) and Rowley and Slack (2004) explained that the literature review is significant to:

- Identify the research area(s) and research questions;
- Find the literature to which the research work will mark an influence;
- Understand and in build theoretical concepts and terminology;
- Make possible listing of the resources that have been referred; and
- Highlight research approaches that might be beneficial.

This review builds upon articles focused on issues of AFSCQ to offer recommendations for further studies. Some of the prominent studies in AFSCQ, for example, by Perez et al. (2009) highlighted the complexity involved in the perishable supply chain to obtain the quality of pork products. Ahumada and Villalobos (2009) focused on the application of planning models in the agri-food supply chain. The main contributions of this review were in the field of production, distribution, and planning for agri-food. Raab et al. (2011) highlighted the literature review and novel temperature monitoring systems and its challenges, and the professional experience was applied to system designers of temperature monitoring in the supply chain. The role of the supplier is crucial in the supply chain (Yadav and Sharma, 2015a) and it becomes more crucial in case of the food supply chain. Therefore, an appropriate supplier selection process is a necessity (Yadav and Sharma, 2015b).

Manning (2013b) conducted a literature review focused on corporate and consumer social responsibilities in the food supply chain. Bosona and Gebresenbet (2013) conducted a comprehensive literature review on the food traceability system which embraces the definitions, drivers, benefits, barriers, technologies, improvement and performance of the food traceability system. Dües et al. (2013) focused on the relationship and links among Lean and Green supply chain management practices. Shukla and Jharkharia (2013) studied the literature on the fresh produce supply chain management. This review was done systematically by collecting the

existing facts and classifying it from difficulty context, methodology, and the product. Furthermore, the review was also classified according to the year of publication and geographic region. Siddh et al. (2015) presented a complete review on the quality of the perishable food supply chain which highlighted that information management, strategic management, logistic management, sustainability, demand forecasting and supply chain integration are some of the critical issues. Kamalahmadi and Parast (2016) focused on research development in supply chain resilience which embraces the enterprise and supply chain resilience definitions, supply chain resilience principles, and supply chain resilience strategies. Yu et al. (2016) presented a literature review on E-commerce logistics in supply chain management from the view of practice perspective. Global implementations and consistent models together with supportive techniques are studied in this chapter. Zhong et al. (2016) focused on big data for supply chain management in the service and manufacturing areas: challenges, openings, and future perceptions. It can be concluded from the analysis of above papers that none of the literature review articles in the recent past reviewed literature on AFSCQ.

Hence, this chapter is aimed at finding present status of literature on AFSCQ and suggestions for further research in this area. This literature review is aimed at answering following research questions:

RQ1. How is the field of AFSCQ evolving over the past years?

RQ2. How much importance is given to research on AFSCQ across countries?

RQ3. What is the prevalence of empirical research in the field of AFSCQ?

The replies to above queries are valuable in tracing the development of research in the field of AFSCQ through the world as far as the research is concerned. Now in order to find out prevalent tools of research in AFSCQ, following query arises:

RQ4. What type of research tools are being used by researchers in the area of AFSCQ?

The reply to this query is valuable to know the research tools and it will also help in finding out the type of problems, type of tools addressed in the field of AFSCQ:

RQ5. What types of product quality problems or issues arise in AFSCQ?

RQ6. What is the significance of performance measurement in AFSCQ?

The answers to these queries are very significant; the reason being, the issue of product quality besides performance measurement reflects the operational effectiveness concerning AFSCQ to a larger extent:

RQ7. What are the gaps and scope of future research in the field of AFSCQ?

The answer to this question is very useful in finding the gap and future scope in the field of AFSCQ.

The structure of this review is as follows: Section 2 shows the methodology for the literature review. Section 3 shows discussion for managing AFSCQ. While Section 4 presents the implications for further research. And finally, the review is concluded in Section 5.

2.2. Methodology

This review consists of a six-step research approach. The first step is the time period (1994 to mid-2016) the year 1994 is taken as the starting point of article collection because the word "supply chain quality" initially appeared in this year itself. The second step is to collect research publications, the publications were selected from management science publishers such as Emerald Online, Taylor & Francis, Wiley Interscience (earlier Blackwell Synergy) and Science Direct. The third step is the selection of research publication from the database using various search keywords such as supply chain quality, agri-food, agri-fresh, agri-food supply chain, food supply chain, vegetable supply chain, fruit supply chain, agri-fresh food supply chain, and perishable food supply chain. The Fourth step is separation or sorting of publications to remove duplication of articles and then analyzing the filtered articles. In the last step, selected articles are classified under several categories: number of research publication per year, journal-wise articles classification, number of studies across countries, empirical research growth in AFSCQ, performance measurement, categorization based on tools utilized or data analysis methods, and classification based on supply chain quality issues. These steps are explained as follows:

Step 1: Time Horizon (1994 to mid-2016) – The evaluation period of research publications is between 1994 and mid-2016 because the word "Food supply chain" initially appeared in 1994 (Taylor, 1994). Mid-2016 is taken as a terminating point of research publications collection.

Step 2: Collection of research publications – Research publications were selected from the major management science publishers. These are: Science Direct, Emerald Online, Taylor & Francis, and Wiley Interscience. These databases have the majority of well-referred journals. Soni and Kodali (2012) also used these management science publishers for a detailed literature review of empirical study approach in supply chain management.

Step 3: Search keywords for research publications selection – The search keywords for research publications selection from four databases are supply chain quality, agri-food, agri-fresh, agri-food supply chain, food supply chain, fruit supply chain, vegetable supply chain, agri-fresh food supply chain, and perishable food supply chain. In total, 1,562 articles were found by using the above keywords.

Step 4: Sorting of research publications – Research publications were shortlisted on the following basis:

Eliminating duplicated publications – Here, repeated publications were separated from all the downloaded publications.

Picking only relevant publications – In this step, the sample size was reduced to make a representative sample set for which following policy was used. The research publication should, at least, be concerned with agri-fresh food, quality of agri-fresh food supply chain, supply chain quality, agri-fresh food, food product quality or supply chain quality. Research publications focusing on agri-fresh produce and publications addressing the food product quality and supply chain quality issues were studied.

At last 142 publications were filtered from the aforesaid downloaded publications.

Step 5: Research publication categorization – Here, publications are organized in subsequent classes:

The number of research publications each year: This one shows the yearly publications rate or trend of AFSCQ literature throughout the period of 23 years.

Journal-wise classification of research publications: It presents the journal-wise classification of publications.

Country-wise classification of research publications: It presents the classification of research studies according to country. The countries are categorized into developed and developing. The research studies or findings which are not specific to any particular country are considered in common studies.

The number of empirical studies each year: It presents the yearly growth of empirical research study in the AFSCQ literature. It is an indicator of the growing importance of empirical studies per year.

Tool utilized or data analysis methods: It shows the details of tool utilized or data evaluation or analysis methods. The tool utilized depends on the research purpose or problem itself and the type of data available.

Supply chain quality issues: Supply chain quality issues are one of the important categorizations in the AFSCQ literature. Reviewing these issues will generate generic constructs governing AFSCQ as well as help researchers in better understanding of the subject.

Performance measurement: The measurement of performance is vital at every part of the supply chain and consequently well-timed action can be taken. In this chapter, it has been investigated that the performance measures are implemented at which level of supply chain and what entities are involved in the same.

2.3. Result and analysis of AFSCQ literature

All the papers in the field of AFSCQ are presented in Table 2.1. This table classifies the publications with respect to country of research, research design and discusses their contribution to research.

Table 2.1: Classification of AFSCQ publications

Researchers	Country	Research design	Contribution to research
Taylor (1994)	Russia	Case study	Improvement major strategic and operational of food supply logistics
Shaw and Gibbs (1995)	UK	Multiple case study	Implications of closer supply chain relation-ships for industry profitability
Wilson (1996)	UK	Focus group	Discussing the supply chain management theory significance to the fresh produce distribution and marketing
Hughes and Merton (1996)	UK	Case study	Looks at how supermarket chains are responding (retailers are starting to focus on building longer-term relationships with key suppliers.)
Soucie (1997)	Multiple	Focus group	Reduce the cost of delivering food products to the consumer
Calza and Passaro (1997)	Italy	Case study	EDI network and logistics management
Loader (1997)	UK	Conceptual Framework	Evaluating transaction costs to illustrate supply chain relationships
Folkerts and Koehorst (1997)	The Netherlands	Case study	Vertical co-ordination for the competitive position of the European agribusiness
Salin (1998)	USA	Focus group	Competitive advantages to agri-food firms
Vorst et al. (1998)	The Netherlands	Case study	Improving performance by reducing uncertainty in food chain
Kennett et al. (1998)	UK	Case study	Observes bread wheat quality and its influence on vertical co-ordination in the wheat supply chain
Rademakers and McKnight (1998)	The Netherlands	Case study	Concentration and inter-firm co-operation within the supply chain
Collins et al. (1999)	Ireland	Multiple case study	Use of a particular form of consolidation results in the imposition of costs
Shaw and Gibbs (1999)	UK	Case study	Study of buying behavior by small retailers of fruit, vegetables
Fearne and Hughes (1999)	UK	Case study	Success factors in the fresh produce supply chain

Researchers	Country	Research design	Contribution to research
Hobbs and Young (2000)	USA	Case study	Introduce a conceptual framework in lieu of vertical co-ordination in the supply chain of agri-food
Blundel and Hingley (2001)	UK	Case study	Insights into the growth of small and medium-sized enterprises (SMEs) engaged in vertical inter-firm relationships
Larson and Gammelgaard (2001)	Multiple	Survey	Validates categorizations of logistics firms
Sporleder and Goldsmith (2001)	Multiple	Theoretical framework	Firm Strategies for Signaling Quality
Hingley (2001)	UK	Multiple case study	Relationship marketing in the food industry
Beverland (2001)	New Zealand	Case study	Creating value through brands
Heiman et al. (2001)	Multiple	Mathematical modeling	Reducing uncertainties of exported fruits and Vegetables
Van der Vorst et al. (2002)	The Netherlands	Case study	Classifications and developments of e-business in food supply chains
Le Heron (2003)	New Zealand	Theoretical framework	Scoped food governance issues
Cadilhon et al. (2003)	Vietnam	Survey	Presents a conceptual framework for the analysis of vegetable supply chains and the role wholesale markets
Salin and Nayga (2003)	USA	Case study	Investigates the business relations in the cold chain
Cante et al. (2004)	USA	Survey	Strategic alliances and expressing penetration, kinds of alliances, business profits, and probable rates or prices
Henson and Reardon (2005)	Multiple	Review	Brief introduction to the evolution and nature of private food safety and quality standards
Ilbery and Maye (2005)	Scotland	Survey	Food supply chains and sustainability
Hingley (2005)	UK	Theoretical framework	Issue of power in business-to-business relationships
Bourlakis and Bourlakis (2005)	UK	Theoretical framework	Propose a relationship framework between the logistics asset buyer and the logistics asset supplier

Researchers	Country	Research design	Contribution to research
Cadilhon et al. (2005)	Vietnam	Case study	Express that collaborative commerce is not limited to trade in brand-named products
Sachan et al. (2005)	India	Case study	Developing Indian grain supply chain cost model
Digal (2005)	Philippines	Case study	Examines the role of quality grades or standards in the supply chain
Cadilhon et al. (2006)	Vietnam	Survey	Describes the development of vegetable marketing
Vasileiou and Morris (2006)	UK	Case study	Comparative significance of economic, social and environmental aspects as they effect decision management
Jedermann et al. (2006)	Germany	Case study	Tracing and tracking systems for food transports
Sohal and perry (2006)	Australia	Survey	Recognizes the business environment aspects underpinning the cereal food products supply chain effectiveness
Taylor (2006)	UK	Case study	How demand management processes could be improved in agri-food supply chains
Custódio and Oliveira (2006)	Portugal	Focus group	Integrating inventory management and vehicle routes design
Hingley et al. (2006)	UK	Case study, Survey	Supplier-retailer relationships in the UK fresh produce supply chain
Pingali (2007)	Itlay	Theoretical framework	Determinants and trends in the diversification and Westernization of Asian diets
Beckeman and Skjöldebrand (2007)	Sweden	Case study	Major innovations and changes since 1945 in the food sector
Shu et al. (2007)	Multiple	Theoretical framework	Effective e-commerce system in agriculture
Holt et al. (2007)	Europe (Region)	Delphi study	Focus on extremely topical problem of food origin
Aramyan et al. (2007)	The Netherlands	Case study	Measuring performance of the tomato supply chain
Matopoulos et al. (2007)	Greece	Case study	Provide a conceptual framework for supply chain collaboration
Duan et al. (2007)	UK	Case study, Survey	A VEGNET Approach for Accelerating internet adoption

Researchers	Country	Research design	Contribution to research
Lu et al. (2008)	China	Case study, Survey	How individual relations as well as trust among farmers and purchasers influence transaction costs
Hingley et al. (2008)	Multiple	Case study	New product procurement, innovation, and differentiation policies carried out by retailers at the global level
Trienekens et al. (2008)	The Netherlands	Conceptual framework	Build a framework to evaluate innovation and performance in food chains
Mikkola (2008)	Finland	Multiple case study	Analyze dyadic empirical relations within food supply chains
Louw et al. (2008)	South Africa	Case study	Illustrates how integration of small-scale farmers into the urban retail market can be facilitated
Vermeulen et al. (2008)	South Africa	Multiple case study, Survey	Structures and issues of raw commodity procurement in South African agribusiness supply chains
Pretty et al. (2008)	Multiple	Focus group	Sustainable supply of crops by reporting on selected sustainability indicators for the crops
Stringer et al. (2009)	China	Case study	Examines how different supply chain characteristics impose different coordination costs on vegetable processors
Minten et al. (2009)	Madagascar	Case study	Impact of supermarkets on small contract farmers in Madagascar
Alfaro and Rábade (2009)	Spain	Case study	Show that traceability can become much more than just a way to guarantee food safety
Maertens and Swinnen (2009)	Belgium	Survey	Quantifies income and poverty effects of high-standards trade
Chiffoleau (2009)	UK	Case study	Series of quantitative and longitudinal network analyses in different systems of direct selling
Blackburn and Scudder (2009)	USA	Case study	Examines supply chain design strategies for a specific type of perishable product
Bevilacqua et al. (2009)	Italy	Case study	Develop business process reengineering for a supply chain
Narrod et al. (2009)	Multiple	Focus group	Demands for food safety from export markets in Kenya and India

Researchers	Country	Research design	Contribution to research
Van Hoi et al. (2009)	The Netherlands	Case study	Market governance in food safety
Aramyan et al. (2009)	The Netherlands	Survey	Understand the perceived impact of different QAS requirements on the performance of the tomato supply chain
Mergenthaler et al. (2009)	Vietnam	Survey	Quality assurance programs affect international market access for horticultural processing firms in developing countries
Barling et al. (2009)	UK	Theoretical framework	Examines the traceability systems that have emerged in the wheat to bread supply in the UK
Manikas and Terry (2009)	UK	Case study	Identify the nature and magnitude of the main logistical problems (assessment of the operational performance of a multiple fresh produce distribution centre in the UK)
Moustier et al. (2010)	Vietnam	Case study	Investigates whether farmer organizations are able to help small-scale farmers obtain access to supermarkets
Thakur and Donnelly (2010)	Multiple	Case study, Survey	Presented some suitable technologies for electronic information exchange within the food supply chains
Hingley et al. (2010)	UK	Focus group	Investigates supply chains and networks that attempt to meet market demand for "specialist" fresh produce
Jan Hofstede et al. (2010)	The Netherlands	Case study	Introduces a simulation gaming environment for enacting a production network
Amador and Emond (2010)	USA	Multiple case study	Sensor readability and thermal relevance for RFID temperature tracking
Nganje et al. (2010)	Multiple	Case study	Food safety policies in vegetable preparation and consumption
Canavari et al. (2010)	Italy	Case study	Focus on traceability as part of information management in the fruit supply chains
Jan Hofstede et al. (2010)	Multiple	Survey	Develop a hierarchical typology of trust elements for business-to-business trade among European companies

Researchers	Country	Research design	Contribution to research
Magnan (2011)	Canada	Theoretical framework	Traces the creative reconstitution of the Canada-UK commodity chain for wheat bread
Petit et al. (2011)	France	Survey	Analyses " isolation distances " between major roads and fields farmed under contract
Gorton et al. (2011)	Multiple	Survey	Implementation and enforcement of public and private environmental regulation in the Serbian fresh fruit and vegetable sector
Thakur et al. (2011)	USA	Case study	Data management in food supply chains to facilitate product traceability
Paksoy et al. (2012)	Turkey	Case study	Fuzzy sets to integrate the supply chain network
de Castro Souza and Amato Neto (2012)	Multiple	Multiple case study	Characterize the transactions between European buyers and producers
Santa et al. (2012)	Spain	Theoretical framework	Proposing a telemetric platform of an integral nature, enhancing tracking and tracing capabilities for vehicles and goods
Srimanee and Routray (2012)	Thailand	Case study	Study the marketing chains of fresh fruit and Vegetables
Iliopoulos et al. (2012)	Multiple	Panel study	Focus on consumer-driven and responsive fruit supply chains
Demirta ş and Tuzkaya (2012)	Turkey	Focus group	Layout of the distribution center is investigated as strategically and recommendation ns are made for the model
Zhang and Li (2012)	China	Focus group	Study the application strategies of RFID based on benefit and safety degree
Bao et al. (2012)	China	Focus group	Proposed strategy of supply chain management basing on E-commerce service platform for fruits and vegetables
Zanoni and Zavanella (2012)	USA	Case study	Decision strategies for sustainable food supply Chains
NicolaasBezuidenhout et al. (2012)	South Africa	Multiple case study	Explain the complexity of collaboration in a diverse multi-stakeholder production in addition to processing environment
Lehtinen (2012)	Finland	Action research	Sustainability as a concept supports the use of locally sourced food in public catering

Researchers	Country	Research design	Contribution to research
Sivakumar and Wall (2013)	Multiple	Case study	To retain overall papaya fruit quality and to reduce postharvest losses during the supply chain
Shukla and Jharkharia (2013)	India	Review	Reviewing major operational issues responsible for post-harvest waste
Louw et al. (2013)	South Africa	Case study	Identify the factors that restrict the development of agro-processing in the small wheat-milling and baking industries
Ji et al. (2013)	UK	Experimental case study	Novel digital imaging methodology that could be used by the fresh produce industry to estimate the ripening stages of bananas
Zhang and Pan (2013)	Multiple	Case study	Transformation of urban vegetable retail in China
Manning (2013a)	UK	Case study	Develop a new model for the activities of knowledge exchange and the diffusion of innovation with specific on agriculture
Hu et al. (2013)	Multiple	Case study	Traceability system modeling and implementation
Banterle et al. (2013)	Multiple (Italy and Germany)	Case study	To analyze the spread of labeled environmental certification in food products
Clasadonte et al. (2013)	USA	Case study	To reduce risk with regards to bad weather, to optimize the combination of soil and crop, and to realize economies of scale
Jraisat and Sawalha (2013)	Jordan	Case study	Explore the factors of quality control among key members of a supply chain and investigate the effect on supply chain
Kirezieva et al. (2013)	Multiple	Focus group	Assessment of food safety management systems
Baghalian et al. (2013)	Multiple	Mathematical modeling, Case study	Developed a stochastic mathematical formulation for designing a network of multi-product supply chains
Liang et al. (2013)	Multiple	Case study	Implementing a prospective grain traceability system to the bulk grain delivery system

Researchers	Country	Research design	Contribution to research
Aubry and Kebir (2013)	France	Case study, Survey	Development of short supply food chains is a noteworthy phenomenon in Europe
Cai et al. (2013)	Multiple	Mathematical modeling	To address the supply chain management problem of a fresh product that involves along distance transportation
Jack et al. (2014)	UK	Survey	Focused on product, service and process innovation
Roggeveen (2014)	Australia	Case study	Greenhouse-grown tomatoes from Australian farms to fruit shops in Sydney, Australia
Del Borghi et al. (2014)	Italy	Case study	An evaluation of environmental sustainability
Van Asselt et al. (2014)	The Netherlands	Case study	Evaluating the sustainability of agri-food production
Lamprinopoulou et al. (2014)	Multiple	Survey	Agricultural innovation
Reardon and Timmer (2014)	Multiple	Review	Food security implications
Soussana (2014)	France	Theoretical framework	Sustainable agri-food systems and life cycle Assessment
Escanciano and Santos-Vijande (2014)	Spain	Survey	Implementing an ISO 22,000 food safety management
Tsolakis et al. (2014)	Greece	Hierarchical decision-making framework	Provide a comprehensive hierarchical decision-making framework and a critical taxonomy
Thomopoulos et al. (2015)	France	Mathematical modeling	Decision support for agri-food chains
Lockie et al. (2015)	Philippine	Theoretical framework	Social and environmental responsibility embodied in private standards and actual practices of regulation
Morganti and Gonzalez-Feliu (2015)	Italy	Case study	City logistics for perishable products
Siddh et al. (2015)	India	Review	Perishable food supply chain quality
Kalia and Parshad (2015)	India	Case study	Novel trends to revolutionize, preservation and packaging of fruits/fruit products
Cai and Ma (2015)	China	Survey	Examine the impact of trust and transaction costs on farmers' contract enforcement choices

Researchers	Country	Research design	Contribution to research
Li et al. (2015)	China	Review	Edible agro-products quality and safety
Zhou et al. (2015)	China	Survey	Food safety control methods through various governance arrangements
Ding et al. (2015)	China	Survey	Ensuring food safety
Handayati et al. (2015)	Indonesia	Case study	Value co-creation in agri-chains network
Akhtar and Khan (2015)	UK	Survey	Understand the multiple dimensions of performance and their linkages
Macfadyen et al. (2015)	Multiple	Theoretical framework	Improving resilience in global food supply
Clark et al. (2015)	USA	Review	Agri-food system policy development
Higgins et al. (2015)	Australia	Theoretical framework	Reduce greenhouse gas emissions
Zhong et al. (2015)	China	Survey	Information sharing strategies among farmers and vendors
Hou et al. (2015)	Italy	Case study	Addresses the issue of international food supply chain organization faced to face to food safety and standard
Fountas et al. (2015)	Multiple	Conceptual framework	Farm management information systems
Wang et al. (2015)	China	Review	Time-temperature indicators as quality monitors in food packaging
Lee et al. (2015)	Korea	Review	Active and intelligent food packaging
Gallardo et al. (2015)	USA	Empirical	Valuation that individual market intermediaries
Aggarwal and Srivastava (2016)	India	Case study	Grounded view of collaboration in Indian agri-food supply chains
Ali (2016)	India	Survey	Concerning adoption of innovative agricultural practices
Kusumastuti et al. (2016)	Multiple	Review	Crop-related harvesting and processing planning
Suryaningrat (2016)	Indonesia	Survey	Raw Material Procurement
Bisogno (2016)	Italy	Case study	Corporate social responsibility
Park et al. (2016)	USA	Empirical	Ecologically based life cycle assessment
Manning and Soon (2016)	UK	Review	Sustainability indicator scoring in favor of the food supply chain

Researchers	Country	Research design	Contribution to research
Niemi and Pekkanen (2016)	Finland	Survey	Assessing the business potential in a local supply chain of food
Giampietri et al., (2016)	Italy	Survey	Investigating consumers' behaviour in the direction of short supply chains of food
Zhang et al. (2016)	China	Survey	Factors influencing the food firm's plan to manage quality
Djekic et al. (2016)	Serbia	Structured research	Improving the supply chain of confectionery industry by means of second party audits
Sharif and Irani (2016)	UK	Review	Discussed perspectives of people, process and policy on food safety
Irani and Sharif (2016)	UK	Exploratory review	Discussed about sustainable food security
Richter and Bokelmann (2016)	Germany	Survey	Focusing the concern of food losses
Bernstad Saraiva et al. (2016)	Multiple	LCA technique	Comparative lifecycle assessment of packaging
Kumar et al. (2016)	India	Statistical analysis	Discussed about losses at numerous phases of supply chain
Balaji and Arshinder (2016)	India	Fuzzy MICMAC and TISM	Modeling the reasons of wastage in food supply chain
Soto-Silva et al. (2016)	Spain	Review	Discussed about models of operational research
Faisal and Talib, (2016)	Multiple	ISM	Instigating the traceability in food-supply chains
La Scalia et al. (2017)	Italy	Shelf life model	Innovative shelf life model based on smart logistic
Routroy and Behera (2017)	India	Review	Discussed about demand forecasting, inventory policy, as well as integration
Nyamah et al. (2017)	China	Surey	Differentiating risk thresholds in food supply chain.
Akhtar et al. (2017)	UK	Survey	Discussed about effectiveness of supply chain coordination wrt leadership.
Cagliano et al.(2017)	Italy	System Dynamics model	Supply chain management of E-grocery assisted by mobile tools
Zhong et al. (2017)	Multiple	Review	Reviewed food supply chain management

Researchers	Country	Research design	Contribution to research
Uddin N (2017)	Bangladesh	Case study	Discussed about higher coordination as well as integration
Liljestrand K. (2017)	Sweden	Multiple case study	Study about logistics management to reduce wastag
MacKenzie and Apte, (2017)	USA	Mathematical model	Enumerate the advantages of diverse disruption-management strategies.
Nakandala et al., (2017)	Australia	Review	Reviewed food supply chain information integration from an all-inclusive outlook.
Martindale and Schiebel (2017)	Multiple	Survey	Developed sustainable meal options.
Sgarbossa and Russo (2017)	Italy	Case study	Developed proactive model in sustainable food supply chain
Bibi et al. (2017)	France	Review	Discussed about tracking in addition to monitoring of food product
Adenle et al. (2017)	Multiple	Review & Case study	Discussed about pathway to sustainable economic growth
Sun et al. (2017)	Multiple	Reiew	Reviewed relationship concerning air pollution as well as food security
Thomas-Francois et al. 2017	Canada	Review	Building up relationships of farmers–hotel supply chain
Mercier et al. 2017	Multiple	Review	Reviewed literature on preservation and transportation of foods
Lau et al. 2018	Australia	MCDM techniques	Builds business process decision model aimed at evaluation of fresh-food supplier
Elghannam et al. 2018	Multiple	Survey	Exposed novel openings for food businesses all around the world
Yan et al. 2018	China	Mathematical model	Established method of effective risk assessment
Chaudhuri et al. 2018	Multiple	Review	Discussed about logistics decision-making
Chauhan et al. 2018	India	ISM	Recognized of sustainable management drivers
Jakhar and Srivastava (2018)	India	Fuzzy AHP	Recognized and rank the drivers, enablers as well as resistors of logistics developments
Zhou, et al. 2018	China	Mathematical modeling	Presented the option contract into supply chain of fresh agri-food

Researchers	Country	Research design	Contribution to research
Prakash, G. 2018	India	Review	Identified the food supply chain's meaning as well as operationalization
Rakesh and Gardas (2018)	India	ISM	Post-harvesting losses during transportation
Naik and Suresh (2018)	India	Mathematical modeling, Case study	Invented sustainable agri-food chains.
Mangla et al. (2018)	UK	ISM – fuzzy, DEMATEL, Case study	Employed sustainable inventiveness
Galvez (2018)	Spain	Review	Look at the blockchain technology potential
Mercier et al. (2018)	Canada	Review	Discussed about the performance of cold chain
Badia-Melis et al. (2018)	Multiple	Review	Novel looks in cold chain monitoring
Bustos and Moors, 2018	The Netherlands	Multiple case study	Reduced losses of post-harvest food by ways of inventive collaboration
El Bilali, and Allahyari, 2018	Multiple	Review	Look at the influence of information as well as communication technologies in the direction of sustainability
Dellino, et al. 2018	Italy	Mathematical modelling	Suggested a decision support system for food supply chain of extremely perishable products

2.3.1. Categorization based on number of research publications each year

This one represents yearly research publication frequencies of the total research publications. It is evident from Figure 2.1 that research in the field of AFSCQ is continuously growing. Furthermore, there has been a rapid rise in the number of publications since year 2005, and it may be due to the comprehensive issues that raised the awareness of practitioners and researchers in the field of AFSCQ.

It is evident from Figure 2.1 that the yearly publications were raised recently as more than half of the total publications were published in the last five years.

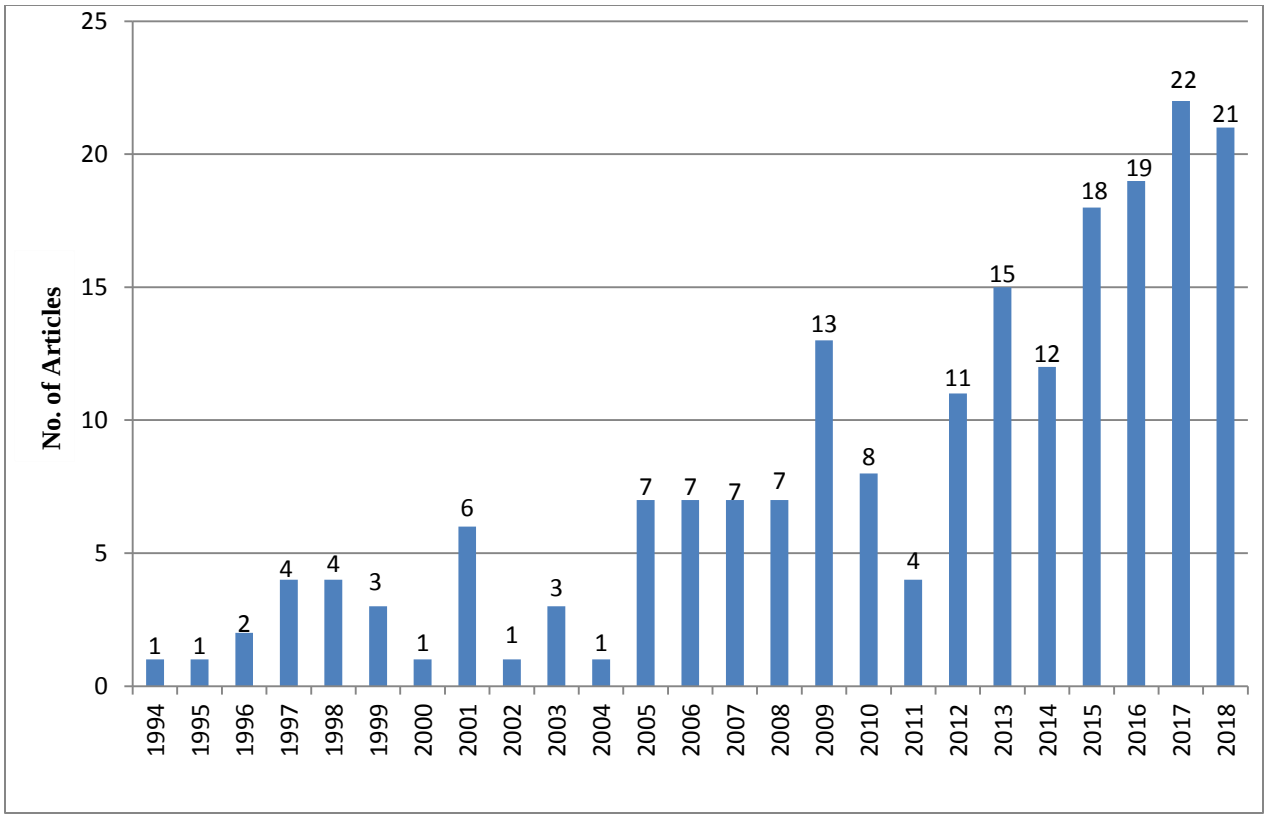


Figure 2.1 Year-wise distribution of research publications

2.3.2. Journal-wise classification of research publications

This classification presents the frequency of publications in journals. Figure 2.2 shows the distribution of research publications on the basis of journals.

These journals particularly deal in the operations management, though the problem may be specific to AFSCQ. In total, 142 articles were found addressing the AFSCQ problems from the context of operations management. This shows that significant amount of research publications were written in context of operations management.

One more aspect perceived from Figure 2.2 is that maximum research publications are from Supply Chain Management: An International Journal (18 research publications, 12.67 percent), British Food Journal (17 research publications, 12 percent), Food Policy (five research publications, 3.52 percentage), and Computers and Electronics in Agriculture (five research publications, 3.52 percent).

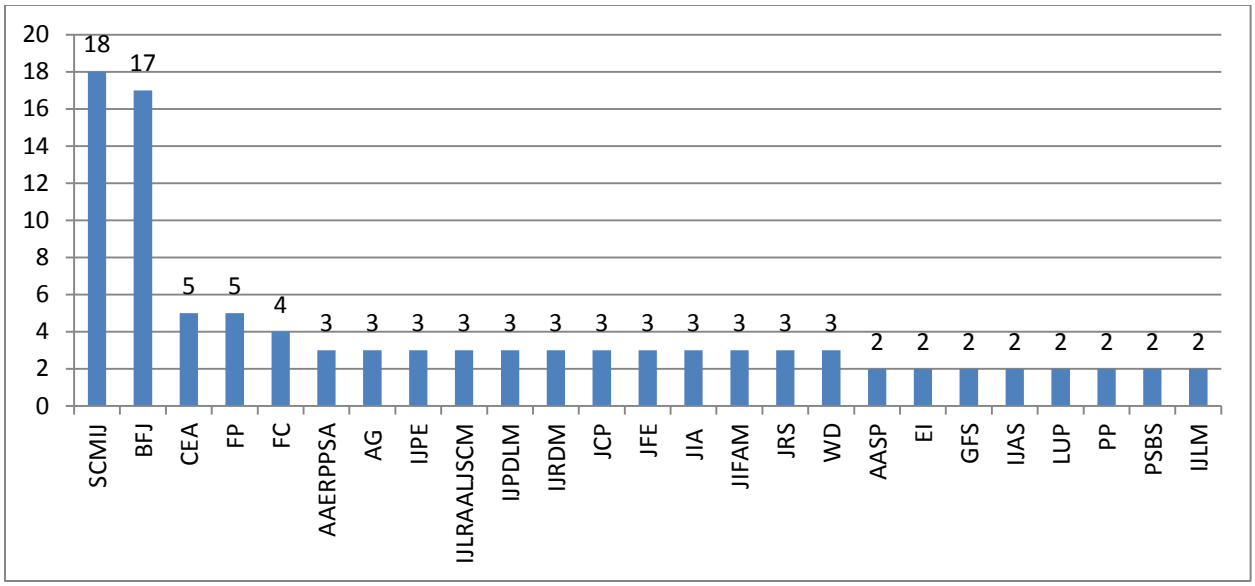


Figure 2.2 Distribution of research papers across journals

Notes: SCMIJ, Supply Chain Management : An International Journal; BFJ, British Food Journal; CEA, Computers and Electronics in Agriculture; FP, Food Policy; FC, Food Control; AAERPPSA, Agrekon : Agricultural Economics Research, Policy and Practice in Southern Africa; AG, Agribusiness; IJPE, International Journal of Production Economics; IJLRAALJSCM, International Journal of Logistics Research and Applications: A Leading Journal of Supply Chain Management; IJPDLM, International Journal of Physical Distribution & Logistics Management; IJRDM, International Journal of Retail & Distribution Management; JCP , Journal of Cleaner Production; JFE, Journal of Food Engineering; JIA, Journal of Integrative Agriculture; JIFAM, Journal of International Food & Agribusiness Marketing; JRS, Journal of Rural Studies; WD, World Development; AASP, Agriculture and Agricultural Science Procedia; EI, Ecological Indicators; GFS, Global Food Security; IJAS, International Journal of Agricultural Sustainability; LUP, Land Use Policy; PP, Physics Procedia; PSBS, Procedia – Social and Behavioral Sciences; IJLM, The International Journal of Logistics Management

2.3.3. Country-wise classification of research publications

Research publications are categorized on the basis of developed and developing country. It is evident from Table 2.2 that most of the publications are from developed countries such as the UK (23 articles, 16.20 percent), USA (12 articles, 8.45 percent) and the Netherlands (ten articles, 7.04 percent), etc. and not much attention is being paid to research work on issues of AFSCQ in developing countries. While on the contrary developing countries like India are largely agrarian, still research in this area is lacking.

Table 2.2 Distribution of research publications over regional basis

Countries	No. of articles	Percentage
UK	23	16.20
USA	12	8.45
Netherlands	10	7.04
China	10	7.04
Italy	9	6.34
India	6	4.23
Vietnam	5	3.52
South Africa	4	2.82
France	4	2.82
Spain	3	2.11
Australia	3	2.11
New Zeland	2	1.41
Philippines	2	1.41
Greece	2	1.41
Finland	2	1.41
Turkey	2	1.41
Indonesia	2	1.41
Russia	1	0.70
Ireland	1	0.70
Scotland	1	0.70
Germany	1	0.70
Portugal	1	0.70
Sweden	1	0.70
Madagascar	1	0.70
Belgium	1	0.70
Canada	1	0.70
Thailand	1	0.70
Jordan	1	0.70
Korea	1	0.70
Multiple	29	20.42

2.3.4. Year-wise empirical research growth in the field of AFSCQ

It is observed that the first empirical research publication in agri-fresh food supply chain appeared in the International Journal of Physical Distribution & Logistics Management in 1994. It can be understood from Figure 2.3 that empirical research publications have exhibited remarkable growth after 2004.

It is visible from the above data that about 60 percent of the empirical research publications were published since last seven years though about 40 percent research publications were remaining publications. It can be seen clearly from Figure 2.3 that from past seven years, there is a major growth in empirical research publications in the field of AFSCQ. It exhibits the growing fondness of researchers towards case study and survey-based research particularly in this area.

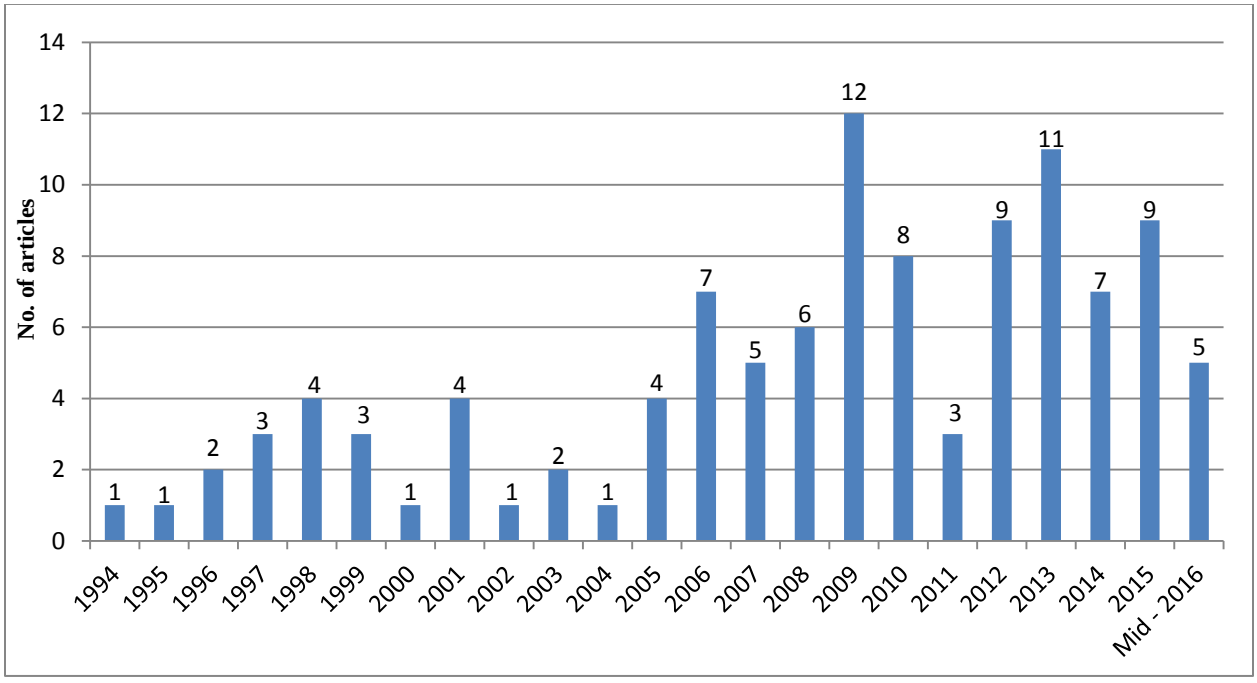


Figure 2.3: Year-wise empirical research growth

2.3.5. Classification based on data analysis methods or tool utilized

The literature of AFSCQ may also be classified by data analysis methods or tools utilized. Table 2.3 shows the categorization of research publications according to data analysis methods.

It is evident from the above table that a majority of research publications utilized "statistical analysis" (39.43 percent), which also indicates that the nature of research is dominantly

quantitative and survey based. In rest of the 44 publications (40.84 percent), no specific tool or data analysis methods were utilized, neither a case study nor conceptually centered research publications.

Table 2.3 Research publications classification based on data analysis methods or tool utilized

Tool/research method	No. of articles	Type
Mathematical models	11 (7.74%)	Econometric analysis, fuzzy, analytical tool, relational database model, simulation, etc.
Theoretical models	5 (3.52%)	Data stemming, sustain ' s sustainability criteria, traceability, etc.
Quality tool	4 (2.82%)	Integrated quality management system, transaction cost approach, etc.
Statistical analysis	56 (39.43%)	Cluster analysis, conjoint analysis, two-stage probit analysis with endogenous variables, factor analysis, and descriptive statistics, etc.
Technological tools	8 (5.63%)	Information technology, internet, network database system and programming language, radio frequency identification, and two-dimensional data matrix (DM) barcode printed, etc.
Others	58 (40.84%)	General conceptual or case study-related publications, etc.

2.3.6. Research publications categorization based on issues of AFSCQ

The review of AFSCQ can furthermore be classified on the basis of AFSCQ issues. Figure 2.4 shows the categorization of research publications according to many types of AFSCQ issues. The thing to be noted is that AFSCQ issues address multiple problems.

From Table 2.4 and Figure 2.4, it is found that the majority of publications were concerned with "Information management" issues (47 articles, 33 percent), while publications with "Sustainability management" were second highest (22 research publications, 16 percent). Also, research publications with "Logistics management" were 18 (13 percent), "Collaboration and Coordination management" were 12, "Strategic management" were nine, "Inventory management" were six, "Demand management" were five, " Food safety management" were four, "Performance measurement" were four, "Integration management" were three, "Supplier management" were three, and "Quality management" were two. It is evident from Figure 2.4 that "Information management" and "Sustainability management" in agri-fresh food supply chain issues are most relevant issues covering almost half of total research publications selected from

the literature review. It does not necessarily mean that other issues are less important but these two issues may indicate their criticality.

Another significant takeaway from the review of articles in this category is the product quality, which is certainly a very important part of AFSCQ. According to Manning et al. (2006) quality assurance standards are very important to be considered for ensuring product quality. As per Oakland (1993), product quality is "conformance to customer's requirement", hence as far as AFSCQ is concerned, it should additionally follow the norms of food production authorities. Fidler (1990) mentioned that the quality assurance of a product is to maintain "product and quality". In AFSCQ, since products are mostly of short shelf-life, maintenance of quality relies much on logistics, collaboration and coordination, food safety and supplier management. As per Baines and Ryan (2002), product quality is considered as a business efficiency tool and minimizes hygienic risks.

From the review, it is also found that several indicators of AFSCQ could be product quality, product safety, cost of quality, quality in logistics, quality of human resources, quality of information and information technology, quality of marketing, performance in terms of quality, relationship quality, sustainability and quality assurance.

Some common issues directed by authors regarding AFSCQ were quality of raw material, biological quality of product, hygiene quality, nutritional quality, quality of resources (e.g. farm machinery, manures, fertilizers, etc.), monitoring decay parameter, etc.

Table 2.4 Agri-fresh food supply chain quality issues

Issues	Studies
Sustainability management	Loader (1997), Ilbery and Maye (2005), Sachan et al. (2005), Pretty et al. (2008), Chiffoleau (2009), Gorton et al. (2011), de Castro Souza and Amato Neto (2012), Lehtinen (2012), Banterle et al. (2013), Jack et al. (2014), Lockie et al. (2015), Thomopoulos et al. (2015), Del Borghi et al. (2014), Van Asselt et al. (2014), Lamprinopoulou et al. (2014), Soussana (2014), Kalia and Parshad (2015), Clark et al. (2015), Higgins et al. (2015), Gallardo et al. (2015), Bisogno (2016), Park et al. (2016)

Issues	Studies
Information management	Shaw and Gibbs (1995, 1999), Wilson (1996), Soucie (1997), Salin (1998), Fearne and Hughes (1999), Sporleder and Goldsmith (2001), Hingley (2001, 2005), Van der Vorst et al. (2002), Le Heron (2003), Digal (2005), Cadilhon et al. (2006), Vasileiou and Morris (2006), Jedermann et al. (2006), Sohal and Perry (2006), Hingley et al. (2006, 2010), Beckeman and Skjöldebrand (2007), Shu et al. (2007), Holt et al. (2007), Duan et al. (2007), Lu et al. (2008), Minten et al. (2009), Alfaro and Rábade (2009), Blackburn and Scudder (2009), Bevilacqua et al. (2009), Van Hoi et al. (2009), Barling et al. (2009), Narrod et al. (2009), Thakur and Donnelly (2010), Amador and Emond (2010), Canavari et al. (2010), Thakur et al. (2011), Magnan (2011), Bao et al. (2012), Santa et al. (2012), Zhang and Li (2012), Louw et al. (2013), Manning (2013a), Hu et al. (2013), Kirezieva et al. (2013), Liang et al. (2013), Roggeveen (2014), Zhong et al. (2015), Fountas et al. (2015), Wang et al. (2015)
Logistics management	Taylor (1994), Calza and Passaro (1997), Vorst et al. (1998), Collins et al. (1999), Larson and Gammelgaard (2001), Henson and Reardon (2005), Bourlakis and Bourlakis (2005), Custódio and Oliveira (2006), Mergenthaler et al. (2009), Manikas and Terry (2009), Paksoy et al. (2012), Demirta ş and Tuzkaya (2012), Cai et al. (2013), Morganti and Gonzalez-Feliu (2015), Handayati et al. (2015), La Scalia et al. (2015), Lee et al. (2015), Cai and Ma (2015)
Collaboration and coordination management	Folkerts and Koehorst (1997), Kennett et al. (1998), Hobbs and Young (2000), Heiman et al. (2001), Cadilhon et al. (2003), Cadilhon et al. (2005), Matopoulos et al. (2007), Mikkola (2008), Vermeulen et al. (2008), Petit et al. (2011), NicolaasBezuidenhout et al. (2012), Aggarwal and Srivastava (2016)
Strategic management	Hughes and Merton (1996), Rademakers and McKnight (1998), Beverland (2001), Salin and Nayga (2003), Cante et al. (2004), Hingley et al. (2008), Srimanee and Routray (2012), Iliopoulos et al. (2012), Zanoni and Zavanella (2012)
Inventory management	Maertens and swinnen (2009), Moustier et al. (2010), Nganje et al. (2010), Sivakumar and Wall (2013), Zhang and Pan (2013), Aubry and Kebir (2013)
Demand management	Taylor (2006), Pingali (2007), Stringer et al. (2009), Baghalian et al. (2013), Clasadonte et al. (2013)
Food safety management	Escanciano and Santos-Vijande (2014), Zhou et al. (2015), Ding et al. (2015), Hou et al. (2015)
Performance management	Aramyan et al. (2007), Trienekens et al. (2008), Aramyan et al. (2009), Akhtar and Khan (2015)
Integration management	Louw et al. (2008), Reardon and Timmer (2014), Kusumastuti et al. (2016)

Issues	Studies
Supplier management	Blundel and Hingley (2001), Jan Hofstede et al. (2010), Suryaningrat (2016)
Quality management	Li et al. (2015), Siddh et al. (2015)
Comprehensive construct	Jan Hofstede et al. (2010), Demirta ş and Tuzkaya (2012), Shukla and Jharkharia (2013), Ji et al. (2013), Jraisat and Sawalha (2013), Tsolakis et al. (2014), Macfadyen et al. (2015)

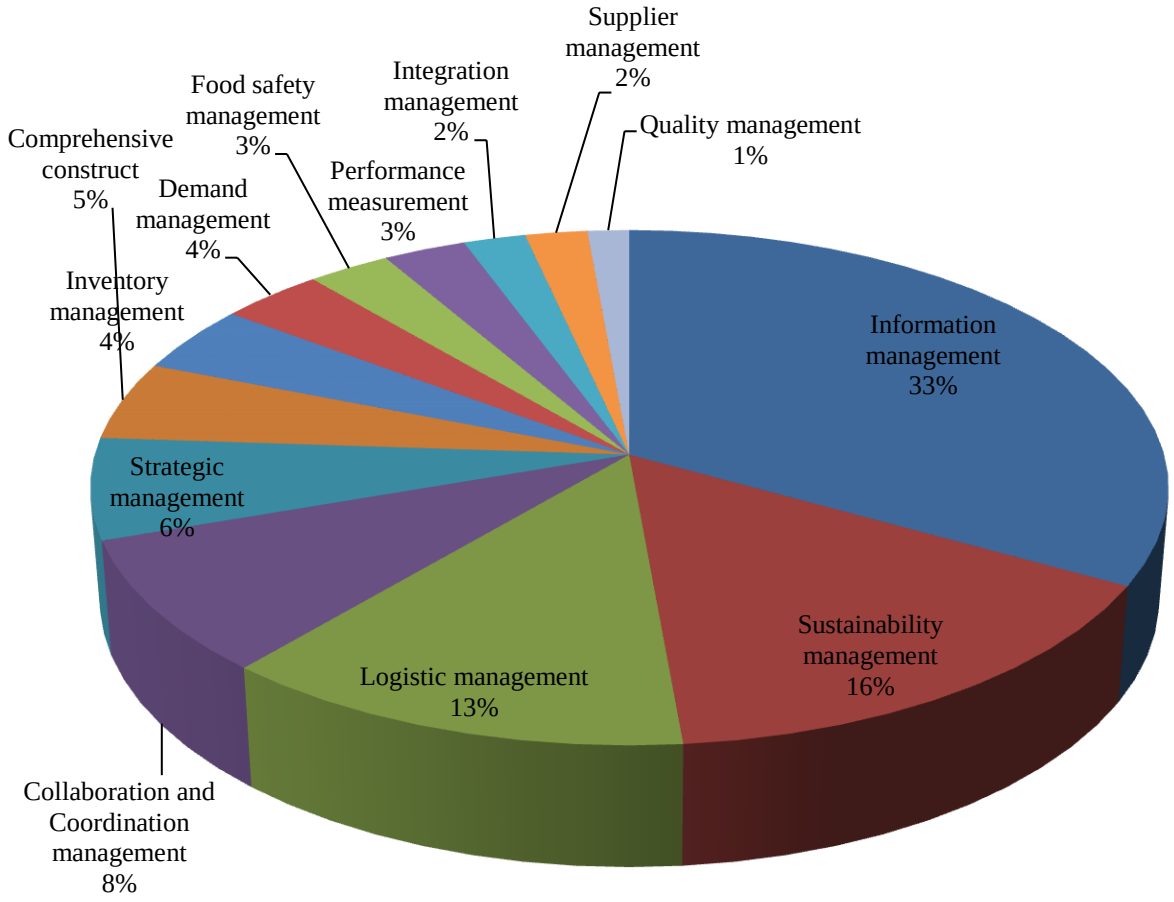


Figure: 2.4 Classification of research publications according to various kinds of agri-fresh food supply chain quality issues

2.3.7. Research publications categorization on the basis of performance measurement

Entity of Analysis (EOA). According to Soni and Kodali (2011), the entity kept at focus while analyzing an article is represented by entity of article. The stakeholders inolve in a chain like manufacture, supplier, distributor etc. are the different entities.

Level of Analysis (LOA). It is the work of Croom et al. (2000), which emphasized that for critical literature review and analytical framework must be adopted. Dyadic, chain and network were the three suggested levels.

Element of Exchange (EOE). Hakansson and Snehota (1989) stated that networks are composed of actors resources and activites that involved exchange. Later EOE was proposed as dimension for classifying the SCM literature based on the study.

It is a vital component of any system of management and so is for AFSCQ. A frequency division of performance measurement publications concerning Entity of Analysis (EOA), Element of Exchange (EOE) and Level of Analysis (LOA) is presented in Table 2.5.

From Table 2.5, it is quiet visible that the performance measurement aspect is in growing stage in the AFSCQ literature. By the statistics it is evident that only 19 publications (22.89 percent) are available in a span of 13 years (i.e. 1994-2006) while rests of the 64 publications (77.11 percent) are available in a span of 12 years (i.e. 2007 to 2018). Additionally a remarkable fact is that 50 publications (60.24 percent) focused on “information”, while 20 publications (24.09 percent) focused on inventory. One more notable aspect found is that 21 publications (25.30 percent) focused on 3PL (single entity) and 52 publications (62.65 percent) focused on a combination of many EOA. This is a very encouraging trend. Moreover, performance measurement exists at merely in the “chain” level in 67 publications (80.72 percent). It indicates that it is still very difficult to develop an integrated performance measurement system in AFSCQ. The major issue that turns out is that the size of players present at each stage of the supply chain is variable. With heterogeneous size of players, the integration aspects are always challenging. Here it is felt that for perishable products and especially for short shelf-life products, an integrated performance measurement system will elevate the AFSCQ.

Table 2.5 Frequency division of performance measurement publications with concerning to Entity of Analysis (EOA), Element of Exchange (EOE) and Level of Analysis (LOA)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Articles	0	0	0	1	3	2	0	3	1	3	1	1	4	5	5	4	4	3	5	10	2	4	6	9	7	83
Entity of Analysis (EOA)																										
3PL	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	2	1	1	4	1	0	0	2	3	3	21
Supplier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
Retailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
Manufacturer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2
Distributor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
consumer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Combination	0	0	0	0	3	1	0	2	1	2	1	1	3	5	3	2	2	2	1	9	2	4	2	4	2	52
Export	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Element of Exchange (EOE)																										
Information	0	0	0	1	2	0	0	3	1	2	1	0	4	4	3	1	2	1	3	7	1	3	2	5	4	50
Inventory	0	0	0	0	1	2	0	0	0	1	0	0	0	0	1	2	2	1	2	2	0	1	1	2	2	20
Money	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2
Combination	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	3	2	1	11
Level of Analysis (LOA)																										
Chain	0	0	0	1	3	2	0	2	0	1	1	1	4	5	3	4	3	3	4	7	2	4	5	7	5	67
Dyad	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	1	1	6
Network	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	3	0	0	1	1	1	9
Combination	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

2.4. Discussion

The primary objective of this chapter is to discover the gaps existing in the literature of AFSCQ by reviewing selected research publications. As the days are passing by, research publications on the AFSCQ are increasing. Nearly 50 percent of the publications were published in past five to six years; it also shows that research toward AFSCQ is increasing. Hence, there is a need to prescribe proper direction for further research in AFSCQ. Another finding is that 60 percent of the research publications are focusing on the issues of developed countries though merely 40 percent of the research publications are directed to the issues of developing countries. Shukla and Jharkharia (2013) also discussed that limited concentration is paid in developing countries while huge emphasis is on developed country issues like innovative research environment and infrastructure while in developing countries focus on availability of fund, infrastructure, and information technology were prime concerns.

Second, about 60 percent of empirical studies are from previous seven years which shows that empirical kind of investigation or research is speedily increasing. In another review in the field of supply chain, Burgess et al. (2006) and Soni and Kodali (2011) also examined that empirical investigation in supply chain management is rising at a steady pace.

As described earlier, AFSCQ emphasizes on practices or exercises that stress on continuous process advancement in order to enhance sustainable performance. Hence, performance measurement is an important aspect for supply chain quality which enables effective organization to indicate correct phase of changes to be brought in the supply chain and a well-timed action can be taken. Such approach is well described by Gopalakrishnan et al. (2006) who focused on the development of scenarios that targeted to reduce energy consumption in the manufacturing system. Siddh et al. (2015) also discussed about the sustainable performance of perishable food supply chain in their review. Another noticable aspect is that the performance measurement facet is also at a growing stage in the literature of AFSCQ. This datum is highlighted from the statistic as merely 20.71 percent (i.e. 1994-2006) of publications are published during 13 years though the rest of 79.29 percent (i.e. 2007 to 2018) of publications are published in a span of 12 years. Interestingly 62.65 percent research publications considered multiple EOA (manufacturer, supplier, retailer, distributor or consumer) besides 25.30 percent

research publications focused on the single entity as 3PL. Atilgan and McCullen (2011) focused on improving supply chain performance through auditing of losses due to perishable nature of products in the supply chain. Fabbe-Costes and Jahre (2008) also observed that 48 percent of publications evaluated performance on dyadic stage or level. Similar trend is observed in this chapter as well and this finding seems to be consistent with the past record. These facts prescribe researchers to preferably develop an integrated performance measurement system for AFSCQ which will enable assessment and propagation of uniformly adopted quality practices in complete supply chain of agri-fresh products.

It is also observed from our literature review that greater part of total publications utilized statistical analysis (39.43 percent) such as a tool for research problem resolving and data analysis. Sachan and Datta (2005) presented a similar list of best conventional statistical analysis techniques used in empirical research analysis and the results are concurrent with current findings.

The majority of articles showed that "information management" is vital for addressing AFSCQ issues (33.10 percent), while "sustainability management" is another important aspect of AFSCQ (15.49 percent). It reveals that research toward supply chain quality issues as "information management" and "sustainability management" is being addressed to a greater extent and it also signifies that quality of agri-fresh products and services involved in the same should be promulgated with integration by using better ways of communicating information among supply chain members. Also the technology and ethics of agri-fresh produce industry should be governed by overarching principles of sustainability.

2. 5. Research implications and directions for future research

This review delivers more opportunities of further research in the field of AFSCQ. The outcomes of the review reveal following implications for investigators or researchers:

- Agri-fresh food produce comprise a significant portion of the world economy, supplies for various industries and the world price of many foodstuffs. Aggarwal and Srivastava (2016) stated that in developing countries, the agriculture industry is the backbone of the economy. Kalia and Parshad (2015) stated that better economic revenues by food growers

and retailers can only be harnessed if the huge post-harvest losses could be decreased through handling and supply chain of food products. Since 2007 research toward AFSCQ is rapidly increasing due to greater potential that AFSCQ is attaining. Thus, there are a lot of research openings in the arena of AFSCQ. One more aspect perceived from the review is that less articles related to research appeared in developing countries. Akhtar and Khan (2015) discussed that agri-fresh food supply chain coordinators (chief executive officers, managing directors and head of departments, etc.) from developing countries should be extra careful as they often use directive leadership, which might not work in developed countries. Hence, researchers in such areas should develop theories based on aforementioned scenario. Ali (2016) stated that in India the vegetable supply chain has traditionally been divided since the greater part of growers are small holders with inadequate experience to better agricultural practices; therefore, innovative agricultural practices among small holders are needed for supply chain quality or efficiency and effectiveness.

- *As per discussion, the researchers should focus on verifying already existing theories in AFSCQ as sufficient volume of literature on theory building is collected and must be verified in different conditions.* It is also observed that literature on AFSCQ necessitates standardized constructs. Fountas et al. (2015) also emphasized on the requirement of standardized quality audit formats based on defined data infrastructure elements in the agri-fresh food sector developed by organizations. Li et al. (2015) also discussed about progress in the agri-fresh products quality and safety standardization system.

- There is remarkable growth in empirical research studies of AFSCQ from 2004. *In upcoming days, empirical research needs to be directed at intra-functional and intra-firm scope at organization and supply chain level. If feasible, such empirical studies can concentrate on complete "network" as well. Else, they should at least concentrate on the "dyad" level where interaction of small farms with distributors is investigated.* Siddh et al. (2015) also emphasized on the same aspect that empirical research studies are required to be targeted at intra- firm and intra-functional scope at the organization level. This point seems to be in sync with the previous implication that there is a need of promoting integration and sustainability philosophy at all the levels in the agri-fresh supply chain.

Kusumastuti et al. (2016) reviewed the literature on crop-related harvesting and process planning stating that research models reflect realism to a limited extent and there is insufficiency of empirical testing research. *Future research studies hence may be comprehensive and could investigate realistic research models.*

- *Popularly, AFSCQ is influenced by material, logistics, supplier, distribution, demand, purchasing, marketing, and information management. Thus, it relies on various issues, among them certain are frequently studied by researchers, while others issues are specifically addressed such as supply chain efficiency, risk management, industrial supply chain quality, supply chain security, supply chain quality, relationship quality, strategic alignment, visibility, end deliverable quality, etc. This may require additional focus of researchers toward carrying out empirical research in the AFSCQ area.* Tsolakis et al. (2014) stated that the design, development, and operation of agri-fresh food supply chains have begun to be met with enhanced attention in recent management science, while quality of such supply chain remains unexplored. Besides, the instability of weather, the perishability of produces, the complicated food safety governing environs, the varying consumers' routine styles, the environmental anxieties and the overabundance of stakeholders immersed pose significant challenges in the direction of robust supply chain development within the agri-fresh food sector. Kalia and Parshad (2015) reviewed key nanotechnology innovations useful in preservation, packaging, safety, and storage of fruits and fruit-centered food products. The safety and quality assurance of packaged food products are most important concerns in existing day world-wide integrated food supply chains. It reflects that technological interventions may also affect AFSCQ. Zhou et al. (2015) advised to emphasize on the agri-fresh food safety practices of three governance structures: farmer cooperatives, agricultural companies, and family farms. These are also one of the major components of the supply chain quality. Ding et al. (2015) stated that farm production is dominated by limited households, and fresh food supply chains including large numbers of traders, small brokers and wholesalers, ensuring food safety along the food supply chain represents a major challenge. Handayati et al. (2015) stated that the buyers of agri-fresh food produces are changing their manners to comprise additional ethical concerns in their choice. In

particular, they have begun to pay more attention to the quality in conjunction with the traceability of food product. Though food demand is becoming more sophisticated than ever, food supply preserves a traditional form of food production. According to Jack et al. (2014), agri-fresh food sector recognizes that in order to keep its competitive benefit in both present and new markets it will need a business strategy concentrated on product, service and process innovation, eventually adding more components to AFSCQ.

- *AFSCQ has a major effect on sustainable performance of organization as the AFSCQ practices sum up along the entire length of supply chain. Sustainable performance contains economic, environment and social sustainability. Distinctive from traditional performance measures, not only sales, return, and market share, etc., sustainable performance consists of economic, environment and social sustainability.* Aggarwal and Srivastava (2016) found that waste reduction is an outcome of supply chain collaborative activities, which has huge social implications. Bisogno (2016) stated that short chain can help to raise the sustainability of interests in a scene of the advancement of the latest way of "doing business" making significance not only in relations of money but also taking liable attitude toward sustainability issues taking into consideration the environmental and social facets. Researchers may need to incorporate the components of sustainability in various facets of AFSCQ and culminating into proposition of new performance measures.

2.6. Conclusion and limitations

This chapter presents a review of the AFSCQ literature, discussing foremost supply chain operational issues responsible for AFSCQ. The purpose of this chapter is to focus on the directions and opportunities of research in AFSCQ. To sustain this objective, literature is picked from four management science publishers over a phase of 25 years (1994-2018). The literature review is methodically classified and analyzed to provide a better insight of the research in the past two decades. To sustain the significance of the complete process, the organized research process is followed in both the collection and content investigation of the literature.

It was observed that more than 50 percent of research publications are published during the past five years. This tendency may be attributed to the factors such as increased utilization of

vegetable oil as a fuel, food prices, more attention toward reducing food wastage, difficulty in managing short shelf-life products, etc. The research in the field of AFSCQ is in growing phase. However, it is observed that research in the context of supply chain integration, information management, strategic management, and integration of transportation system for enhancing AFSCQ is deficient and researchers can direct their endeavours in blending these areas of research.

This review does have some limitations such as every publication concerning AFSCQ might not have been part of this review. This can be attributed to organized literature review procedure which governed the selection criteria, constrained by the limiting boundaries of publications used for article selection. Mainly, those research works that are published by manuscripts under open source collections, papers published in conferences, Inderscience publishers are not considered in the present study. However, this literature review provided an introductory picture towards AFSCQ issues and future research gap into this area. Further research related to this literature review could be an extension of work in specific key areas of food supply chain quality such as sustainability in food supply chain, collaboration with suppliers for quality, etc.

CHAPTER 3

AGRI-FRESH FOOD SUPPLY CHAIN QUALITY (AFSCQ) AND ORGANIZATIONAL SUSTAINABILITY (OS): A CONCEPTUAL MODEL

3.1. Introduction

The inclination in the direction of globalization along with advanced innovation and revolution has directed to the improvement of links of organizations. The supply chain has been viewed as a leading inter-organizational practice for the attainment of competitive advantage (Janvier-James, 2012). Supply chain management emphasizes interdependence amid organizations and functioning collaboratively to attain effectiveness in supply chain actions (Shin et al., 2000; Narasimhan and Kim, 2002). Effective strategy and execution of supply chain practices improves quality regarding cost reduction, increasing flexibility and also makes sure customer gratification. Henceforth, it would be a beneficial way to keep customer value and competitive advantage in the marketplace (Li et al., 2006). In this regard, cover quality matters at the supply chain level and it is the key to successful organization regarding product quality (Sila et al., 2006).

Instead, the significance of supply chains and their part in enriching competitive advantage of the organizations, insufficient consideration has been specified to quality problems in the supply chains. Though by the organization point of view, quality is distinct regarding quality practices like top management leadership and commitment, customer focus or contentment and employee participation, our indulgent about quality practices at the supply chain level are inadequate. Then further research to report the conception of quality within supply chains (Sitkin et al., 1994; Ross, 1998; Foster, 2008; Foster et al., 2011). Kaynak and Hartley, (2008), indicated that quality-based culture could enhance the operational performance, customer focus or satisfaction, and economic performance, etc., along with the stakeholders of the supply chain. Numerous researchers and practitioners have opinionated about the integrating quality and supply chain management (Zeng *et al.,* 2013; Robinson and Malhotra, 2005). And so, for evaluating quality issues, it is necessary to have an additional focused attempt or approach within the supply chain.
The practices that improve the quality of supply chain are recognized as the supply chain quality practices (Siddh et al., 2015; Siddh et al., 2017). Mellat-Parast (2013) stated that supply chain

quality is a set of quality practices that stress on continuous enhancement among the supply chain partners to boost performance and attain customer gratification. These clarifications about supply chain quality are related to manufacturing goods with limited work in the area of food produce though food products frame a considerable portion of world economy along with the resource of raw-material for numerous food industries. Siddh et al. (2015) indicated that various reviews of literature that target at the critical analysis of the literature on supply chain are conveyed, however not a single one of them concentrated absolutely on the supply chain quality of perishable food.

As well Mahajan et al. (2017) noticed that scanty research work had been showed on supply chain quality of food products. The food supply chain quality is tremendously complicated due to the extreme ambiguity in demand as well as cost, perishability in nature, greater consumer immersion for safeness of food produce (Van der Vorst and Beulens, 2002), and dependence on the environmental condition (Salin,1998).

The industry of food is suffering from unprecedented challenges and heaviness. No other type of industry that similar to food industry signifies the challenge of sustainability. Food industry's sustainability is highly dependent on the sustainability of the fresh food supply chains. Moreover, various supply chains have globally joined to create international food supply chains. Because of Globalization, there is an issue of concern in change over techniques of marketing, tendencies of consumption and technology innovation. All this has increased the concerns regarding economic, social and environmental sustainability. Moreover, Darkow et al. (2015) analyzed the food supply chains in multifaceted and unstable business or commercial environs, wherever the sustainability requisites of customers in addition to legislation are growing. From now there is an extreme necessity of advancing the area of food supply chain quality. Siddh et al. (2015) reviewed literature on the supply chain quality of perishable food products then referred to as Perishable Food Supply Chain Quality (PFSCQ) and stated that the research in the direction of "agri-fresh foods" are perishable products is foremost. Siddh et al. (2017) reviewed literature on the supply chain quality of agri-fresh food products then referred to as Agri-fresh Food Supply Chain Quality (AFSCQ) and analyzed that there is no model or framework available for managing AFSCQ in the literature. Bisogno (2016) denoted that short supply chain could support to improve the concerns regarding sustainability in a view of the development of the

innovative approach of "Implementing Business" attaining importance not only in associations by means of money but keeping a responsibility involving about the concern of sustainability for instance social and environmental views. These apprehensions are pressing to organizations for advance systems that make sure the command on the complete supply chain, assure quality and food security, and tracking / traceability practices and produces (Gulati et al., 2007).

This study emphasizes practices of Agri-fresh Food Supply Chain Quality (AFSCQ). A conceptual model of AFSCQ is suggested to examine the relationship or link between AFSCQ practices and organizational sustainability. Investigating these relationship or link is very essential for the reason that it permits us to appreciate how the AFSCQ practices influence on Organizational Sustainability (OS) extremely.

The construction of the chapter is in such a way: Section 3.2 shows literature on AFSCQ & sustainability deals using recognition of the AFSCQ practices & OS. Section 3.3 discoursed AFSCQ practices and OS dimensions. Section 3.4 focuses on the conceptual model of AFSCQ and related hypothesis. Section 3.5 shows discussion for managing AFSCQ and organizational sustainability. Though, Section 3.6 depicts research implications. At last, the chapter is concluded.

3.2. Literature review

The advancement in quality and supply chain integration has been proposed by numerous researchers and practitioners.

Ross (1998) identified the common tendencies that prominent to enhanced importance on supply chain quality: development of quality creativities or innovations, liberalism in the transportation segment, and spreading out of logistics accomplishments. Kuei et al. (2002) discussed that supply chain quality has to be eminent from supply chain technology. The earlier highlights that customer-driven values are the social basis to enable the supply chain advancement, even though the focus on the advancement of technological stand to enable the effective supply chain integration management. Mellat-Parast (2013) discussed that Supply chain quality management as a set of practices that emphasize continuous process development among partners (firms) of the supply chain to get better performance and accomplish customer gratification through eminence in acquiring or learning the culture. These descriptions are mainly concerned with

manufacturing and service sector while little attention being given to agri-fresh food products. The agri-fresh food products constitute a foremost portion of word financial prudence and are the source of resources for numerous food industries. The supply chain quality of agri-fresh food products, herein after suggested as Agri-fresh Food Supply Chain Quality (AFSCQ) covers the quality of process and product from farm to the delivery of agri-fresh food products to folk.

The AFSCQ is exceedingly complicated by cause of the short shelf life, higher amount of uncertainty during demand in addition to the cost of the agri-fresh food products (Van der Vorst and Beulens, 2002). Manzini et al. (2014) highlighted that the food security and environmental sustainability are highly interdependent in processes along with activities of the supply chain. Darkow et al. (2015) argued that rising sustainability needs of customers with legislation, the managing of AFSCQ is becoming highly complicated & unpredictable. Therefore there is a vast necessity of advancing the field of AFSCQ.

Research Gaps

AFSCQ practices have a considerable influence on the Organizational Sustainability (OS) as Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS) that covering Upstream Side Management (USM) or Supplier management (SM), Internal Management (IM) or Process Management (PM) and Logistics Management (LM), and Downstream Side Management (DSM) or Customer Focus (CF) of supply chain. Though, it has not been taken in the literature effectively, a number of studies concentrated only on the Upstream Side Management (USM) or Supplier Management (SM) of the agri-fresh food supply chain (Grundvag Ottesen G., 2006; shokri et al., 2010; Liu et al., 2013). As well, various studies concentrated only on the Downstream Side Management (DSM) or Customer Focus (CF) of the agri-fresh food supply chain. (Soucie, 1997; Chrysochou et al., 2009). Additionally, some studies assessed influence of Internal Management (IM) on the organizational performance (Pieter van Donk et al., 2008; Rajaguru and Jekanyika Matanda, 2009; Bosona and Gebresenbet, 2011). Han et al. (2013) studied about Supply Chain Integration Management (SCIM) and organizational performance. Hamister (2012) stated that practices of supply chain management are ever more linked to performance at the supplier and retail platforms. All the previous studies are having different perceptions about AFSCQ practices and Organizational Sustainability (OS). Han et al. (2013) indicated that the execution of AFSCQ practices is not only about the Internal

Management (IM), which are restricted inside the organization, but also on the external practices as Supplier Management (SM) and Customer Focus (CF). A number of studies suggested that information flow play a substantial role in the effective supply chain integration among supply chain partners (Beulens et al., 2005; Sigala M., 2007; Bosona and Gebresenbet, 2011). Lack of information from one end of the supply chain to another end produces considerable issues comprising, but not limited to, needless inventory investing, inadequate customer facility, inefficient transportation, unproductive production plans and wasted revenues. Jraisat et al. (2013) studied the information sharing drivers between producers and exporters of supply chains and examined relation to the export performance. Siddh et al. (2015) reviewed perishable food supply chain quality and stated that "Information management or Information quality" is necessary for AFSCQ to achieve organizational sustainability. Moreover, Nakandala et al. (2017) discoursed that information flow is necessary among various entities of food supply chain. And so, information is essential to possess for quality integration in the entire supply chain. Besides, previous studies are largely paying attention to the direct relationships, and so, there is an inadequacy of assessing relationship among AFSCQ practices. Siddh et al. (2015) also discussed that it's not complete if a research model or framework does not indicate the interrelationship amid practices of supply chain quality. In future, there is an urging necessity of advancing the arena of AFSCQ and organizational sustainability. For the time being, previous models or frameworks do assess the relation between the practices of supply chain quality and the financial performance. Vasileiou and Morris (2006) also deliberated the significance of economic, social and environmental sustainability. Zanoni and Zavanella (2012) discussed about the decision approaches in chilled or frozen food supply chains for sustainability. Martindale (2014) explained food sustainability by using the customer's survey. Del Borghi et al. (2014) utilized Life Cycle Assessment (LCA) to assess environmental sustainability. Van Asselt et al. (2014) explored sustainability in the production of agri-food. As well Soussana (2014) explored Life Cycle Assessment (LCA) and sustainability of the agri-food systems. Nunes et al. (2014) examined environmental sustainability in the agricultural production. Lockie et al. (2015) discussed environmental and social liability expressed in private standards and real practices. Schoenherr (2015) studied about the assured food protection from the perception of social sustainability. Bisogno (2016) explored about the food supply chains and Corporate Social Responsibility (CSR).

The AFSCQ literature gets concentration on accepting the reliable methodology along with making use of leading with lagging factors in an organized manner. Also, the essential measures of organizational sustainability need to be associated with goals of top management.

The following research gaps have been identified by earlier literature on AFSCQ.
(i) The absence of a model or framework that comprise Upstream Side Management (USM), Internal Management (IM) and Downstream Side Management (DSM) of Agri-fresh food supply chain to make better in Organizational Sustainability (OS). (ii) Supply Chain Integration Management using IT (SCIMIT) among supply chain stakeholders or partners is not thoroughly considered. (iii) Numerous aspects of Organizational Sustainability (OS) are not assessed simultaneously.

This chapter shows the conceptual framework and conceptual model of AFSCQ to attain organizational sustainability. The conceptual framework of AFSCQ displays expanded the view of AFSCQ practices and Organizational Sustainability (OS). Moreover, the conceptual model of AFSCQ displays the impact of AFSCQ practices on organizational sustainability as economic, social and environmental sustainability simultaneously.

3.3. Agri-fresh Food Supply Chain Quality (AFSCQ) practices and Organizational Sustainability (OS)

3.3.1. Research methodology

In the beginning, AFSCQ practices and numerous organizational sustainability dimensions were recognized by a comprehensive review of the literature. It includes the collection of research papers followed by categorization by the contents of AFSCQ like AFSCQ practices and numerous organizational sustainability dimensions as economic, social and environmental sustainability. A schematic representation of research methodology adopted is shown in Figure 1. The collection of data for review is started from the year 1994 because of the term supply chain related to food sector firstly appeared in the year of 1994. The year 2017 is considered as the finishing year of data collection for the reason that it is accomplishing previous years of the evaluation. Consequently, the period from the year 1994 to 2017 is taken for data collection from four management science publishers. These four publishes Emerald online, Science direct, Taylor & Francis online and Wiley online library for the reason that almost all well-reputed

journals of industrial and management engineering are accessible in these databanks. Then research papers are collected or downloaded from these well-reputed journals of industrial and management engineering by utilization of numerous keywords like agri-fresh food supply chain quality, AFSCQ, agri-fresh food supply chain, vegetable supply chain, fruit supply chain, agri-food supply chain, vegetarian supply chain, perishable food supply chain, Perishable Food Supply Chain Quality (PFSCQ), perishable food supply chain quality, PFSCQ, food supply chain, food supply chain quality etc.. After that, repetitive or repetition of research paper from the collected or downloaded papers are omitted**.**

After identification, the two academicians having doctorate in the perishable food segment and three food supply chain experts or professionals were invited for truncation process of collected or downloaded research papers. During the truncation process, the research papers which are related to Agri-fresh Food Supply Chain Quality (AFSCQ) are separated. In specific, AFSCQ practices are recognized in both agri-fresh food supply chain and quality associated research studies. After recognization, AFSCQ practices are grouped as Upstream Side Management (USM) or Supplier Management (SM), Internal Management (IM) or Process Management (PM) and Logistics Management (LM), Downstream Side Management (DSM) or Customer Focus (CF) and supportive practices like Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Supply Chain Integration Management using IT (SCIMIT) etc.

By tradition, organizational sustainability was generally evaluated by financial measures like return on invested capital, etc., (Aramyan et al. 2007). The financial measures of organization do not completely depict the organizational sustainability because of organizational sustainability is completely attained by some additional objectives as social and environmental sustainability (Siddh et al., 2017). Kaplan and Norton (1992) presented balanced scorecard model that comprises a number of insights of performance measures like, satisfaction of customer, internal processes, financial, innovation etc.. Bigliardi and Bottani (2010) also presented balance score card model for the measurement of performance in the case of food supply chain.

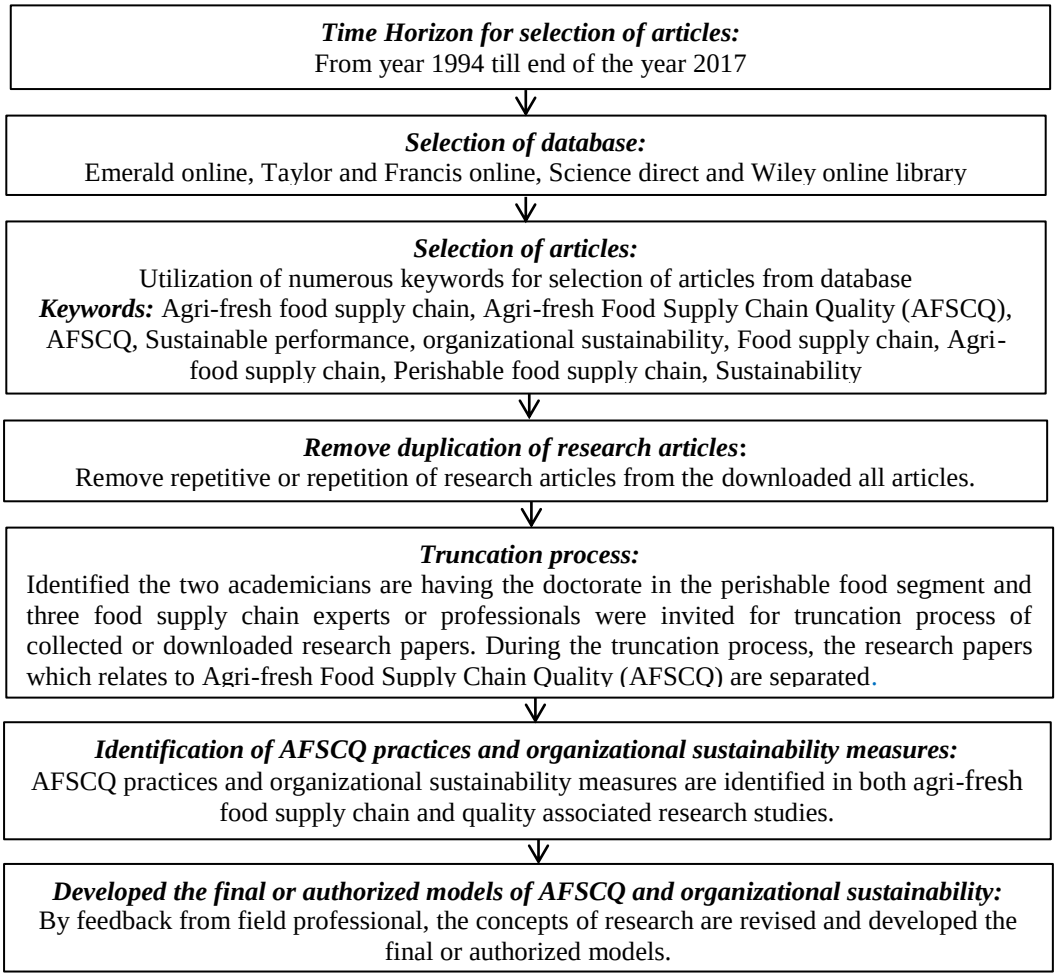


Figure 3.1: Research methodology

Later on, structured interviews or conversations with academicians and field expert had been organized. The discussions with academicians and field expert were documented and examined before accomplishing some development in the research models or frameworks. Then Q-sort technique is utilized to assess the consistency of the models. During the assess model conformity or consistency, selected senior-level managers are invited to study the models to develop an all-inclusive quality.

By feedback from field professional, the concepts of research are revised and developed the final or authorized models are developed.

3.3.2. AFSCQ practices

As per conversed, an all-inclusive accomplishment of AFSCQ necessitates to covering three major dimensions, comprising: Upstream Side Management (USM) or Supplier Management (SM), Internal Management (IM) or Process Management (PM) and Logistics Management (LM) Downstream Side Management (DSM) or Customer Focus (CF). Besides, supportive practices like Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) and Supply Chain Integration Management using IT (SCIMIT), etc. takes part as a significant function in the effective supply chain execution or Organizational Sustainability (OS).

Considering the comprehensive literature review, the considerable AFSCQ practices are recognized (See Table 3.1).

The main categorization of AFSCQ practices are;

(1) Upstream Side Management (USM) or Supplier Management (SM)

(2) Downstream Side Management (USM) or Customer Focus (CF); and

(3) Internal Management (IM) or Process Management (PM) and Logistics Management (LM)

(4) Supporting Practices like Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) and Supply Chain Integration Management using IT (SCIMIT) etc.

3.3.3. Organizational Sustainability (OS)

The innovative processes, products, or organizational approaches to a surviving organization are needed to increase sustainable effectiveness (Hansen et al. 2009; Schaltegger & Wagner, 2011; Horn & Brem, 2013). Sustainability can be expressed as the establishing of novel processes, products, or organizational methods that have a complete optimistic impact on the capital stock of the organization, by the focus on economic, social and environmental objectives (Hansen et al., 2009). Balanced scorecard model recognizes the limits of conventional measurement of organizational performance and enlightens organization's approach to performance goals, largely concentrating on imperceptible consequences like the relationship between supplier and customer, value chain, innovations, employee proficiencies or abilities, etc. (Kaplan and Norton, 1992). This innovative method attempts the usual attention of physical assets to the focus on physical as well as intangible assets for a promise to corporate continuing or long-term advancement of the organization in the upcoming time. The balanced scorecard approach has

four insights, comprising financial, customer or consumer, internal procedures or process and innovations that is competent of cover-up leading and lagging performance measures. Bhattarai et al. (2013) discussed the supply chain of organic vegetable and evaluated the performance as of a smallholder view. Matopoulos et al. (2015) examined considerable characteristics of resources efficient or resourceful food supply chains. Deng et al. (2016) discussed the economic performances and associations of the considerable actors in the supply chain of grapes by the approach of value chain analysis.

The chapter recognizes the group of Organizational Sustainability (OS) measures. Particularly, the Internal Management (IM) of the organizational supply chain is measured by Process Management (PM) and Logistics Management (LM), Upstream Side Management (USM) is measured by Supplier Management (SM) as well Downstream Side Management (DSM) implies for Customer Focus (CF), and at last, Organizational Sustainability (OS) comprises of economic, social and environmental sustainability. Distinctive from conventional measures of performance, as well market share and Return on Investment (RoI), etc. organizational sustainability measures comprises of economic, social and environmental sustainability.

3. 4. Conceptual model of Agri-fresh Food Supply Chain Quality (AFSCQ) and related hypotheses

This section discussed the conceptual model of AFSCQ and related hypotheses in the subsequent stages. Figure 3.2 shows the conceptual framework for governing all the suggested factors or construct of AFSCQ that influence the Upstream Side Management (USM), Internal Management (IM) and Downstream Side Management (DSM) of agri-fresh food supply chain that suffered inadequate focus in earlier literature. Zeng et al. (2013) stated that upstream quality mainly relates to supplier quality; internal quality of supply chain links to processing quality or process control while downstream quality mainly relates to customer focus or customer satisfaction. Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) is illustrated as base or foundation of the framework. It indicates that Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) examine; Human Resources Management that sustains Supplier Management (SM), Internal Management (IM) or processing quality and logistics quality, Customer Focus (CF) and supportive practices like Supply Chain Integration Management using IT (SCIMIT). On the basis of above discussion Organizational Sustainability

(OS) is expressed as economic, social and environmental sustainability that shows at the top of concerned framework. Then, direct and indirect relationships of concerned concepts or practices with several extents of Organizational Sustainability (OS) are established, as indicated in Figure 3.2. The proposed conceptual model of Agri-fresh Food Supply Chain Quality (AFSCQ) to achieve Organizational Sustainability (OS) is shown in figure 3. In the subsequent stages, hypotheses are developed that show relationship among AFSCQ practices and organizational sustainability.

Table 3.1: Categorization of Agri-fresh Food Supply Chain Quality (AFSCQ) practices

AFSCQ Practices	Items	Studies
Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)	1. Commitment to customer satisfaction. 2. Commitment to supplier relationship. 3. Effective adoption and execution of innovations with new programs, technologies, and activities for improvement of processing and logistic conditions. 4. Human resource management.	Sitkin et al., 1994; Flynn et al., 1995; Ellram, 1995; Ross, 1998; Ahire and Ravichandran, 2001; Esterhuizen et al., 2001; Yakovleva and Flynn, 2004; Vasileiou and Morris, 2006; Yakovleva, 2007; Foster, 2008; Singh, 2008; Sagheer et al., 2009; Spence and Bourlakis, 2009; Soler et al., 2010; Toften and Hammervoll, 2010 Foster et al., 2011; Zeng et al., 2013; Banterle et al., 2014; Kretschmer et al., 2014; Kretschmer et al., 2014; Siddh et al., 2015; Nakandala, 2016.
Internal Management (IM) or Process Management (PM) and Logistics Management (LM)	1. Continuous process improvement for internal process control or improving processing quality. 2. Quality standards to make sure assured quality of food product. 3. Emphasis on research and development related to food processing quality. 4. Standard conditions for food product storage and transportation.	Taylor, 1994; Neng Chiu, 1995; Calza and Passaro, 1997; Soucie, 1997; Vorst et al., 1998; Hobbs et al., 1998; Banks and Bristow, 1999; McDonagh and Commins, 1999; van der Ploeg and Frouws, 1999; Hamdar, 1999; Collins et al., 1999; Van Der Vorst and Beulens, 1999; Samuel and Hines, 1999; Minegishi and Thiel, 2000; Sonneveld, 2000; Larson and Gammelgaard, 2001; Van der Vorst and Beulens, 2002; Owens and levary, 2002; Gerbens-Leenes et al., 2003; Sage, 2003; Henchion and McIntyre, 2004; McKinnon and Ge, 2004; Aghazadeh, 2004; Bossu et al., 2004; Bourlakis and Bourlakis, 2005; Dorling et al., 2005; Kotzab and Teller, 2005; Rundh, 2005; Apaiah and Hendrix, 2005; Ilbery and Maye, 2005; Bogataj et al., 2005;

AFSCQ Practices	Items	Studies
	5. Inventory management.	Henson and Reardon, 2005; Ilbery and Maye, 2005; Ahmed et al., 2005; Beverland, 2005; Bertolini et al., 2006; McKinnon and Ge, 2006; Gimenez, 2006; Taylor, 2006; Custódio and Oliveira, 2006; Jedermann et al., 2006; Sohal and perry, 2006; Fulconis et al., 2006; Connolly, 2007; Fritz, 2007; Qu et al., 2007; Shu et al., 2007; Ortmann and King, 2007; Matopoulos et al., 2007; Stanton and burkink, 2008; Abate, 2008; Knickel et al., 2008; Kumar, 2008; Lynch and Whicker, 2008; Stanton and burkink, 2008; Vega, 2008; Barling et al., 2009; Aramyan et al., 2009; Tuominen et al., 2009; Engelseth, 2009; Naspetti and Zanoli, 2009; Mergenthaler et al., 2009; Spence and Bourlakis, 2009; Stringer et al., 2009; Wang et al., 2009; Sagheer et al., 2009; Mergenthaler et al., 2009; Ahumada and Villalobos, 2009; Menachof et al., 2009; Matopoulos et al., 2009; Van der Vorst et al., 2009; Rundh, 2009; Nabhani and Shokri, 2009; Manikas and Terry, 2009; Tuominen et al., 2009; Narrod et al., 2009; Kumar et al., 2009; Prado-Prado, 2009; Anders et al., 2010; Pullman and Dillard, 2010; Tanik, 2010; Hingley et al., 2010; Hsiao et al., 2010; Hodgkins et al., 2010; Wu et al., 2010; Bayraktar et al., 2010; Kuo and Chen, 2010; Hingley et al., 2010; shokri et al., 2010; Abrahamsson and Rehme, 2010; Lazaridesa, 2011; Rong et al., 2011; Kizos and Vakoufaris, 2011; Kumar et al.,2011b; Virtanen et al., 2011; Bosona and Gebresenbet, 2011; Karlsen and Olsen, 2011; Petit et al., 2011; Magnan, 2011; Rong et al., 2011; Díaz et al., 2011; Wang et al., 2012; Myae and Goddard, 2012; Zanoni and Zavanella, 2012; Nicolaas Bezuidenhout et al., 2012; Puligundla et al., 2012; Paksoy et al., 2012; Aiello et al., 2012; Taylor et al., 2012; Santa et al., 2012; White and Cheong, 2012; Zhang and Li, 2012; Myae and Goddard, 2012; Makkar and Jha, 2012; Lao et al., 2012; Miyaoka, 2013; Jraisat and sawalha, 2013; Yu and Nagurney, 2013; Louw et al., 2013; Azoury and Miyaoka, 2013; Beckeman et al., 2013; Nguyen et al., 2013; Azoury and Miyaoka,

AFSCQ Practices	Items	Studies
		2013; Shukla and Jharkharia, 2013; Bosona and Gebresenbet, 2013; Mohan et al., 2013; Manzini and Accorsi, 2013; Vivaldini and Pires, 2013; Cai et al., 2013; McCarthy et al., 2014; Heising et al., 2014; Jack et al., 2014; Gattuso et al., 2014; Martikainen et al., 2014; Siddh et al., 2015; La Scalia et al., 2015; Morganti and Gonzalez-Feliu, 2015; Lee et al., 2015; Handayati et al., 2015; Kusumastuti et al., 2016; Siddh, et al., 2017.
Supplier Management (SM)	1. Quality of supplier's raw food. 2. Set up long-term relationships with suppliers. 3. Actively suppliers' engagement in organizational supply chain quality development courses. 4. Collaboration and coordination along with suppliers for attaining eco-friendly goals.	Shaw and Gibbs, 1995; Fearne and Hughes, 1999; Blundel and Hingley, 2001; Hingley, 2001; Owens and Levary, 2002; Le Heron, 2003; Aghazadeh, 2004; Jansen-Vullers et al., 2004; Fearne et al., 2005; Menkhaus et al., 2005; Rimmington et al., 2006; Manning et al., 2006b; Tassabehji et al., 2006; Aramyan et al., 2007; Holt et al., 2007; Knoppen and Christiaanse, 2007; Raspor and Jevšnik, 2008; Naspetti and Zanoli, 2009; Anders et al., 2010; Jan Hofstede et al., 2010; Moustier et al., 2010; shokri et al., 2010; Tanik, 2010; Bourlakis, 2012; O'Donovan et al., 2012; Taylor et al., 2012; Fischer, 2013; Liu et al., 2013; Acosta, et al., 2014; Aggarwal and Srivastava, 2016; Siddh et al., 2017.
Customer Focus (CF)	1. Brand awareness toward quality of food product. 2. Emphasis on product variety or diversity. 3. Frequently communication with customers, like consistent or routine survey of customer's view. 4. Improve customer's convenience by providing significant information on the packaging of food product.	Folkerts and Koehorst, 1997; Cadilhon et al., 2006; McKinnon and Ge, 2006; Aramyan et al., 2007; Nabhani and Shokri, 2009; Fritz and Schiefer, 2009; shokri et al., 2010; Siddh et al., 2015.

AFSCQ Practices	Items	Studies
Supply Chain Integration Management using IT (SCIMIT)	1. Technological integration among the entire supply chain activities and processes. 2. Unbiased profit distributing among entire supply chain stakeholders to keep lifelong relationship. 3. E-commerce (Exchange of data among supply chain stakeholders). 4. Traceability and Tracking of the entire supply chain.	Shaw and Gibbs, 1995; Neng Chiu, 1995; Wilson, 1996a; Wilson, 1996b; Van Hoek, 1997; Sánchez Chiappe and Angel Herrero, 1997; Soucie, 1997; Bell et al., 1997; Van Hoek, 1997; Wilson and Clarke, 1998; Hobbs, 1998; Vorst et al., 1998; Salin, 1998; Shaw and Gibbs, 1999; Kerr, 1999; Loader and Hobbs, 1999; Ziggers and Trienekens, 1999; Samuel and Hines, 1999; Ploeg and Frouws, 1999; McDonagh and Commins, 1999; Armstrong, 1999; Fearne and Hughes, 1999; Adebanjo and mann, 2000; Hingley, 2001; Heiman et al., 2001; Esterhuizen et al., 2001; Doyer and Van Rooyen, 2001; Dzever et al., 2001; Larson and Gammelgaard, 2001; Van der Vorst et al., 2001; Sporleder and Goldsmith, 2001; Holmström et al., 2001; Van der Vorst et al., 2002; Cadilhon et al., 2003; Le Heron, 2003; Cox et al., 2003; Ropkins and Beck, 2003; Sage, 2003; Vlachos, 2004; Aghazadeh, 2004; Tang et al., 2004; Jansen-Vullers et al., 2004; Hollingsworth, 2004; Jones et al., 2005; Menkhaus et al., 2005; Kotzab and Teller, 2005; Yee et al., 2005; Ellis et al., 2005; Beulens et al., 2005; Bourlakis and Bourlakis, 2005; Digal, 2005; Fearne et al., 2005; Lee, 2005; Huq et al., 2005; Henson and Reardon, 2005; Penker and Wytrzens, 2005; Jaffee and Masakure, 2005; Beulens et al., 2005; Hingley, 2005a; Bergstro¨m et al., 2005; Hingley, 2005b; Jain and Dubey, 2005; Darroch and Mushayanyama, 2006; Gimenez, 2006; Wales et al., 2006; Cadilhon et al., 2006; Sohal and perry, 2006; Jedermann et al., 2006; Gimenez, 2006; Folinas et al., 2006; Vasileiou and Morris, 2006; Thron et al., 2006; Gorton et al., 2006; Bessel et al., 2006; Tassabehji et al., 2006; Bertolini et al., 2006; Hingley et al., 2006; Vlachos and Bourlakis, 2006; Knoppen and Christiaanse, 2007; van der Sigala, 2007; Qu et al., 2007; Sigala, 2007; Duan et al., 2007; Fritz, 2007; Stringer and Hall, 2007; Matopoulos et al., 2007; Connolly, 2007; Holt et al., 2007; Sahin et al., 2007; Beckeman and Skjo¨ldebrand, 2007; Regattieri et al., 2007; Bremmers et al., 2007; Shu et al., 2007; Gessner et

AFSCQ Practices	Items	Studies
		al., 2007; Kelepouris et al., 2007; Cox et al., 2007b; Stanton and Burkink, 2008; Clements et al., 2008; burkink, 2008; Lu et al., 2008; Vermeulen et al., 2008; Montanari, 2008; Petter Stræte, 2008; Hingley et al., 2008; Louw et al., 2008; Charlebois, 2008; Banterle and Stranieri, 2008b; Lejars et al., 2008; Louw et al., 2008; Higgins et al., 2008; Alexander and Smaje, 2008; Pieter van Donk et al., 2008; Bechini et al., 2008; Dunne, 2008; Roth et al., 2008; Eden et al., 2008; Whipple et al., 2009; Degeneffe et al., 2009; Mergenthaler et al., 2009; Rundh, 2009; Engelseth, 2009; Joshi et al., 2009; Blackburn and Scudder, 2009; Rajaguru and Jekanyika Matanda, 2009; van Veen-Dirks and Verdaasdonk, 2009; Van der Vorst et al., 2009; Matopoulos et al., 2009; Rajaguru and Jekanyika Matanda, 2009; Spence and Bourlakis, 2009; Wiskerke, 2009; Zhang and Aramyan, 2009; Engelseth, 2009; Minten et al., 2009; Wang et al., 2009; Bevilacqua et al., 2009; Narrod et al., 2009; Hovelaque et al., 2009; Chrysochou et al., 2009; Edwards-Jones et al., 2009; Bevilacqua et al., 2009; Van Hoi et al., 2009; ; Emongor and Kirsten, 2009; Fritz and Schiefer, 2009; Alfaro and Rábade, 2009; Manikas and Manos, 2009; Barling et al., 2009; Haverkamp et al., 2010; Canavari et al., 2010; Pigni et al., 2010; Yanes-Este´vez et al., 2010; Tanik, 2010; Kohli, A.S. and Jensen; Amador and Emond, 2010; Haverkamp et al., 2010; Li et al., 2010; Manos and Manikas, 2010; Solér et al., 2010; Andrée et al., 2010; Kher et al., 2010; Thakur and Donnelly, 2010; Jan Hofstede et al., 2010; Bayraktar et al., 2010; Hodgkins et al., 2010; Anders et al., 2010; Moustier et al., 2010; Hingley et al., 2010; Nganje et al., 2010; shokri et al., 2010; Jiang, 2010; Conner et al., 2010; Kuo and Chen, 2010; Olsen and Aschan, 2010; Bodini and Zanoli, 2011; Bosona and Gebresenbet, 2011; Thakur et al., 2011b; Virtanen et al., 2011; Kittipanya-ngam et al., 2011; Hong et al., 2011; Binter et al., 2011; Wognum et al., 2011; Schneider and Hoffmann, 2011; Ostapenko, 2011; Naspetti et al., 2011;

AFSCQ Practices	Items	Studies
		Zhang et al., 2011; Rong et al., 2011; Magnan, 2011; Karlsen et al., 2011; Bosona and Gebresenbet, 2011; Thakur et al., 2011a; Karlsen and Olsen, 2011; Myae et al., 2011; Shen et al., 2011; Bao et al., 2012; Randrup et al., 2012; Heyder et al., 2012; Salampasis et al., 2012; Wang and Li, 2012; Collins et al., 2012; Baert et al., 2012; Angeles Sanfiel-Fumero et al., 2012; Trienekens et al., 2012; Joshi et al., 2012; Chen, 2012; Zhang and Li, 2012; O'Donovan et al., 2012; Azuara et al., 2012; Engelseth and Felzensztein, 2012; Sauer et al., 2012; Zach et al., 2012; Santa et al., 2012; Hu et al., 2013; du Plessis and du Rand, 2013; Baghalian et al., 2013; Manzini and Accorsi, 2013; Liu et al., 2013; Vivaldini and Pires, 2013; Bastian and Zentes, 2013; Storøy et al., 2013; Bosona and Gebresenbet, 2013; Aubry and Kebir, 2013; Jraisat and sawalha, 2013; Fischer, 2013; Pazos Corella et al., 2013; Piramuthu et al., 2013; Donnelly et al., 2013; Mohan et al., 2013; Zhao et al., 2013; Clasadonte et al., 2013; Louw et al., 2013; Azoury and Miyaoka, 2013; Kirezieva et al., 2013; Ku¨hne et al., 2013; Aramyan et al., 2013; Van Boxstael et al., 2013; Yu and Nagurney, 2013; Liang et al., 2013; Jie et al., 2013; McCarthy et al., 2014; Belaya and Hanf, 2014; Roggeveen, 2014; Banterle et al., 2014; Prasanna and Shiratake, 2014; Heising et al., 2014; Roggeveen, 2014; Reardon and Timmer, 2014; Wang et al., 2015; Fountas et al., 2015; Zhong et al., 2015; Kusumastuti et al., 2016.

Table 3.2: Categorization of Organizational Sustainability (OS)

Dimensions of Organizational Sustainability (OS)	Items	Studies
Economic Sustainability (ECS)	1. To reduce food processing cost. 2. To reduce logistics costs. 3. Reduce transaction cost. 4. Increase market-share. 5. Emphasis on revenues or returns from "green" products and reduce cost of the waste management.	Loader and hobbs, 1999; Lillford and Howker, 2000; Doyer and Van Rooyen, 2001; Esterhuizen et al., 2001; Yakovleva and Flynn, 2004; Hamprecht et al., 2005; Apaiah et al., 2005; Ilbery and Maye, 2005; Vasileiou and Morris, 2006; Yakovleva, 2007; Shu et al., 2007; Pretty et al., 2008; Carter and Rogers, 2008; Baker, 2008; Abate, 2008; Banterle and Stranieri, 2008b; Blandon et al., 2009; Engelseth, 2009; Chiffoleau, 2009; Hovelaque et al., 2009; Solér et al., 2010; Vakoufaris, 2010; Shaw et al., 2010; Beer and Lemmer, 2011; Wognum, *et al.*, 2011; Lazaridesa, 2011; Lehtinen, 2012; Green Jr *et al.*, 2012; Zanoni and Zavanella, 2012; Baker and Smyth, 2012; Yakovleva et al., 2012; Forsman-Hugg et al., 2013; Kronborg Jensen et al., 2013; Macharia et al., 2013; Gold et al., 2013; Wiese and Toporowski, 2013; Kretschmer et al., 2014; Reardon and Timmer, 2014; Soussana, 2014; Tsolakis et al., 2014; Lamprinopoulou et al., 2014; Nunes et al., 2014; Banterle et al., 2014; Yu et al. 2014; Prasanna and Shiratake, 2014; Van Asselt et al., 2014; Escanciano and Santos-Vijande, 2014; Kalia and Parshad, 2015; Wilkinson, 2015; Thomopoulos et al., 2015; Kırcı and Seifert, 2015; Schaltegger and Burritt, 2014; Jack et al., 2014; Siddh et al., 2014; Fountas et al., 2015; Tajbakhsh and Hassini, 2015; Gallardo et al., 2015; Vijay et al., 2015; Cai and Ma, 2015; Higgins et al., 2015; Clark et al., 2015; Bisogno, 2016; Zhong et al., 2015; Kusumastuti et al., 2016; Park et al., 2016; Suryaningrat, 2016; Voldrich, et al., 2017; Siddh, et al., 2017.
Social Sustainability (SOS)	1. Food product quality like safe, healthy. 2. Build up the social welfare schemes.	Sage, 2003; Yakovleva and Flynn, 2004; Hamprecht *et al.*, 2005; Farina et al., 2005; Apaiah et al., 2005; Ilbery and Maye, 2005; Vasileiou and Morris, 2006; Rimmington et al., 2006; Yakovleva, 2007; Bremmers et al., 2007; Pretty et

	3. Food product contributions to more population or community. 4. Specified working environment. 5. Flora and fauna centering framework. 6. Diversity or Miscellany of employees.	al., 2008; Abate, 2008; Baker, 2008; Carter and Rogers, 2008; Spence and Bourlakis, 2009; Chiffoleau, 2009; Vakoufaris, 2010; Shaw et al., 2010; Holweg et al., 2010; Beer and Lemmer, 2011; Lazaridesa, 2011; Wognum et al., 2011; Gorton et al., 2011; Oosterveer and Spaargaren, 2011; Yakovleva et al., 2012; Carbone et al., 2012; Lehtinen, 2012; Baker and Smyth, 2012; Manning, 2013; Wiese and Toporowski, 2013; Kronborg Jensen et al., 2013; Gold et al., 2013; Zhao et al., 2013; Forsman-Hugg et al., 2013; Wiese and Toporowski, 2013; Banterle et al., 2014; Nunes et al., 2014; Soussana, 2014; Tsolakis et al., 2014; Yu et al., 2014; Schaltegger and Burritt, 2014; Kretschmer et al., 2014; Stiller and Gold, 2014; Lamprinopoulou et al., 2014; Van Asselt et al., 2014; Chkanikova and Mont, 2015; Tajbakhsh and Hassini, 2015; Kırcı and Seifert, 2015; Lockie et al., 2015; Akhtar and Khan, 2015; Wilkinson, 2015; Clark et al., 2015; Handayati et al., 2015; LI et al., 2015; Higgins et al., 2015; Ali, 2016; Bisogno, 2016; Aggarwal and Srivastava, 2016.
Environmental Sustainability (ENS)	1. To reduce air emission and effluent discharge. 2. Safe and sound dumping of packaging substances. 3. To reduce utilization of harmful materials like toxic / antibiotics etc. 4. Save ecosystem.	Kerr, 1999; Banks and Bristow, 1999; Hooker and Caswell, 2000; Lillford and Howker, 2000; Esterhuizen et al., 2001; Schiefer, 2002; Gerbens-Leenes et al., 2003; Sage, 2003; Cadilhon et al., 2003; Jansen-Vullers et al., 2004; Yakovleva and Flynn, 2004; Apaiah et al., 2005; Bergstro¨m et al., 2005; Hamprecht et al., 2005; Ilbery and Maye, 2005; Henson and Reardon, 2005; Penker and Wytrzens, 2005; Sohal and perry, 2006; Bhaskaran et al., 2006; Vasileiou and Morris, 2006; Ilbery et al., 2006; Yakovleva, 2007; Bremmers et al., 2007; Yakovleva, 2007; Pretty et al., 2008; Dabbene et al., 2008; Abate, 2008; Baker, 2008; Higgins et al., 2008; Carter and Rogers, 2008; Van der Vorst et al., 2009; Chiffoleau, 2009; Wiskerke, 2009; Van Hoi et al., 2009; Yanes-Este´vez et al., 2010; Solér et al., 2010; Shaw et al., 2010; Vakoufaris, 2010; Haverkamp et al., 2010; Beer and Lemmer, 2011; Virtanen et al., 2011; Magnan, 2011; Gorton et al., 2011; Lazaridesa, 2011; Oosterveer and Spaargaren, 2011; Wognum et al., 2011; Aiello et al., 2012;

		Lehtinen, 2012; Myae and Goddard, 2012; Näyhä and Horn, 2012; Yakovleva et al., 2012; Lehtinen, 2012; Carbone et al., 2012; Green Jr et al., 2012; Baker and Smyth, 2012; Banterle et al., 2013; Kronborg Jensen et al., 2013; Gold et al., 2013; Forsman-Hugg et al., 2013; Macharia et al., 2013; Ruel et al., 2013; Wiese and Toporowski, 2013; Banterle et al., 2014; Yu et al., 2014; Van Asselt et al., 2014; Prasanna and Shiratake, 2014; Schaltegger and Burritt, 2014; Kretschmer et al., 2014; Nunes et al., 2014; Del Borghi et al., 2014; Jack et al., 2014; Escanciano and Santos-Vijande, 2014; Manzini et al., 2014; Lamprinopoulou et al., 2014; Soussana, 2014; Tsolakis et al., 2014; Wang et al., 2015; Wilkinson, 2015; Thomopoulos et al., 2015; Kırcı and Seifert, 2015; Lee et al., 2015; Lockie et al., 2015; Macfadyen et al., 2015; LI et al., 2015; Morganti and Gonzalez-Feliu, 2015; Tajbakhsh and Hassini, 2015; Fountas et al., 2015; Handayati et al., 2015; Higgins et al., 2015; Hou et al., 2015; ZHOU et al., 2015; DING et al., 2015;Clark et al., 2015; Chkanikova and Mont, 2015; Kalia and Parshad, 2015; Bisogno, 2016; Kusumastuti et al., 2016; Park et al., 2016; La Scalia, et al., 2017.

3.4.1. Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)

The Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) plays a vital role in a better and profitable execution of AFSCQ practices (Banterle et al. 2014). Sustainability plays a substantial character in all activities of each organization. It is very necessary for top management as well as employees to be well acquainted with needs of organizational sustainability. The required resources are being made available by top management to assess customer's feedback, in addition, to making up attempt to sustain them. Also, the involvement of customers in organizational activities is very vital for the success of the overall supply chain. Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) can assist customer involvement from the initial phases of advancement to the commercialization or final phase (Flynn et al. 1995). According to Ahire and Ravichandran (2001), top management leadership and commitment to AFSCQ, delineate mission and vision of the organization, setting the

succeeding environs that every member of organization boost up to concentrate on focusing customer gratification.

In innovative outlook, supplier management is viewed as top management leadership and commitment to AFSCQ that primarily emphases on supplier relationship or quality. Supplier Management (SM) denotes raw food quality and attaining environmental sustainability (Rimmington et al. 2006). Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) is important to confirm this implementation is effective or fruitful (Singh, 2008; Soler et al., 2010; siddh et al., 2015). Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) energetically take part in concerned practice will be grounded on the evaluation of more demanding measures, e.g., quality of the process, and services, etc. It confirms that organization has harmonious supplier management (Flynn et al., 1995). The top management leadership counts the quality of supplier is the major part by endorsing developed strengths of integration and keeping a relationship with the best suppliers that cause superior cooperation and collaboration among partners of the supply chain (Ellram, 1995). Perez Mesa and Galdeano-Gomez (2015) presented empirical support that in what way cooperation is associated with the performance of suppliers', a bond that is supposed to be inveigled by the humane of customer and the phase to which the market is established. Also, an effective lead of supply chain integration, information should be shared with stakeholders of the supply chain. Consequently, top management leadership has a considerable role, to confirm that sharing of information is employed positively among stakeholders of the supply chain. As well, quality of information like accuracy, credibility, and timeliness, etc. is also governed by top management for integration of supply chain (Zeng et al., 2013). From now on, propose the following hypotheses.

The top management also plays a vital part in the employees' development or progress and enthusiasm. Empowering of the employees helps them to decide their responsibilities. The top management also conducts training programs to improve skills and knowledge related to the quality of employees. Some authors show that top management leadership positively influence the human resources management (Yakovleva and Flynn, 2004; Singh, 2008; Kretschmer et al., 2014).

Moreover, internal management is measured by process management and logistics management. Process management is one of the considerable criteria for top management for organizational sustainability. Siddh et al. (2017) discussed that perspective of agri-fresh food supply chain quality is concerned with process control or process quality which is perfectly governed by top management too. As such logistic management is significantly considered for AFSCQ and also directed by top management. Nakandala (2016) established a technique to top management leaders in the fresh food supply chain for cost augmented decisions about transportation using decreasing the cost but sustaining the fresh food products quality during transportation. From now, propose the following hypotheses.

H_{01}: *The Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) positively influences the AFSCQ.*

H_{11}: *The Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) negatively influences the AFSCQ.*

3.4.2. Customer Focus (CF)

The Customer Focus (CF) is taken into account as a key part of an organization by top management (Siddh et al., 2015). Customer focus is related to necessities of customers or provides the superior product to the customer. All activities like an advancement of novel product or process, distribution, services related to after sales and marketing, etc. depends on customer focus or downstream side management. According to Ali et al. (2010) buyers or consumers are widely showing their interest for freshness/cleanliness of food products followed by quality, price, packaging, and obtainability of non-seasonal food product, etc. Mutonyi et al. (2016) discussed that reliability of food product prices like the reasonable price of food products is a dimension of price satisfaction that impacts maker's reliance on the customer. As well, the trust among makers and customer is noticed as a reliable mediator between producer constancy and price satisfaction. Lamprinopoulou and Tregear (2011) cover up the linkage to the performance of marketing by examining the contents and structure of network relationship. All of the department should communicate vision and mission among employees that are related to customer focus (Flynn et al., 1995; Aghazadeh, 2004; Nabhani and Shokri, 2009; Joshi et al., 2009; shokri et al., 2010). Lakhal et al. (2006) stated about customer focus practices that

appreciate customer needs and market opportunities. Lee et al. (1997) also discussed that planning for purchasing, production, and distribution, etc. can be active in an organization by using practices of customer focus. An organization can effectively manage machines, equipment, and human resources by taking into consideration of customer's demand during the production process to decrease process inconsistency.

Moreover, to boost the customer's welfares, organizations develop the values of work by understanding quality constraints of food products. Subsequently, errors are reduced and advances in process and services, etc., are also directed. Also, the customer's feedback reveals the needs and desires of customers so that organizations convert their attempts and start acting on them.

It is too helpful to improve the quality of internal management like the quality of process and logistics management, etc. (Ahmed et al., 2005; Louw et al., 2007, Tuominen et al., 2009; Aramyan et al., 2009; McCarthy et al., 2014). Consequently, Downstream Side Management (DSM) or Customer Focus (CF) influences the AFSCQ. From now on, propose the following hypotheses.

H_{02} *: The Custmer Focus (CF) positively influences the AFSCQ.*

H_{12} *: The Custmer Focus (CF) negatively influences the AFSCQ.*

3.4.3. Supplier Management (SM)

The Supplier Management (SM) practices shows that input raw food material meets the quality standard of process and product (Manning et al., 2006b; Kaynak and Hartley, 2008; shokri et al., 2010; Bourlakis et al., 2012). Flynn et al. (1995) discussed that specified quality of process and product would assist the organizations by supplying quality raw food at the desired time with the essential quantity. Rimmington et al. (2006) discussed that effective upstream side management or supplier management could reduce inventory, waste and keep up environment friendly goals. As a result, the supplier management influences the AFSCQ. From now, proposed the following hypothesis.

H_{03}. *The Supplier Management (SM) positively influences the AFSCQ.*

H_{13}. *The Supplier Management (SM) negatively influences the AFSCQ.*

3.4.4. Supply Chain Integration Management using IT (SCIMIT)

Integration of organizational supply chain partners using IT enhances the efficacy of the internal management (Samuel and Hines, 1999). In the case that suppliers are able to provide the high-quality raw food material used for processing of food and assist buyers to have higher quality of raw food material that can be utilized more efficiently in processing of food (Flynn et al., 1995; Dabbene et al., 2008; Hovelaque et al., 2009; Hoegl and Wagner, 2005; Hamprecht et al., 2005; Bourlakis et al., 2012). Ulwick (2005) discussed that to attain fruitfulness quality of product, process, and service; the integration of suppliers and customers with the organization is required. Flynn et al. (1995) stated that there must be communication of consciousness associated with core business developments among stakeholders of the supply chain to improve the quality of the internal management of an organization.

Information technology has a significant role in supply chain integration. Information and data sharing among stakeholders of food supply chain, with an actual purpose of reducing waste and making the feasible organizational sustainability. The paper concentrated on the flow of information and material, especially on communing necessity and information of shelf-life (Kaipia et al., 2013). Supply chain stakeholders that communicate information commonly are efficient of functioning as a distinct or single entity, jointly or cooperatively, they can make out the necessities of the consumer perfectly and henceforth, can react to market variant more rapidly. From now, proposed the following hypothesis.

H_{04} : *The Supply Chain Integration Management using IT (SCIMIT) positively influences Agri-fresh Food Supply Chain Quality (AFSCQ).*

H_{14} : *The Supply Chain Integration Management using IT (SCIMIT) negatively influences Agri-fresh Food Supply Chain Quality (AFSCQ).*

3.4.5. Internal Management (Process Management and Logistics Management)

Internal management consist the processing and logistics management of the organization. Processing management concerns to the utilization of apposite technology, quality standards and enhancing the level of automation in processes, etc. (Hamdar, 1999; Hingley et al., 2008; Jie et al., 2013). Besides, the usage of preventive maintenance makes up food processing process efficiently by managing trouble in the production system (Kittipanya-ngam et al., 2011). Adeyeye (2017) discussed the scientific involvements to reduce the challenges of food security during food processing.

Moreover, the logistics management also influences the Internal Management (IM). Logistics management suggests the facility location close to suppliers as well as customers also manage the order size (Gong et al., 2007). Paksoy et al. (2012) discussed that delay in product delivery and spoilage of the food product during transportation is reduced by logistic management. From now, proposed the following hypothesis.

H_{05} : *The Internal Management (IM) positively influences the AFSCQ.*

H_{15} : *The Internal Management (IM) negatively influences the AFSCQ.*

3.4.6. AFSCQ and Organizational Sustainability (OS)

The effective execution of agri-fresh food supply chain has the considerable effect on Organizational Sustainability (OS) like economic, social and environmental sustainability. Siddh et al. (2015) reviewed the literature associated to perishable food supply chain quality and stated that food supply chain quality practices like top management leadership, supplier quality, customer focus, information technology and quality of human resources, etc. influence on the Organizational Sustainability (OS). Ilbery and Maye (2005) also discussed food supply chain and sustainability. Siddh et al. (2017) reviewed AFSCQ and discussed that AFSCQ has the main effect on organizational sustainability as AFSCQ practices encapsulate along the complete span of the supply chain. The Organizational Sustainability covers economic, social and environmental sustainability of an organization. From now, proposed the following hypothesis.

H_{06a} : *The AFSCQ positively influences the economic sustainability of an organization.*

H_{16a} : *The AFSCQ negatively influences the economic sustainability of an organization.*

H_{06b} : *The AFSCQ positively influences the social sustainability of an organization.*

H_{16b} : *The AFSCQ negatively influences the economic sustainability of an organization.*

H_{06c} : *The AFSCQ positively influences the environmental sustainability of an organization.*

H_{16c} : *The AFSCQ negatively influences the environmental sustainability of an organization.*

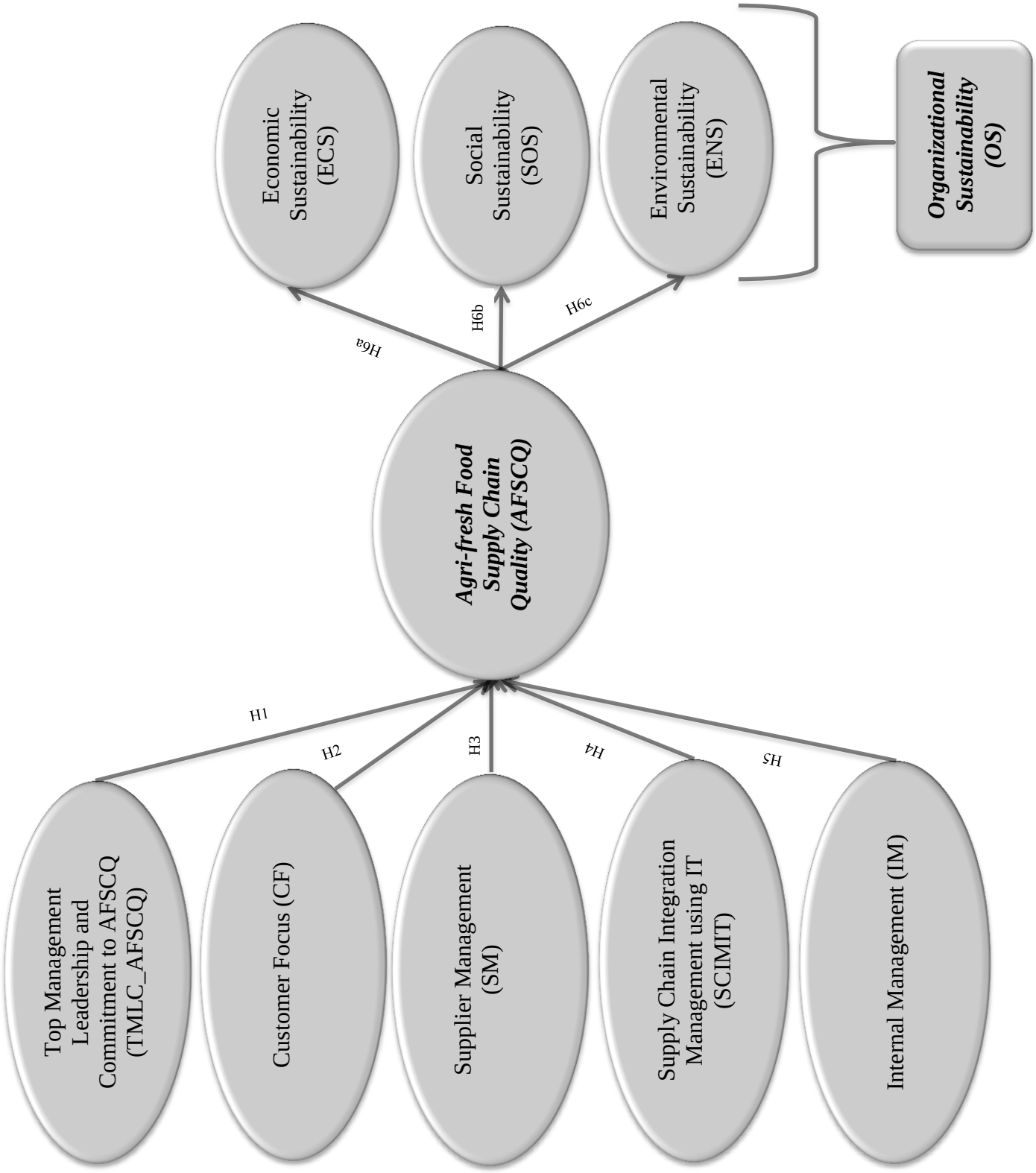


Figure 3.2: Conceptual Model of Agri-fresh Food Supply Chain Quality (AFSCQ) practices and Organizational Sustainability (OS)

3.5. Discussion

This chapter serves the main purpose of developing conceptual model of Agri-fresh Food Supply Chain Quality (AFSCQ) practices and Organizational Sustainability (OS). As expressed earlier, AFSCQ emphasizes on practices that focus on continuous procedure improvement to enrich organizational sustainability as economic, social and environmental sustainability. Therefore, organizational sustainability is a valuable outlook for AFSCQ that enables the successful organization to show the appropriate stage of variations to be conveyed in the supply chain in addition to appropriate accomplishment that can be considered. Moreover, Siddh et al. (2015) discussed the organizational sustainability in terms of perishable food supply chain quality. One more noticeable outlook is that the measurement of performance aspect is also at a rising phase in AFSCQ literature. Atilgan and McCullen (2011) expressed their concern on enhancing the performance of supply chain by examining the losses due to perishable kind of nature of products in the supply chain. These particulars suggest researchers / practitioners to preferably build up an integrated performance measurement system for the AFSCQ that will assist evaluation and propagation of consistently implemented quality practices in the all-inclusive agri-fresh food supply chain.

The bulk of the papers indicated that information management is dynamic for concentrating AFSCQ issues, though sustainability management is one more vital outlook of AFSCQ. It exposes that research towards AFSCQ practices and organizational sustainability is being focused to an immense extent. It also indicates that agri-fresh food products and concern services quality immersed should be propagated by means of integration through use of good means of communicating or interactive information amid supply chain stakeholders. In addition, the technology and moral principles of industry of agri-fresh products ought to be regulated by overarching standards of sustainability.

From the above discussion on AFSCQ and organizational sustainability, there is no model or framework available for managing AFSCQ and organizational sustainability. Siddh et al. (2017) also evaluated the literature on AFSCQ and investigated that there is no model or framework existing for governing AFSCQ in the earlier literature.

On the basis of above discussion on AFSCQ and organizational sustainability, a conceptual outline has been developed for managing of AFSCQ and organizational sustainability that is shown in Figure 3.2. The conceptual framework is proposed for managing all of the proposed constructs of AFSCQ that affect the Upstream Side Management (USM), Internal Management (IM) and Downstream Side Management (DSM) of agri-fresh food supply chain that suffered insufficient attention in the earlier literature. Zeng et al. (2013) specified that upstream side quality of supply chain mainly relates to supplier quality, internal quality of supply chain relates to processing quality even downstream side quality of supply chain primarily connects to the emphasis of customer focus. In Figure 3.2, the Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) is shown as a foundation of the AFSCQ framework. It signifies that TMLC_AFSCQ appraise the human resources management that hold up Supplier Management (SM), Internal Management (IM), Customer Focus (CF) by means of customer satisfaction and supportive practices also, like Supply Chain Integration Management using IT (SCIMIT). The Organizational Sustainability (OS) is expressed as economic, social and environmental sustainability that shows final outcome of the AFSCQ practice at the top of the concerned conceptual framework.

Moreover, the proposed conceptual model for AFSCQ and organizational sustainability is shown in Figure 3.2. The conceptual model is suggested to test the relationship between AFSCQ practices and organizational sustainability. Examining these associations is essential as it allows us to realize how the AFSCQ practices influence Organizational Sustainability (OS).

3. 6. Research implications

This chapter presents possible avenues of research in the realm of AFSCQ. The findings of the chapter expose subsequent implications for researchers.

- The agri-fresh food products have a substantial share in the economy of the world and also constitute supplies for a lot of food industries. The price of agri-fresh food has shown a critical rise through the world. Aggarwal and Srivastava (2016) discussed that agriculture based industry is the strength of developing countries' economy. Kalia and Parshad (2015) specified that superior economic returns by means of food growers also retailers can only be attained if the enormous post-harvest damages could possibly be

lessened by way of better handling and improved supply chain processes. Moreover, it is also noticed that bulk of research papers are from the developed countries in the field of AFSCQ while not as much of awareness in developing countries. Siddh et al. (2017) reviewed the literature on AFSCQ and also stated that research in the direction of AFSCQ is fast growing due to more impendence that AFSCQ is achieving. Consequently, there are numerous research opportunities in the field of AFSCQ in developing countries.

- The AFSCQ has a considerable impact on the organizational sustainability by means of the AFSCQ practices considering the complete dimensions of the supply chain. The Organizational sustainability consists of economic, social and environmental sustainability of an organization. Organizational sustainability measures are distinct from the usual measures of performance as return on investment, etc. Bisogno (2016) indicated that small supply chain can facilitate the concentration on sustainability in term of money or economic sustainability in addition to economic and environmental sustainability. Researchers or practitioners may require integrating the sustainability in numerous aspects of AFSCQ.

- In future empirical research, necessities to be focused at intra-functional as well as an intra-firm compass at the organization level and supply chain too. If possible, such empirical studies can be focused on the entire "network" closely. Otherwise, they should focus on the "dyad" stage at least where communication of small farms and suppliers is examined. Besides, Siddh et al. (2017) put emphasis on the similar facet that empirical research is necessitated to be aimed at intra- firm as well as intra-functional extent at the level of organization.

3.7. Conclusion

This chapter discusses the integration of quality and agri-fresh food supply chain that is lacking in the concerned literature. It enunciates the all-inclusive framework for advising AFSCQ. As per concerns, managerial implications in the chapter, by reviewing the quality issues contained by agri-fresh food supply chain, a conceptual framework that offers a complete depiction of essential practices or dimensions of AFSCQ and distinct facts of organizational sustainability is

suggested. This conceptual or theoretical framework of AFSCQ can be utilized as "a direction" for theory constructing and preparing a measurement instrument. Also, a conceptual model that identifies the direct, as well as indirect relationship among AFSCQ practices and dimensions of organizational sustainability, are proposed. Practitioners can utilize that model like "road map" in support of employing AFSCQ practices. Since all the endeavor of any organization must initiate by the top management leadership. Also, infrastructure supportive practices like Supply Chain Integration Management using IT (SCIMIT), Human Resources Management (HRM), etc. are then used to assists the core or central practices like Supplier Management (SM), Customer Focus (CF), and Internal Management (IM) etc..

As far as future work of this study is concerned, the proposed conceptual model requires testing of reliability and validity. It is desirable to establish rationality of these models by empirical research in distinctive perspectives. Outcomes from the subsequent empirical analysis will give evince to support the relationship or correlation between AFSCQ practices as well as organizational sustainability. These commendations imply innovative advice for upcoming researches or studies.

CHAPTER 4

AGRI-FRESH FOOD SUPPLY CHAIN QUALITY (AFSCQ) AND ORGANIZATIONAL SUSTAINABILITY (OS): AN EMPIRICAL INVESTIGATION

4.1. Introduction

Agri-fresh food produce comprise a significant portion of the world economy, supplies for various industries and the world price of many foodstuffs. This sector is also a profitable venture of all farming activities as it provides ample employment opportunities and scope to raise the income of the agricultural community. Aggarwal and Srivastava (2016) stated that in developing countries, the agriculture industry is the backbone of the economy. In the last decade, there were dramatic changes in the supply chain of agri-fresh products. Kalia and Parshad (2015) stated that better economic revenues by food growers and retailers can barely be harnessed if the huge postharvest losses could be decreased through handling and supply chain of food products. Inside agri-fresh food supply chains, raw food stuffs are transformed through packaging, distribution and related services. In this process it is very important that not only product quality is ensured but supply chain quality should be maintained as well.

The agri-fresh food supply chain quality has a major effect on organizational sustainability as the agri-fresh food supply chain quality practices sum up along the entire length of supply chain. Organizational sustainability contains economic, social and environmental sustainability of an organization. Distinctive from traditional performance measures, not only sales, return, and market share, etc., organizational sustainability consists of economic, social and environmental sustainability of an organization. Aggarwal and Srivastava (2016) found that waste reduction is an outcome of supply chain collaborative activities, which has huge social implications. Bisogno (2016) stated that short chain can help to raise the sustainability of interests in a scene of the advancement of the latest way of "doing business" making significance not only in relations of money but take a liable attitude towards sustainability issues taking into consideration the social and environmental facets. Hence objective of this study is an empirical study of Agri-fresh Food Supply Chain Quality (AFSCQ) and Organizational Sustainability (OS) in select Indian industries which follows:

- Proposition of a conceptual framework to study the relationships between AFSCQ practices and organizational sustainability.

- An empirical investigation of the relationships between AFSCQ practices and organizational sustainability in select Indian industries.

- Validating the results of empirical investigation using case study approach in select Indian industries.

In the previous chapter, the conceptual framework to study the relationship between AFSCQ practices and organizational sustainability was proposed. In this chapter, an empirical investigation of the relationships between AFSCQ practices and organizational sustainability in select Indian industries is selected as a key concern.

4.2. Research approach for conducting the empirical investigation

The research methods used to examine the replies during survey are discussed based on the methodology suggested by Flynn, *et al.,* (1990). The empirical research employs survey research design to examine proposed conceptual model of the relationship between AFSCQ practices and organizational sustainability measures, and set up AFSCQ practices and organizational sustainability measures in select Indian industries. The characteristics of good survey are:

- It does not simply focus on the work out of the author however keeps an applicable broader context.

- An effective survey should have intrinsic additional value, in the sensation that the sum should be effective than its parts. For instance, it may offer an innovative structure, point out links not remarked before, or a novel perspective for long-standing outcomes.

The flow of research work in this chapter is organized according to the stages of empirical research suggested by Flynn, *et al.,* (1990). The stages of empirical research are as follow:

Phase 1: Establish the theoretical foundation
Phase 2: Selection of research design

Phase 3: Selection of data collection method

Phase 4: Implementation

Phase 5: Data analysis

Phase 6: Findings, discussion and conclusion

The common research methodology takes on for conducting the empirical investigation is shown in Figure 4.1.

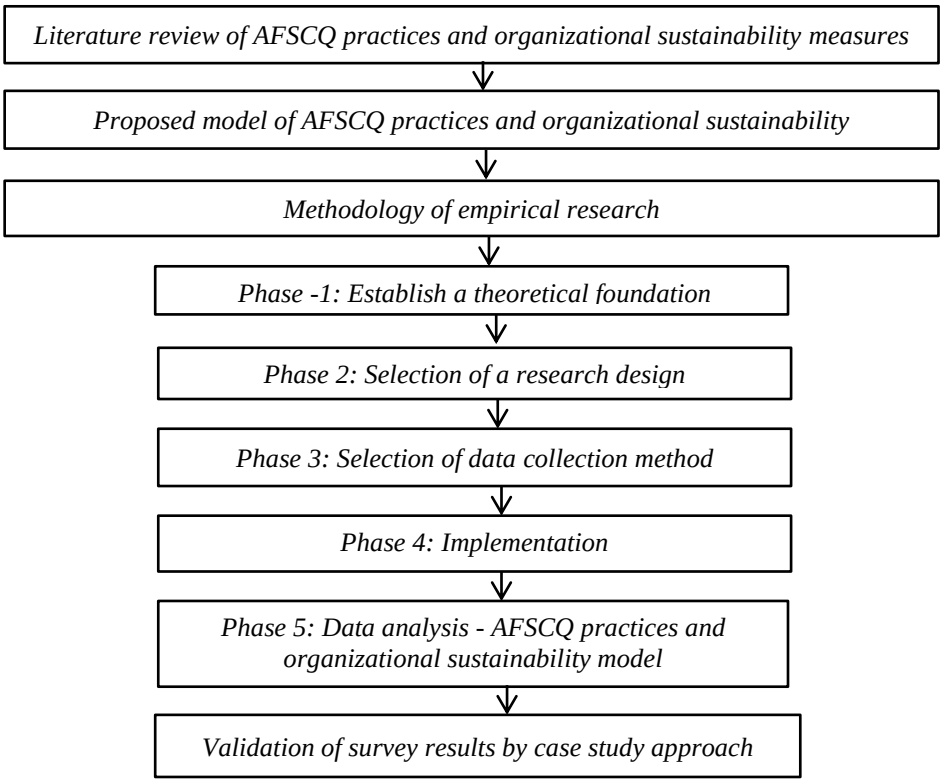


Figure 4.1 General research approach

Establish the theoretical foundation

In the Chapter 3 conceptual model of AFSCQ and related hypotheses in the subsequent stages has already been discussed comprehensively. Figure 3.2 shows the conceptual model of AFSCQ and organizational sustainability.

The conceptual model of AFSCQ practices and organizational sustainability along with the related hypothesis in Chapter 3 is totally based on a proposed theory hence in order to generalize it an empirical investigation is required. The steps of the structural model represent the initiation

of practices for AFSCQ. Examining relationship between these practices is extremely important because it allows us to understand how AFSCQ practices impact on organizational sustainability deeply.

Selection of research design

It was seen in Chapter 2 that in empirical studies, survey (macro phase) and case study (micro phase) research design are most prevalent. This study involves theory building and theory verification as well. Theory building has already been carried out in Chapter 3 with the propositioning of conceptual model of AFSCQ and organizational sustainability, thus now theory verification has to be performed. Verification of AFSCQ and organizational sustainability structural model will be done using a survey research design and later validation of survey results will be accomplished by case study.

Selection of data collection method

The most commonly used data collection method for survey research design is the use of questionnaires to retrieve the response on the observed variables in the concerned study. Hence a questionnaire is designed in two parts (Annexure – I) to achieve the research objectives of the study.

Implementation

The target population for collecting the data was Indian food industries which are related to agri-fresh food products as fruits and vegetables. The agri-fresh food industry is made up of many different sectors. In India the major Agri-fresh food supply chains are: Manufactured (processed) food supply chain, Conserved (frozen) food supply chain, and Local (short) food supply chain (Cagliano et al., 2016). Henceforth these three sectors are counted in the survey of supply chains involved in agri-fresh food in Indian food industry. The manufactured food comprises processed food, often through developed or industrialized processes, utilizing a collection of ingredients derived from numerous resources, often spread out across the earth and pre-processed. Supply networks are generally multifaceted and dynamic; often correspond with those of challengers or competitors. The conserved (frozen) food include a collection of conservation practices or techniques (canning, pasteurization, freezing, chilling, controlled atmosphere, etc.), food can be saved or stored for longer periods and transported or moved over long distances. They are

commonly functioned on a large-scale and include big or large organizations. Nowadays, "fresh" fruit and vegetables and dairy produce can be traded as "conserved food". Local (short) food supply chain includes short-distance, small-scale supply chains, usually involving medium/small companies and traditional products. They are mainly appropriate for fresh, highly or extremely perishable food products that need a very short time from the field to the table or from farm to folk.

A database of 1155 food industry which relates to agri-fresh food was extracted from industrial directory. This database covers comprehensive information but for the use of our study the industry name, address, CEO's name, designation and e-mail ID were extracted.

The survey questionnaire contained two parts (Annexure-I). Part A of the questionnaire containing question related to general information of the industry and respondent such as respondent name, designation, area of work, work experience, and number of employees etc. Part B of the questionnaire contains AFSCQ practices and organizational sustainability measures. To examine the content validity of the questionnaire items, it was sent to five experts from industry, one consultant and three academicians. The comments given by them were incorporated in the survey questionnaire and final or updated edition of the survey questionnaire was sent to CEO's of 1155 industries.

The survey questionnaire was sent as an attachment in form of MS word document along with covering letter to 1155 industry CEO's on their e-mail ID's. A considerable number of 357 mails bounced back. After thirty days only 21 responses were obtained. A responses rate of 2.63%was highly dispiriting. Thus in order to enhance the response rate, phone calls was made to the concerned respondents. It was revealed that respondents were not comfortable in giving responses via attachment, they rather favored online forms. Hence it was decided to post the survey questionnaire online by mailing the link of online survey and save their response to MS excess database. The survey questionnaire link was resent to prospective industry respondents via e-mail (deleting 357 invalid e-mail ID's). Now the response rate increased to 11.46% (with 89 responses). Saxena and Sahay (2000) stated that response rate of 8% is considered to be adequate in Indian surroundings. Ruparathna & Hewage (2015) and Gopal & Thakkar (2016) attain the response rate of 10.80% and 16.2% respectively. The major share of the survey

respondents (259 nos) were from offline mode such as personnel meet with senior management during various programme conducted by state, center governments and agriculture related departments in which India's reputed industries participated. Table 4.1 gives the statistics of the respondent industries and sector wise distribution of respondents.

4.3 Data analysis

Data has been colleceted from the selected Indian industries. The validity and reliability of the proposed conceptual model has been tested using different statistical techniques.

4.3.1. Data coding and screening

It is essential to code the respondents' data, prior to performing any inferential statistics. According to Coakes et al. (2007), the practice of coding includes the numbering of variables, their levels and values. The coding was performed for all the items of part B before carrying out the data analysis.

Next to coding, data screening was started in which the assumptions were made considering those that were generally implicit in numerous statistical analysis**.** Leech et al. (2005) advised the initial data analysis before any inferential study with the subsequent order: firstly, to look at outliers, data pattern distribution, find out any missing data; secondly, to assess the level to which the assumption of statistical methods are meet up; and lastly, demographic data of study which develops the level of comprehension about research study or problem.

4.3.2 Missing value analysis

Missing value analysis process was utilized to detect missing values and forms of missing values in the collected data. It assists to make a decision that, in what manner the missing values are to be considered. This analysis is utilized casually to assess the missing data and secure a judgment of not putting means to missing values. In collected data, there is no missing value.

4.3.3 Outliers

Mahalanobis distance (D2) was used as a measure of the outliers. It is a distance of a specific case from the centroid of outstanding cases. The centroid is a point which is generated by means

of all variables. According to Hair et al. (2006), the critical level for measure D2/Df should be lesser than 3 or 4 in big or large sample size. Herein no evince was observed of outliers after analyzed by means of SPSS 18.0 software.

4.3.4 Non responses bias

The test of non-response bias was conducted to evaluate in case there is considerable difference in items between early and late respondents. Early and late respondents were compared utilizing independent test for items. Non-response bias estimate by means of t-test analysis was carried out in order to analyze the variation in items during the early and late responses (Armstrong and Overton, 1977). The outcomes (P-value 0.342) non-response bias test was insignificant for all items at five percent significance level, therefore advising that non-response bias was not existent.

4.3.5 Statistics of respondent industries

Table 4.1: Statistics of respondent industries

Kind of industry (Sector)	**Responses received**	**Percentage**
Manufactured food industry	138	37.40
Conserved food industry	117	31.71
Local or medium/small companies	114	30.89
Region wise industries	**Number of industries**	**Percentage**
North	162	43.90
West	97	26.29
South	57	15.45
East	53	14.36
Number of Employees	**Respondent industries**	**Percentage**
100 or less	78	21.14
101 to 500	74	20.05
501 to 1000	87	23.58
1001 to 3000	67	18.16
More than 3000	63	17.07
Approximate trend of profits during the last three years	**Respondent industries**	**Percentage**
Increase up to 10% per year	52	14.09
Increase more than 10% per year	91	24.66
Almost constant	128	34.69
Decrease up to 10 % per year	98	26.56
Total no. of respondent industries = 369		

4.3.6 Descriptive statistics

Descriptive statistics are utilized to depict the elementary characteristics of the data in a study. The descriptive assessment is accomplished to examine the mean, standard deviation and to measure the shape of data distribution like skewness and kurtosis, which will assist to analyze the Agri-fresh Food Supply Chain Quality (AFSCQ) practices and its influence on organizational sustainability. Table 4.2 shows the mean, standard deviation, skewness and kurtosis of items of research constructs.

4.3.7 Testing of data set for normality

In this study the values of skewness and kurtosis of measuring items are taken into consideration as a measure to estimate normality of data set distribution. A rule of thumb for value of skewness and kurtosis of items is being between -1 to 1 or close to zero. The suitable range for skewness or kurtosis is below +1.5 and above -1.5 (Tabachnick & Fidell, 2013). Table 4.4 shows the skewness and kurtosis value of items. From the table 4.4 the uppermost value of skewness and kurtosis was -1.271, -1.090, -1.318, -1.490 and -1.229, which is closely near to range between -1 to 1.

4.3.8 Reliability test

The reliability test is utilized for checking of internal consistency between set of items of a construct. Estimate cronbach's alpha is a measure of internal consistency. In general, a score of cronbach's alpha (α) higher than 0.7 is considered acceptable (Flynn, et al., 1990). The final cronbach's alpha scores for these constructs varied from 0.674 to 0.830, which is counted to be a satisfactory indicator of reliability of the scale. Table 4.7 shows all the values of cronbach's alpha (α).

Table 4.2: Descriptive statistics of items of research constructs

Constructs	Code	Items Description	Code	Mean	Standard Deviation	Skewness	Kurtosis
Top Management Leadership and Commitment to AFSCQ	TMLC_AFSCQ	Commitment to customer satisfaction	TMLC_AFSCQ 1	4.41	.653	-.650	-.597
		Commitment to supplier relationship	TMLC_AFSCQ 2	3.63	.838	-.077	-.578
		Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistics conditions	TMLC_AFSCQ 3	4.27	.748	-.790	.216
		Human resource management	TMLC_AFSCQ 4	3.75	.851	-.143	-.674
Customer Focus	CF	Brand awareness toward quality of food product	CF1	4.54	.575	-.812	-.336
		Emphasis on product variety or diversity	CF2	3.47	.718	-.390	.418
		Frequently communication with customers, like consistent or routine survey of customer's view.	CF3	3.72	1.062	-.583	-.379
		Improve customer's convenience by providing significant information on the packaging of food product.	CF4	4.23	.796	-.632	-.572
Supplier Management	SM	Quality of supplier's raw food	SM1	3.38	.661	.604	.233
		Set up long-term relationships with suppliers	SM2	4.21	.668	-.386	-.315
		Actively suppliers' engagement in organizational supply chain quality development courses.	SM3	3.91	.836	.024	-1.271
		Collaboration and coordination along with suppliers for attaining eco-friendly goals.	SM4	3.80	.821	-.083	-.713
Supply Chain Integration Management using IT	SCIMIT	Technological integration among the entire supply chain activities and processes	SCIMIT1	3.79	.600	-.418	.616
		Unbiased profit distributing among entire supply chain stakeholders to keep lifelong relationship	SCIMIT2	4.24	.703	-.523	-.331
		E-commerce (Exchange of data among supply chain stakeholders)	SCIMIT3	4.41	.641	-.808	.481
		Traceability and Tracking of the entire supply chain	SCIMIT4	3.82	.935	-.227	-.846

Constructs	Code	Items Description	Code	Mean	Standard Deviation	Skewness	Kurtosis
Internal Management	IM	Continuous process improvement for internal process control or improving processing quality and emphasis on research and development related to food processing quality	IM1	3.62	.681	-.236	-.062
		Quality standards to make sure assured quality of food product	IM2	4.20	.753	-.536	-.448
		Standard conditions for food product storage and transportation	IM3	4.42	.672	-.743	-.561
		Inventory management	IM4	4.42	.715	-.817	-.631
Economic Sustainability	ECS	To reduce food processing and logistics cost	ECS1	3.95	.816	-.262	-.690
		Reduce transaction cost	ECS2	4.17	.602	-.089	-.387
		Increase market-share	ECS3	3.56	.716	.333	-.378
		Emphasis on revenues or returns from "green" products and reduce cost of the waste management.	ECS4	3.96	.725	.058	-1.090
Social Sustainability	SOS	Food product quality like safe, healthy	SOS1	3.85	.866	.111	-1.318
		Build up the social welfare schemes. Food product contributions to more population or community	SOS2	3.49	.684	.137	-.205
		Specified working environment	SOS3	3.34	.706	.472	.137
		Flora and fauna centering framework	SOS4	3.57	.738	.238	-.391
		Diversity or Miscellany of employees	SOS5	4.02	.834	-.069	-1.490
Environmental Sustainability	ENS	To reduce air emission and effluent discharge	ENS1	3.86	.811	-.326	-.380
		Safe and sound dumping of packaging substances	ENS2	3.34	.920	.192	-.780
		To reduce utilization of harmful materials like toxic / antibiotics etc.	ENS3	3.82	1.025	-.208	-1.229
		Save ecosystem	ENS4	4.14	.874	-.659	-.488

4.3.9 Profile of respondents

Table 4.3 shows the profile of the respondent. The respondent profile consists of work experience and position of respondent in the concerned industry.

Acoording to work experience of the respondent, Table 4.3 shows that 20.05 percent respondents have less than five year work experience, 42.82 percent respondents have 5 to 10 year work experience and 37.13 percent respondents have higher than 10 year work experience.

According to position of the respondent Table 4.3 shows that 8.67 percent respondents are from precedents/CEO level of industry, 20.05 percent respondents are form senior management level of industry, 42.55 percent respondents are form middle management level of industry and 28.73 percent respondents are junior management level of industry.

Table 4.3: Profile of respondents

Work experience (Years)	**Frequency**	**%**
<five years	74	20.05
5-10 years	158	42.82
> ten years	137	37.13
Respondent position	**Frequency**	**%**
Precedents/CEO	32	8.67
Senior management	74	20.05
Middle management	157	42.55
Junior management	106	28.73

4.3.10. Establishing constructs

Factor analysis is primarily utilized for data reduction and extraction of factors or constructs. Factor analysis is utilized to establish the factors or constructs that could be utilized to explain the correlations among a set of items or variables (Mitra & Datta, 2014). In this study factor analysis is utilized for data reduction and extracts research constructs concerned with AFSCQ practices and organizational sustainability. The Principle Component Analysis (PCA) including varimax rotation was utilized for extraction of constructs. The first step to be taken into consideration before beginning PCA is to test the suitability of data for study.

In this study, it is highly important to reveal whether the sample size of 369 is appropriate for performing factor analysis by means of PCA approach. There are various outlooks concerning the appropriateness of sample size. Hutcheson and Sofroniou (1999) suggested as a minimum 150-300 response. Though Comrey and Lee (1992) considered a sample size of 200 is acceptable. PCA was performed utilizing varimax rotation that produced 08 constructs on the basis of eigenvalues (>1, Kaiser's criteria) which considered 61.951 percent of total variance. Factor analysis consists of a number of steps or stages which are explained in subsequent sections.

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity

In the starting, two essential tests were performed namely Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy as well as Bartlett's test of sphericity. These two tests assess the relevance of pertaining factor analysis (Field, 2009). The lowest possible value is 0.5 for KMO measure which is acceptable (Malhotra and Dash, 2011). As well for Bartlett's test of sphericity the significant value is 0.000. In this study the value of KMO measure is (.843) and value of Bartlett's test is (Sig. 0.000) shows suitability of data for factor analysis. Table 4.4 shows the value of KMO measure and Bartlett's test of sphericity.

Table 4.4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.843
Bartlett's Test of Sphericity	Approx. Chi-Square	4545.317
	df	528
	Sig.	.000

Determinant = 2.868E-006

Eigen value

PCA was carried out utilizing varimax rotation that produced 08 components on the basis of eigenvalues (>1, Kaiser's criteria). Hair et al., (2006) suggested that Kaiser's criterion is taking into consideration for the number of variables between 20 and 50. In this case the number of variable or items is 33. Hence scree plot was not taken into consideration. Table 4.5 shows the Eigen values for each component.

Factor Loading

The factor loadings represent correlation of distinctive variables (items) with each component or factor and also the level of correlation. Items with loadings above 0.4 were taken into consideration. Comrey and Lee, (1992) suggested that loadings above 0.71 are regard as excellent, 0.63 very good, 0.55 good, 0.45 acceptable and 0.32 insignificant. Henceforth, by going throughout all the items or variables for a distinct factor or construct and by taking into consideration factor loading (from rotated component matrix) of items exceeding 0.4, all the items or variables were designated under one construct or factor. It is notable here that all cross loadings got eliminated by taking into consideration factor loadings exceeding 0.4.

Table 4.6 shows the rotated component matrix. In the rotated component matrix items are strongly loading on each of the extracted constructs. The rotated component matrix for Agri-fresh Food Supply Chian Quality (AFSCQ) practices and dimension of organizational sustainability are measured with considerable factor loading on their unique constructs. The factor loadings are ranging from 0.532 to 0.839 and there are no cross loadings between constructs.

Table 4.5: Total Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.837	20.719	20.719	6.837	20.719	20.719	3.139	9.513	9.513
2	3.019	9.148	29.866	3.019	9.148	29.866	2.783	8.434	17.946
3	2.543	7.706	37.573	2.543	7.706	37.573	2.669	8.088	26.034
4	2.203	6.675	44.247	2.203	6.675	44.247	2.583	7.827	33.862
5	1.866	5.654	49.901	1.866	5.654	49.901	2.483	7.525	41.386
6	1.475	4.469	54.370	1.475	4.469	54.370	2.479	7.513	48.899
7	1.276	3.866	58.236	1.276	3.866	58.236	2.193	6.646	55.545
8	1.226	3.715	61.951	1.226	3.715	61.951	2.114	6.405	61.951
9	.925	2.802	64.753						
10	.843	2.556	67.308						
11	.786	2.383	69.691						
12	.686	2.080	71.771						
13	.682	2.068	73.839						
14	.657	1.992	75.831						
15	.637	1.932	77.763						
16	.596	1.806	79.569						
17	.571	1.732	81.301						
18	.560	1.696	82.997						
19	.508	1.539	84.537						
20	.496	1.504	86.041						
21	.483	1.462	87.503						
22	.448	1.358	88.861						
23	.440	1.333	90.193						
24	.414	1.254	91.447						
25	.391	1.184	92.631						
26	.383	1.159	93.790						
27	.353	1.071	94.861						
28	.335	1.015	95.876						
29	.311	.941	96.818						
30	.308	.932	97.750						
31	.273	.827	98.577						
32	.251	.761	99.338						
33	.219	.662	100.000						

Extraction Method: Principal Component Analysis.

Table 4.6: Rotated Component Matrix

Rotated Component Matrix[a]

	Component							
	1	2	3	4	5	6	7	8
SOS4	.798							
SOS5	.774							
SOS2	.761							
SOS3	.753							
SOS1	.747							
TMLC_AFSCQ3		.736						
TMLC_AFSCQ1		.723						
TMLC_AFSCQ2		.647						
TMLC_AFSCQ4		.638						
IM2			.783					
IM3			.705					
IM1			.683					
IM4			.634					
SM2				.786				
SM4				.769				
SM1				.754				
SM3				.740				
CF1					.825			
CF3					.678			
CF2					.663			
CF4					.637			
ECS4						.839		
ECS3						.778		
ECS2						.758		
ECS1						.687		
SCIMIT3							.830	
SCIMIT2							.687	
SCIMIT1							.657	
SCIMIT4							.532	
ENS4								.715
ENS3								.705
ENS1								.705
ENS2								.699

Internal consistency analysis for eight constructs

Internal consistency analysis was utilized to assess reliability of each construct (Nunnally, 1967). The value of cronbach's alpha was estimated for all constructs. Precisely, cronbach's alpha is established by the average correlation of items or variables in a test (Ngai and Cheng, 1997). The value of cronbach's alpha higher than 0.6 is preferred to reveal internal consistency. According to Flynn et al., (1990) the greatly favored value of cronbach's alpha is 0.7. Table 4.9 shows that each construct have higher value of cronbach's alpha from the acceptable range. From the reliability analysis the study established five constructs of AFSCQ practices i.e. Top management leadership and commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Supply Chain Integration Management using IT (SCIMIT) and Internal Management (IM) also three outcome constructs i.e. Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS).

Table 4.7: Internal consistency for constructs

Sr. No.	Constructs	No. of Items	Cronbach's alpha
1	Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)	4	.758
2	Customer Focus (CF)	4	.775
3	Supplier Management (SM)	4	.809
4	Supply Chain Integration Management using IT (SCIMIT)	4	.729
5	Internal Management (IM) or Process Management (PM) and Logistics Management (LM)	4	.775
6	Economic Sustainability (ECS)	4	.773
7	Social Sustainability (SOS)	5	.830
8	Environmental Sustainability (ENS)	4	.674

Evaluation of validity

In the literature, three kinds of validity are generally taken into consideration first is content validity, second is criterion related validity, and third is construct validity.

To test the content validity of the measurement items, it was forwarded to three practitioners in industry, one or two consultant and three academicians. The comments passed by them were incorporated in the measurement instrument. Pilot study was also performed before it could be

mailed or dispatched to the industry. Ten production / purchasing / supply chain managers, each belonging to food industry in north India, were communicated and informed about the purpose of this research study. And, they were invited to respond the survey instrument. Thus, from the suggestions given by them, all the inconsistencies were sought out and the finishing form of the survey questionnaire was mailed to practitioners of industries.

The criteria related validity involves checking the performance by comparing it with some standard performance criteria. Table 4.10 shows bivariate correlations and it is visible that for both criteria which are related there is a high correlation. Thus, the criteria related validity is represented by the scale.

Table 4.8: Bivariate correlation analysis

Correlations								
	TMLC_AFSCQ	CF	SM	SCIMIT	IM	ECS	SOS	ENS
TMLC_AFSCQ	1							
CF	.479**	1						
SM	.333**	.368**	1					
SCIMIT	.399**	.450**	.281**	1				
IM	.485**	.515**	.311**	.495**	1			
ECS	.035	.127*	.171**	.192**	.121*	1		
SOS	.117*	.144**	.215**	.139**	.135**	.005	1	
ENS	.034	-.056	.112*	.055	.054	.029	.061	1
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

The construct validity is performed in order to get an estimate if items in the scale measure similar construct. This estimate is done with the help of PCA. Matrices with Eigen value more than one show that constructs are uni-factorial.

Table 4.9: Summarised factor matrices

Sr. No.	Name of Constructs	KMO	% variance	Eigen Value
1	Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)	0.774	58.355	2.334
2	Customer Focus (CF)	0.790	62.121	2.485
3	Supplier Management (SM)	0.774	64.256	2.570
4	Supply Chain Integration Management using IT (SCIMIT)	0.764	56.725	2.269
5	Internal Management (IM)	0.772	59.738	2.390
6	Economic Sustainability (ECS)	0.706	60.150	2.406
7	Social Sustainability (SOS)	0.825	60.032	3.002
8	Environmental Sustainability (ENS)	0.723	50.794	2.032

Results obtained through this study display reliable construct validity of the developed scales. Table 4.9 shows the construct validity, where the KMO value varies from 0.706 – 0.825 and Eigen value is greater than 1, as a result all constructs are in favor of factor analysis.

4.4. Structural equation model and statistical investigation

The objective of this section is to identify and validate Agri-fresh Food Supply Chain Quality (AFSCQ) model for Indian food industry. The prime focus is statistical investigation the AFSCQ model and hypothesis testing which are well-defined in the Chapter 3. The relationship among Agri-fresh Food Supply Chain Quality (AFSCQ) and Organizational Sustainability (OS) as economic, social and environmental sustainability are investigated by means of structural equation modeling (SEM).

Structural equation modeling

Structural Equation Modeling (SEM) is a multivariate statistical analysis method that is utilized to examine structural relationships. SEM method is the combination of factor analysis and multiple regression analysis, as well as it is utilized to examine the structural relationship concerning measured items and latent constructs. A SEM comprises of two type models one is measurement model and another is structural model.

Two-step modeling approach

In the two-step modeling approach, the first step is the assessment of measurement model to enumerate how observed variable come together to signify the theory. In the existing study eight constructs are considered that is Top management leadership and commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Supply Chain Integration Management using IT (SCIMIT), Internal Management (IM), Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS). The consequence of this assessment recognizes the properties of measurement model. Measurement model is well-defined for each dependent and independent construct**.** In the second step, the structural model signifies the theory that presents how constructs are related to other constructs. SEM is also known as casual modeling for the reason that it examines the suggested causal relationship.

Method of model estimation

Software package for Structural Equation Modeling (SEM), AMOS 18.0 was utilized to perform CFA. The Maximum Likelihood (ML) estimation method was applied. Current research also displays that ML estimation method can be utilized for data with minor deviations from normality (Wang and Ahmed, 2004; Raykov and Widaman, 1995). There are some assumptions required to be justified in order to apply the ML method (Velicer and Fava, 1998). These are sample size should be sufficient; observed variables (items) scale should be continuous; hypothesized model should be authentic; observed variable (items) distribution should be multivariate normal.

The data collected for this study sustain the main necessity as the sample size is 369. Velicer and Fava (1998) suggested that in Exploratory Factor Analysis (EFA), factor loadings size, number of variables (items) and sample size were prominent elements in attaining a good factor model.
This can be simplified to SEM models as well. Since the sample size of 369 is found to be apposite for EFA, it is adequate & sufficient for SEM as well. The scale of the observed variables (items) is continuous and the hypothesized model is build up from the literature, hence it is valid. Lastly, Maximum Likelihood Estimation (MLE) method is utilized as the research constructs accomplish the state of multivariate normality (estimated).

Model-fit indices

Model-fit indices estimate model fit for the data being analyzed. Some of the generally used model-fit indices are: chi-squared ($\chi 2$); Goodness of Fit Index (GFI); Adjusted Goodness of Fit Indices (AGFI); Normed Fit Index (NFI); Comparative Fit Index (CFI); Root Mean Square Error of Approximation (RMSEA) and Root Mean Square Residual (RMR) (Smith, and McMillan, 2001). Table 4.12 shows the permissible range of model fit indices from the operation research arenas (Shah and Goldstein, 2006).

Table 4.10: Indices of model-fit

Model fit indices	Permissible range
($\chi 2$), df, p	p>0.05
($\chi 2$)/df	0.02 - 4.80
GFI	0.75 - 0.99
AGFI	0.63 - 0.97
NFI	0.72 - 0.99
CFI	0.88 -1.00
RMSEA	0.00 - 0.13
RMR	0.010 - 0.140

(Source: Shah and Goldstein, 2006; Gotschol, et al. 2014)

Structural Equation Modeling (SEM) process

The process of SEM is shown in Figure 4.2. It consists of a number of steps, which are: Defining individual constructs; Developing the overall measurement model; Assessing the validity of measurement model; Specify structural model if validity of measurement model is ok; Examine the validity of structural model; Point out conclusions and mark suggestions if validity of structural model is ok (Kline 2005; Hair et al. 2013).

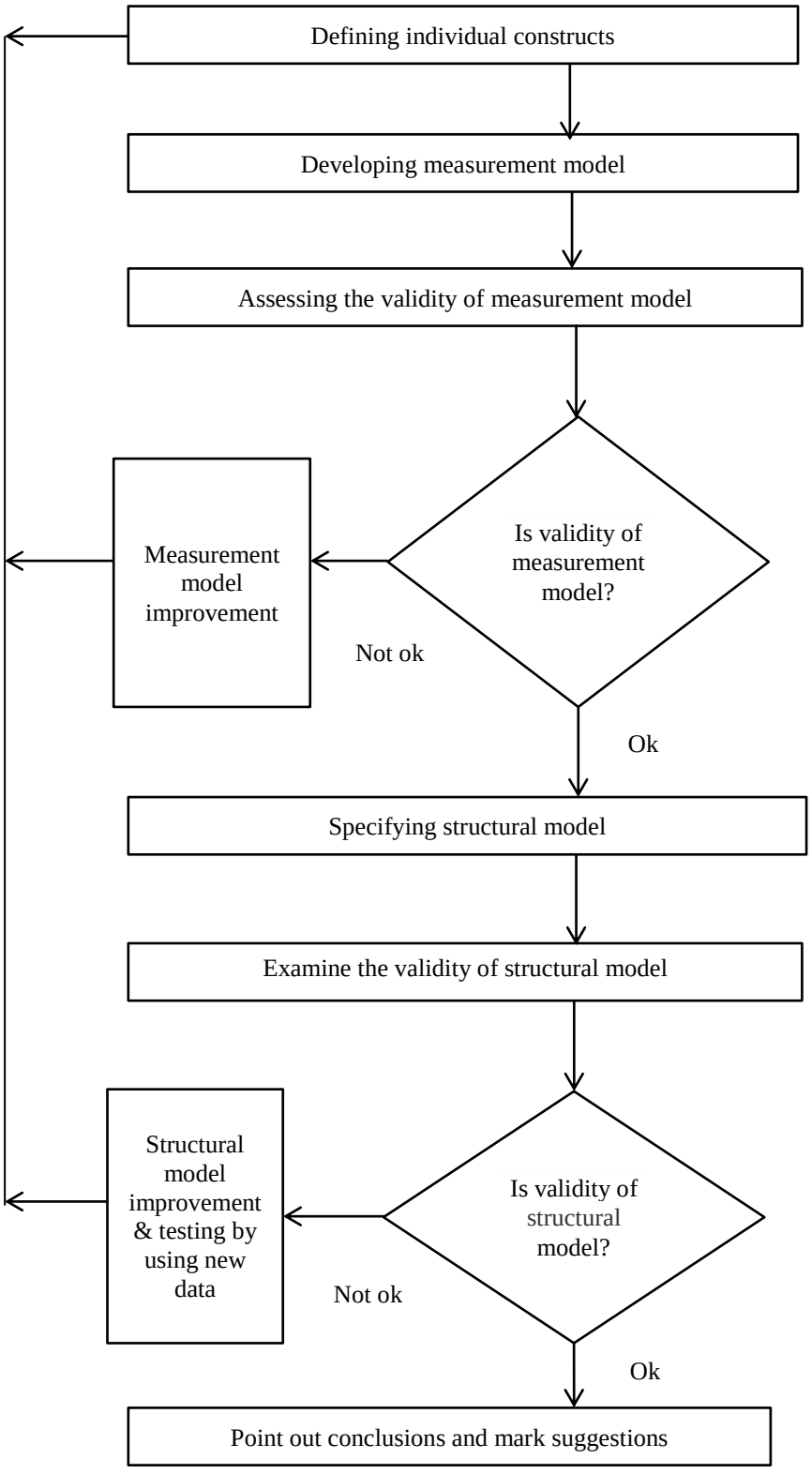


Figure 4.2: Structural Equation Modeling (SEM) process
(Source: Malhotra and Das, 2011)

Defining individual constructs

The first step is defining the constructs theoretically. In the Chapter 3, the latent constructs or unobserved variable are defined theoretically with items or observed variables. Table 4.11 defines the total eight individual constructs (independent and dependent) i.e. Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ); Customer Focus (CF); Supplier Management (SM); Supply Chain Integration Management using IT (SCIMIT); Internal Management (IM); Economic Sustainability (ECS); Social sustainability (SOS); Environmental sustainability (ENS).

Table 4.11: Defining individual constructs

Sr. No.	Latent Constructs	Items
1	Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)	TMLC_AFSCQ i; Where i = 1 to 4
2	Customer Focus (CF)	DSMi or CF; Where i= 1 to 4
3	Supplier Management (SM)	USMi; or SMi Where i= 1 to 4
4	Supply Chain Integration Management using IT (SCIMIT)	SCIMITi; Where i= 1 to 4
5	Internal Management (IM)	IMi; Where i= 1 to 4
6	Economic Sustainability (ECS)	ECSi; Where i= 1 to 4
7	Social Sustainability (SOS)	SOSi; Where i= 1 to 5
8	Environmental Sustainability (ENS)	ENPi; Where i= 1 to 4

Developing the measurement model by using confirmatory factor analysis

For developing the measurement model of research constructs (top management leadership and commitment to AFSCQ, customer focus, supplier management, supply chain integration management using IT, internal management, economic sustainability, social sustainability and environmental sustainability), the items (observed variables) were extracted or obtained from literature review, concerned industry professionals and expert view or opinion. A survey questionnaire on five point likert scale was utilized to collect the data or responses (total 369) from three sectors viz. manufactured, conserved and local or medium/small of Indian food industry. Moreover CFA was conducted to make a measurement model (Narasimhan and Kim, 2002; Sarkis et al., 2010). In this research study AMOS 18.0 program with Maximum Likelihood (ML) estimation method was employed. A sequence of processes were utilized to confirm that

all suggested measurement items or observed variables signify the latent constructs and latent constructs signify the model.

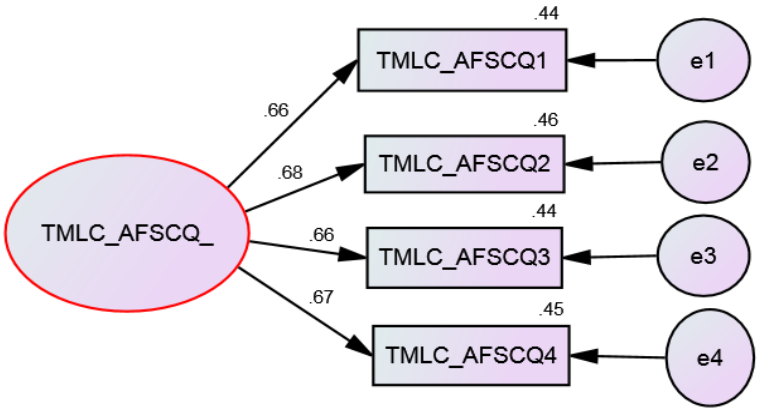
4.4.1. One - factor congeneric measurement model

In assessing whether a measurement is unidimensional, each item or variable of a latent construct is considered as a one-factor congeneric model. In SEM, a rectangle displays an observed item or variable and a circle display a latent construct. Anderson and Gerbing (1988) discussed that one-factor congeneric model consists a model of individual construct which is evaluated by observed items or variables. This research study comprises eight constructs.

There are a number of indices taken into consideration for good level of fit of measurement model. Some of the generally used model-fit indices are: Chi-squared ($\chi 2$); Goodness of Fit Index (GFI); Adjusted Goodness of Fit Indices (AGFI); Normed Fit Index (NFI); Comparative Fit Index (CFI); Root Mean Square Error of Approximation (RMSEA) and Root Mean Square Residual (RMR) (Smith, and McMillan, 2001).

One - factor congeneric model of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)

The latent construct of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) comprises four observed items or variables specify TMLC_AFSCQ1 to TMLC_AFSCQ4. The one-factor congeneric model of TMLC_AFSCQ was observed statistically considerable for further or additional analysis because of the values of model fit indices are in permissible range as displayed in Figure 4.3 and Table 4.12 as well. Table 4.12 represents regression weights of TMLC_AFSCQ. Moreover the factor loading of observed variables or items is higher than .66 (standardized) which assist construct validity of TMLC_AFSCQ.



Model Fit Indices (TMLC_AFSCQ)	Model Values
(χ2)/df	1.731
GFI	0.995
AGFI	0.976
RMR	0.01
NFI	0.990
CFI	0.996
RMSEA	0.045

Figure 4.3: Measurement model of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)

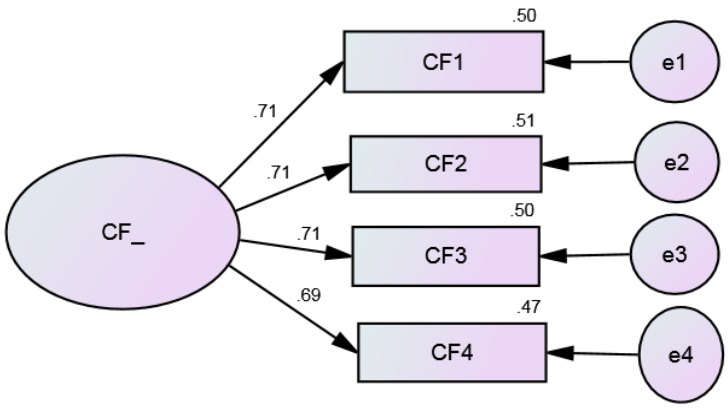
Table 4.12: Regression weights of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)

			Estimate (Unstandardized)	Estimate (Standardized)	Standard Error (S.E.)	Critical Ratio (C.R.)	P
TMLC_AFSCQ1	<---	TMLC_AFSCQ_	0.758	0.662	0.080	9.515	***
TMLC_AFSCQ2	<---	TMLC_AFSCQ_	0.991	0.675	0.103	9.620	***
TMLC_AFSCQ3	<---	TMLC_AFSCQ_	0.865	0.660	0.091	9.500	***
TMLC_AFSCQ4	<---	TMLC_AFSCQ__	1.000	0.671			

***P≤0.001

One - factor congeneric model of Customer Focus (CF)

The latent construct of Customer Focus (CF) comprises of four items or observed variables specified as CF1 to CF4. The one-factor congeneric model of CF was observed statistically considerable for further or additional analysis because of the values of model fit indices are in permissible range as displayed in Figure 4.4 with Table 4.13 also. Table 4.13 represents regression weights of Customer Focus (CF). In addition to this, the factor loading of observed variables or items is higher than 0.69 (standardized) which assist construct validity of CF.



Model Fit Indices (CF)	Model Values
(χ2)/df	2.337
GFI	0.993
AGFI	0.967
RMR	0.011
NFI	0.989
CFI	0.994
RMSEA	0.060

Figure 4.4: Measurement model of Customer Focus (CF)

Table 4.13: Regression weights of Customer Focus (CF)

			Estimate (Unstandardized)	Estimate (Standardized)	Standard Error (S.E.)	Critical Ratio (C.R.)	P
CF1	<---	CF	0.540	0.706	0.049	10.997	***
CF2	<---	CF	0.683	0.715	0.062	11.085	***
CF3	<---	CF	1.000	0.708			
CF4	<---	CF	0.728	0.686	0.067	10.791	***

***P≤0.001

One - factor congeneric model of Supplier Management (SM)

The latent construct of Supplier Management (SM) comprises of four items or observed variables specified as SM1 to SM4. The one-factor congeneric model of SM was observed statistically considerable for further or additional analysis because of the values of model fit indices are in permissible range as displayed in Figure 4.5 with Table 4.14 also. Table 4.14 represents regression weights of Supplier Management (SM). Additionally the factor loading of observed variables or items is higher than 0.63 (standardized) which assist construct validity of SM.

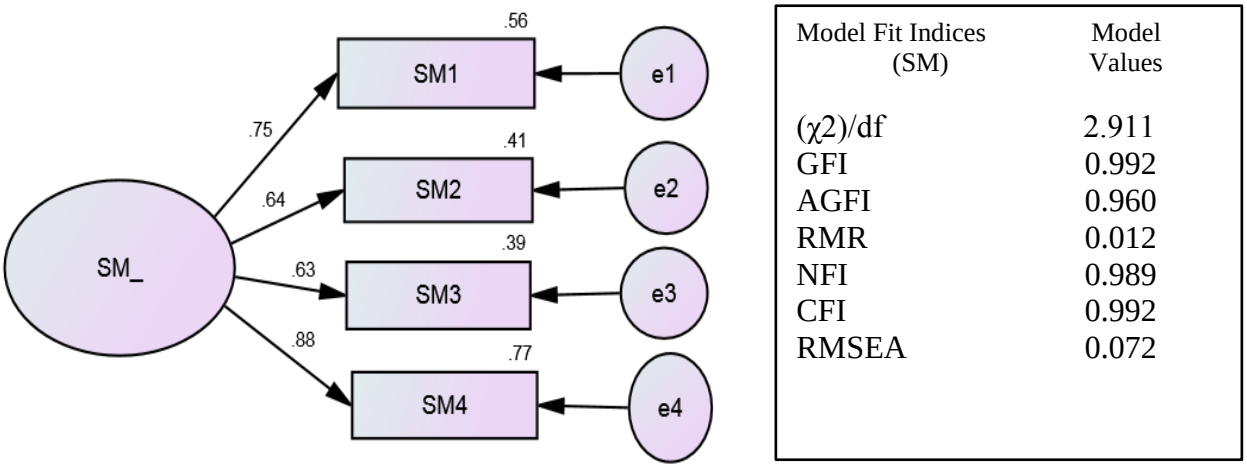


Figure 4.5: Measurement model of Supplier Management (SM)

Table 4.14: Regression weights of Supplier Management (SM)

			Estimate (Unstandardized)	Estimate (Standardized)	Standard Error (S.E.)	Critical Ratio (C.R.)	P
SM1	<---	SM	0.686	0.748	0.049	14.073	***
SM2	<---	SM	0.590	0.637	0.049	12.033	***
SM3	<---	SM	0.726	0.626	0.061	11.806	***
SM4	<---	SM	1.000	0.878			

***P≤0.001

One - factor congeneric model of Supply Chain Integration Management using IT (SCIMIT)

The latent construct of Supply Chain Integration Management using IT (SCIMIT) comprises of four items or observed variables specified as SCIMIT1 to SCIMIT4. The one-factor congeneric model of SCIMIT was observed statistically considerable for further or additional analysis because of the values of model fit indices are in permissible range as displayed in Figure 4.6 with Table 4.15 also. Table 4.15 represents regression weights of Supply Chain Integration Management using IT (SCIMIT). Moreover the factor loading of observed variables or items is higher than 0.61 (standardized) which assist construct validity of SCIMIT.

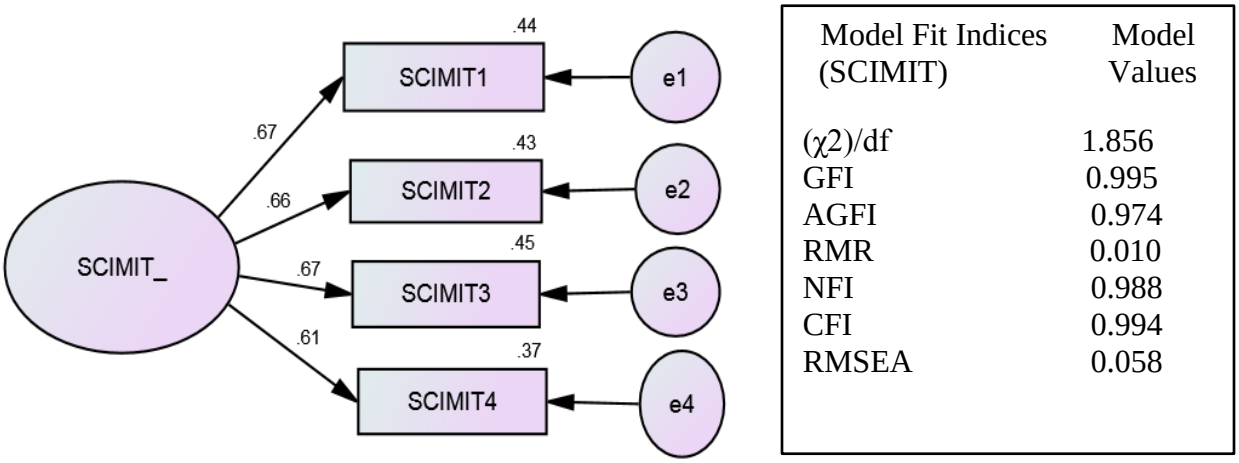


Figure 4.6: Measurement model Supply of Chain Integration Management using IT (SCIMIT)

Table 4.15: Regression weights of Supply of Chain Integration Management using IT (SCIMIT)

			Estimate (Unstandardized)	Estimate (Standardized)	Standard Error (S.E.)	Critical Ratio (C.R.)	P
SCIMIT1	<---	SCIMIT	0.700	0.667	0.080	8.769	***
SCIMIT2	<---	SCIMIT	0.807	0.655	0.093	8.699	***
SCIMIT3	<---	SCIMIT	0.749	0.668	0.085	8.774	***
SCIMIT 4	<---	SCIMIT	1.000	0.611			

***P≤0.001

One - factor congeneric model of Internal Management (IM)

The latent construct of Internal Management (IM) comprises of four items or observed variables specified as IM1 to IM4. The one-factor congeneric model of IM was observed statistically considerable for further or additional analysis because of the values of model fit indices are in permissible range as displayed in Figure 4.7 with Table 4.16 also. Table 4.16 represents regression weights of Internal Management (IM). Besides this, the factor loading of observed variables or items is higher than 0.60 (standardized) which assist construct validity of IM.

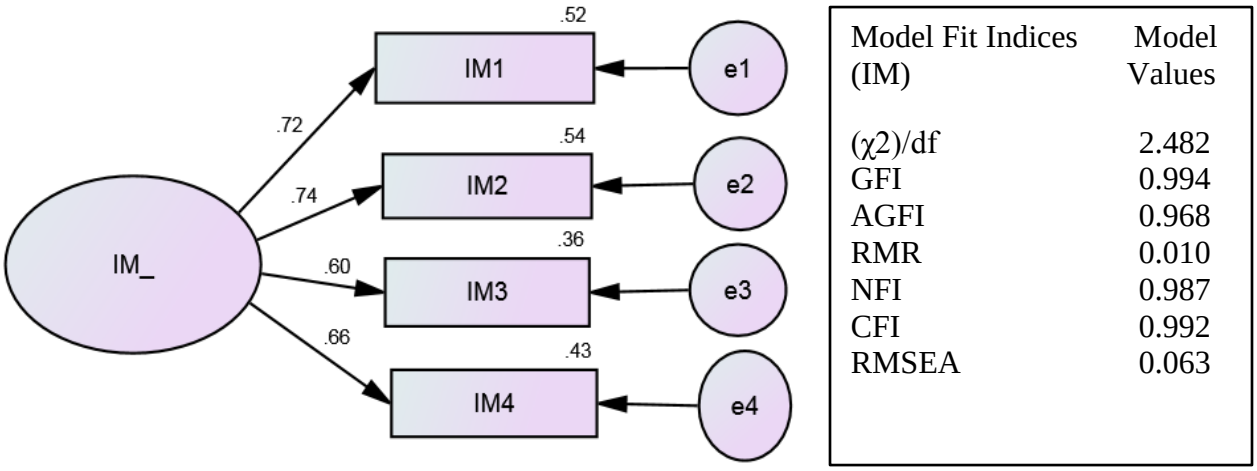


Figure 4.7: Measurement model of Internal Management (IM)

Table 4.16: Regression weights of Internal Management (IM)

			Estimate (Unstandardized)	Estimate (Standardized)	Standard Error (S.E.)	Critical Ratio (C.R.)	P
IM1	<---	IM	0.890	0.724	0.081	10.956	***
IM2	<---	IM	1.000	0.736			
IM3	<---	IM	0.730	0.602	0.076	9.666	***
IM4	<---	IM	0.849	0.659	0.082	10.374	***

***P≤0.001

One - factor congeneric model of Economic Sustainability (ECS)

The latent construct of Economic Sustainability (ECS) comprises of five items or observed variables specified as ECS1 to ECS4. The one-factor congeneric model of ECS was observed statistically considerable for further or additional analysis because of the values of model fit indices are in permissible range as displayed in Figure 4.8 with Table 4.17 also. Table 4.17 represents regression weights of Economic Sustainability (ECS). Additionally, the factor loading of observed variables or items is higher than 0.49 (standardized) which assist construct validity of ECS.

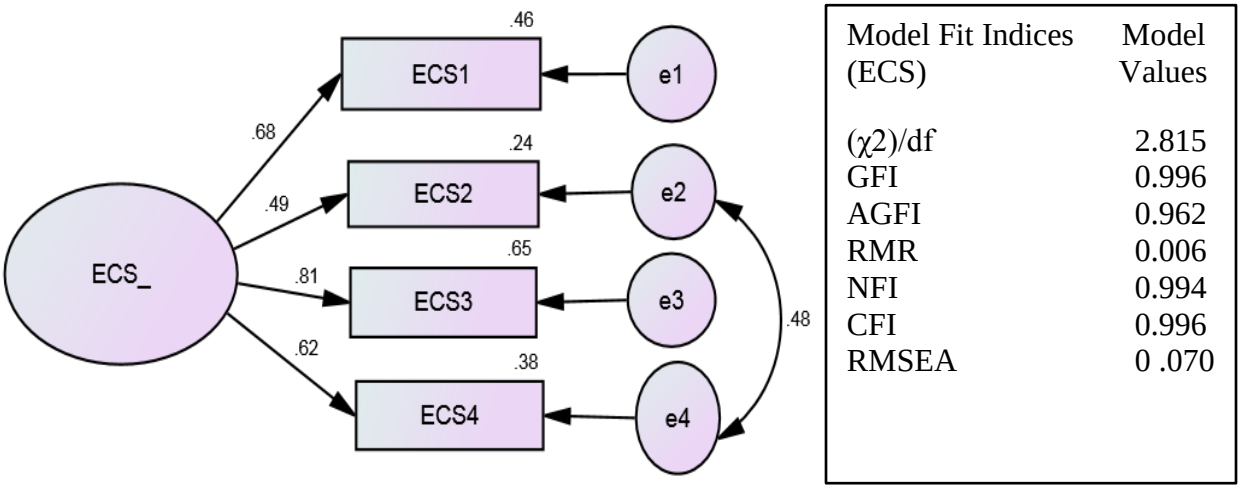


Figure 4.8: Measurement model of Economic Sustainability (ECS)

Table 4.17: Regression weights of Economic Sustainability (ECS)

			Estimate (Unstandardized)	Estimate (Standardized)	Standard Error (S.E.)	Critical Ratio (C.R.)	P
ECS1	<---	ECS	0.958	0.677	0.104	9.202	***
ECS2	<---	ECS	0.507	0.486	0.069	7.326	***
ECS3	<---	ECS	1.000	0.806			
ECS4	<---	ECS	0.776	0.617	0.087	8.902	***

***P≤0.001

One - factor congeneric model of Social Sustainability (SOS)

The latent construct of Social Sustainability (SOS) comprises of four items or observed variables specified as SOS1 to SOS5. The one-factor congeneric model of SOS was observed statistically considerable for further or additional analysis because of the values of model fit indices are in permissible range as displayed in Figure 4.9 with Table 4.18 also. Table 4.18 represents regression weights of Social Sustainability (SOS). In addition, the factor loading of observed variables or items is higher than 0.61 (standardized) which assist construct validity of SOS.

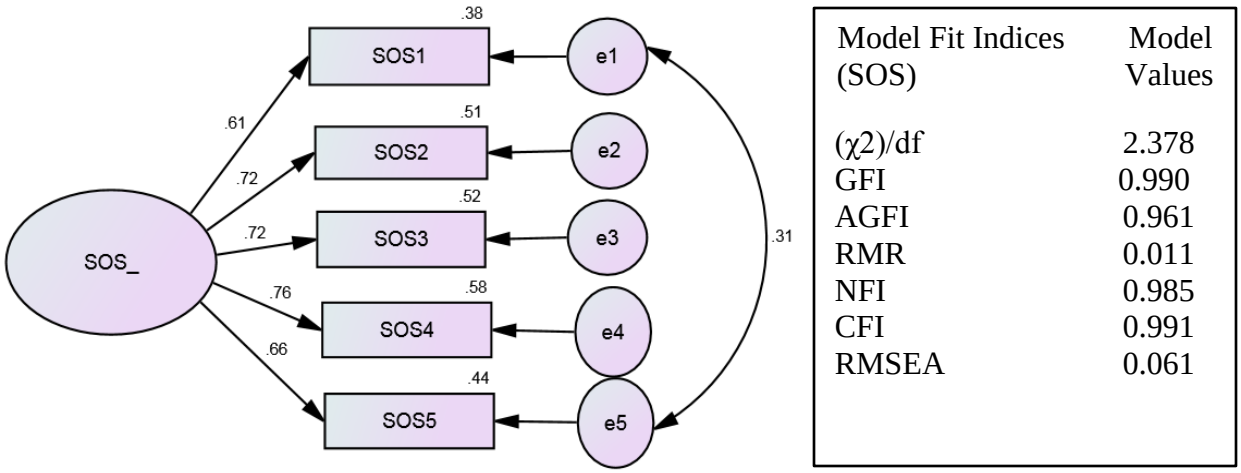


Figure 4.9: Measurement model of Social Sustainability (SOS)

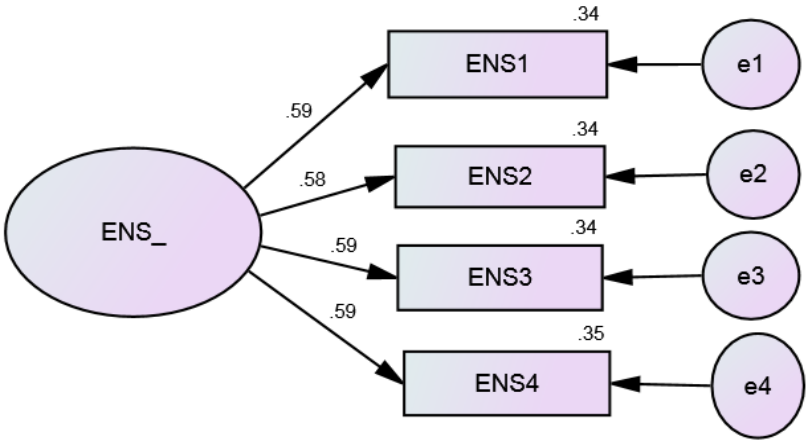
Table 4.18: Regression weights of Social Sustainability (SOS)

			Estimate (Unstandardized)	Estimate (Standardized)	Standard Error (S.E.)	Critical Ratio (C.R.)	P
SOS1	<---	SOS	0.942	0.613	0.090	10.474	***
SOS2	<---	SOS	0.868	0.715	0.071	12.254	***
SOS3	<---	SOS	0.902	0.721	0.073	12.334	***
SOS4	<---	SOS	1.000	0.763			
SOS5	<---	SOS	0.977	0.661	0.086	11.298	***

***P≤0.001

One - factor congeneric model Environmental Sustainability (ENS)

The latent construct of Environmental Sustainability (ENS) comprises of four items or observed variables specified as ENS1 to ENS4. The one-factor congeneric model of ENS was observed statistically considerable for further or additional analysis because of the values of model fit indices are in permissible range as displayed in Figure 4.10 with Table 4.19 also. Table 4.19 represents regression weights of Environmental Sustainability (ENS). Also, the factor loading of observed variables or items is higher than 0.58 (standardized) which assist construct validity of ENS.



Model fit indices (ENS)	Model Values
(χ2)/df	3.066
GFI	0.991
AGFI	0.957
RMR	0.023
NFI	0.971
CFI	0.980
RMSEA	0.075

Figure 4.10: Measurement model of Environmental Sustainability (ENS)

Table 4.19: Regression weights of Environmental Sustainability (ENS)

			Estimate (Unstandardized)	Estimate (Standardized)	Standard Error (S.E.)	Critical Ratio (C.R.)	P
ENS1	<---	ENS	0.790	0.586	0.112	7.024	***
ENS2	<---	ENS	0.892	0.583	0.127	7.012	***
ENS3	<---	ENS	1.000	0.587			
ENS4	<---	ENS	0.858	0.590	0.122	7.044	***

***P≤0.001

From the analysis of one - factor congeneric model for each latent research construct, it was found that the values of model fit indices for each latent constructs are in permissible range or statistically considerable. After this latent constructs are utilized for further examination.

4.4.2. Multi-factor congeneric measurement approach or models

After the analysis of one- factor congeneric measurement model for each latent construct, the multi-factor congeneric measurement models are than established with the main purpose to examine discriminant validity along with construct validity by means of Confirmatory Factor Analysis (CFA).

Based on the hypothesized model discussed in Chapter 3, total eight research constructs are identified. After two models are suggested on the basis of hypothetical model, (i) Examine practices of AFSCQ, (ii) Examine relationship of AFSCQ and organizational sustainability as economic, social and environmental sustainability. The two multifactor congeneric measurement models are established. First, multifactor congeneric measurement model is utilized to examine AFSCQ practices and second; multifactor congeneric measurement model is utilized to examine relationship of AFSCQ and organizational sustainability as economic, social and environmental sustainability.

There are a number of indices taken into consideration for good level of fit of measurement model. Some of the generally used model-fit indices are: Chi-square (CMIN/df); Goodness of Fit Index (GFI); Adjusted Goodness of Fit Indices (AGFI); Normed Fit Index (NFI); Comparative Fit Index (CFI); Root Mean Square Error of Approximation (RMSEA) and Root Mean Square Residual (RMR) or RMSR (Smith, and McMillan, 2001).

Multifactor congeneric measurement model to examine Agri-fresh Food Supply Chain Quality (AFSCQ)

Agri-fresh food supply chain quality comprises, Top management leadership and commitment to AFSCQ (TMLC_AFSCQ), Customer focus (CF), Supplier management (SM), Supply Chain Integration Management using IT (SCIMIT) and Internal Management (IM) as discussed in Chapter 3.

To examine these constructs, the first order and second order measurement model are utilized. In first order measurement model TMLC_AFSCQ, CF, SM, SCIMIT and IM are linked respectively as per measurement dimensions designed for Agri-fresh Food Supply Chain Quality (AFSCQ) and second order measurement model is utilized to evaluate involvement level of all AFSCQ practice with AFSCQ.

4.4.2.1. First order confirmatory factor analysis (measurement model)

The first order confirmatory factor analysis (measurement model) for Agri-fresh Food Supply Chain Quality (AFSCQ) is done by utilizing AMOS 18.0 as sown in Figure 4.11. There are five constructs (practices) (i.e. TMLC_AFSCQ, CF, SM, SCIMIT, and IM) in the measurement

model. All five constructs (practices) are independent in the first order confirmatory factor analysis for AFSCQ. The first order confirmatory factor analysis (measurement model) for AFSCQ is accepted at all the essential checks.

Evaluation of first order confirmatory factor analysis (measurement model)

To attain goodness of fit, it is essential to test reliability and validity of the concerned constructs. In the beginning, reliability of distinctive items is confirmed by assessing reliably loading on their concerned construct at closely or above 0.5 (Fornell and Larcker, 1981). Each construct were established by means of considerable standardized loadings of items. Table 4.20 displays the values of estimates (Standardized), R-squared (Squared multiple correlations), CR (Composite Reliability) and AVE (Average Variance Extracted).

Unidimensionality determines the level to which observed items or variables in a scale compute the same or identical construct (Venkatraman, 1989). To examine unidimensionality the value of R-squared is calculated by means of CFA. Table 4.20 shows that value of R-squared varying from 0.236 to 0.772. Falk and Miller (1992) suggested that R-squared values should be equal to or greater than 0.10 in order for the variance explained of a distinct endogenous construct to be deemed acceptable. And so, each construct has goodness of fit and consequently all constructs are unidimensional.

Composite Reliability (CR) is a measure of the overall reliability of a collection of heterogeneous but similar items. Table 4.20 shows that value of CR and Cronbach's alpha is above 0.7 (Nunnally, et al., 1967).

Convergent validity of the measurement model can be assessed by the Average Variance Extracted (AVE). Table 4.20 shows that AVE is varying from 0.468886 to 0.588935 for all research constructs. While AVE is less than 0.5, but composite reliability is greater than 0.6, the convergent validity of the research construct is still acceptable (Fornell and Larcker, 1981).

Table 4.20: Outcomes of confirmatory factor analysis for measurement model

Construct	Items	Estimate (Standardized)	Squared Multiple Correlations (R^2)	Average Variance Extracted (AVE)	Composite Reliability (CR)	Average Shared Variance (ASV)	Maximum Shared Variance (MSV)	Cronbach's alpha
TMLC_AFSCQ	TMLC_AFSCQ1	.662	.450	0.47252	0.781116	0.3184	0.3956	0.758
	TMLC_AFSCQ2	.675	.436					
	TMLC_AFSCQ3	.660	.456					
	TMLC_AFSCQ4	.671	.438					
CF	CF1	.706	.471	0.496412	0.795936	0.3375	0.4369	0.775
	CF2	.715	.501					
	CF3	.708	.511					
	CF4	.686	.498					
SM	SM1	.748	.772	0.581318	0.847351	0.1892	0.2421	0.809
	SM2	.637	.391					
	SM3	.626	.405					
	SM4	.878	.560					
SCIMIT	SCIMIT1	.667	.374	0.468886	0.775116	0.2798	0.4109	0.729
	SCIMIT2	.655	.446					
	SCIMIT3	.668	.430					
	SCIMIT4	.611	.445					
IM	IM1	.724	.434	0.49464	0.795597	0.3449	0.4369	0.775
	IM2	.736	.363					
	IM3	.602	.542					
	IM4	.659	.524					

Discriminant validity indicates the level to which dissimilar factors are distinct. As Table 4.21 presents, the correlation coefficients between AFSCQ practices and organizational sustainability measures are lesser than the reliability coefficients, hence the measures have discriminant validity. Also, square roots of the AVEs denoted in italics (Table 4.21) are larger than the off-diagonal constituents in the consistent rows and columns exceed the correlations between a given construct; this proposes that a construct is soundly correlated with its indicators than with the other constructs in the measurement model. Thus discriminant validity seems acceptable at the construct level in the instance of entirely constructs.

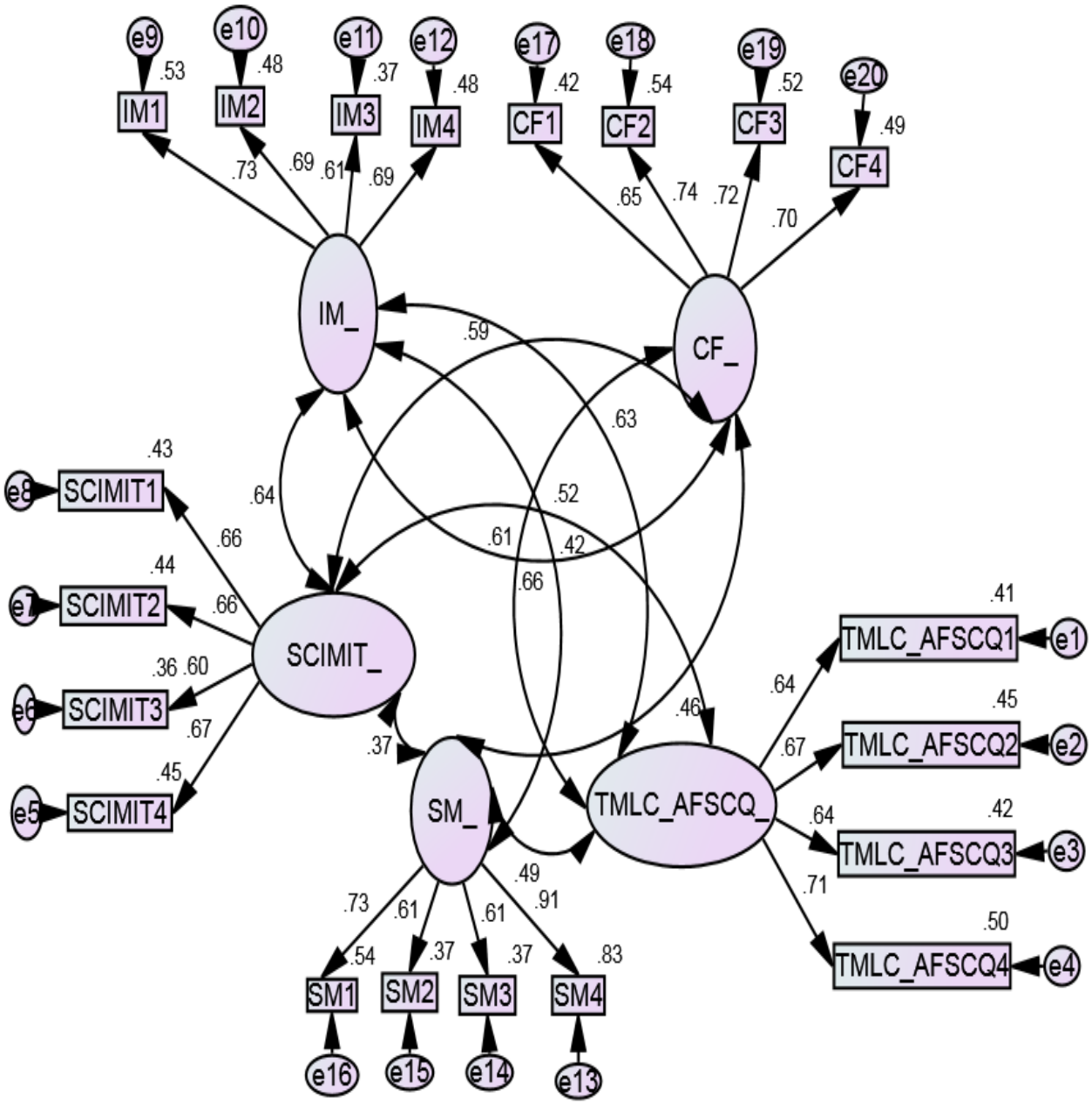
Table 4.21: CR, AVE, MSV, ASV and correlations between constructs

Constructs	CR	AVE	MSV	ASV	SCIMIT	TMLC_ AFSCQ	IM	CF	SM
SCIMIT	.775116	.468886	.4109	.2798	*.6847*				
TMLC_ AFSCQ	.781116	.47252	.3956	.3184	.524	*.6874*			
IM	.795597	.49464	.4369	.3449	.641	.629	*.7033*		
CF	.795936	.496412	.4369	.3375	.586	.612	.661	*.7046*	
SM	.847351	.581318	.2421	.1892	.365	.492	.418	.465	*.7624*

Note: Diagonal in italics shows square root of Average Variance Extracted (AVE); off-diagonal denotes correlations between constructs.

First-order structural model evaluation

The results of measurement model are acceptable. After that, the first-order structural model was evaluated. There are five constructs (i.e. TMLC_AFSCQ, CF, SM, SCIMIT and IM).



(χ2)/df	2.401		
GFI	0.901		
AGFI	0.870		
RMR	0.031	CMIN	384.2
NFI	0.862		
CFI	0.914		
RMSEA	0.062		

Figure 4.11: First-order CFA (measurement model)

The values of various model fit indices of first-order structural model are as follows; (χ2)/df = 2.401, GFI = .901, AGFI = .870, RMR = .031, NFI = .862, CFI = .914 and RMSEA = .062. All model fit indices are in acceptable range. It shows absolute depiction of construct of AFSCQ.

4.4.2.2 Second order confirmatory factor analysis (measurement model)

Second order confirmatory factor analysis was performed by utilizing AMOS 18.0 software as displayed in Figure 4.13. The second order measurement model assumed a latent construct leading the correlation among TMLC_AFSCQ, CF, SM, SCIMIT and IM.

Second-order measurement model evaluation

Confirmatory factor analysis was utilized to evaluate the second order measurement model. Each construct in the second order measurement model meets the essential necessities and are consequently counted significant. The outcomes for leading construct (AFSCQ) also sub constructs (TMLC_AFSCQ, CF, SM, SCIMIT and IM) were computed by the utilization of CFA.

Unidimensionality evaluation should be made first prior to evaluating Validity and Reliability.

The CFA approach has the capability to evaluate the Unidimensionality of a latent construct. Two measurement models are established to examine the five constructs of Agri-fresh Food Supply Chain Quality (AFSCQ). During the first measurement model, constructs relevant to AFSCQ are counted completely as first-order latent constructs. During the measurement model, the constructs of AFSCQ are counted as second order latent constructs, assessed by first-order latent constructs as TMLC_AFSCQ, CF, SM, SCIMIT and IM. The consequence of all measurement models pertaining to model fit indices are statistically considerable and all measuring items have acceptable factor loadings for the respective latent construct.

Convergent validity of the second-order measurement model can be assessed by the Average Variance Extracted (AVE). The value of AVE is 0.551 for second-order latent construct AFSCQ. The convergent validity of the second-order latent construct AFSCQ is acceptable.

Composite Reliability (CR) is a measure of the overall reliability of a collection of heterogeneous but similar items. The value of CR for second order latent construct is 0.858. The composite reliability of the second-order latent construct AFSCQ is acceptable.

Second-order structural model evaluation

Agri-fresh Food Supply Chain Quality (AFSCQ) is conceptualized as a second-order construct with five sub-dimensions: Top Mangement Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Supply Chain Integration Management using IT (SCIMIT) and Internal Management (IM). A second-order structural model of Agri-fresh Food Supply Chain Quality (AFSCQ) is established by the utilization of AMOS 18.0 by means of Maximum Likelihood (ML) estimation method. Figure 4.12 shows the second order structural model.

The values of various model fit indices for second-order structural model are as follows; chi square ($\chi 2$) = 390.798, Degree of Freedom (DF) = 165, ($\chi 2$)/df = 2.368, GFI = .900, AGFI = .873, RMR = .031, NFI = .860, CFI = .913 and RMSEA = .061. All model fit indices are in acceptable range. It shows that Agri-fresh Food Supply Chain Quality (AFSCQ) is takes into consideration as a second-order construct with five sub-dimensions.

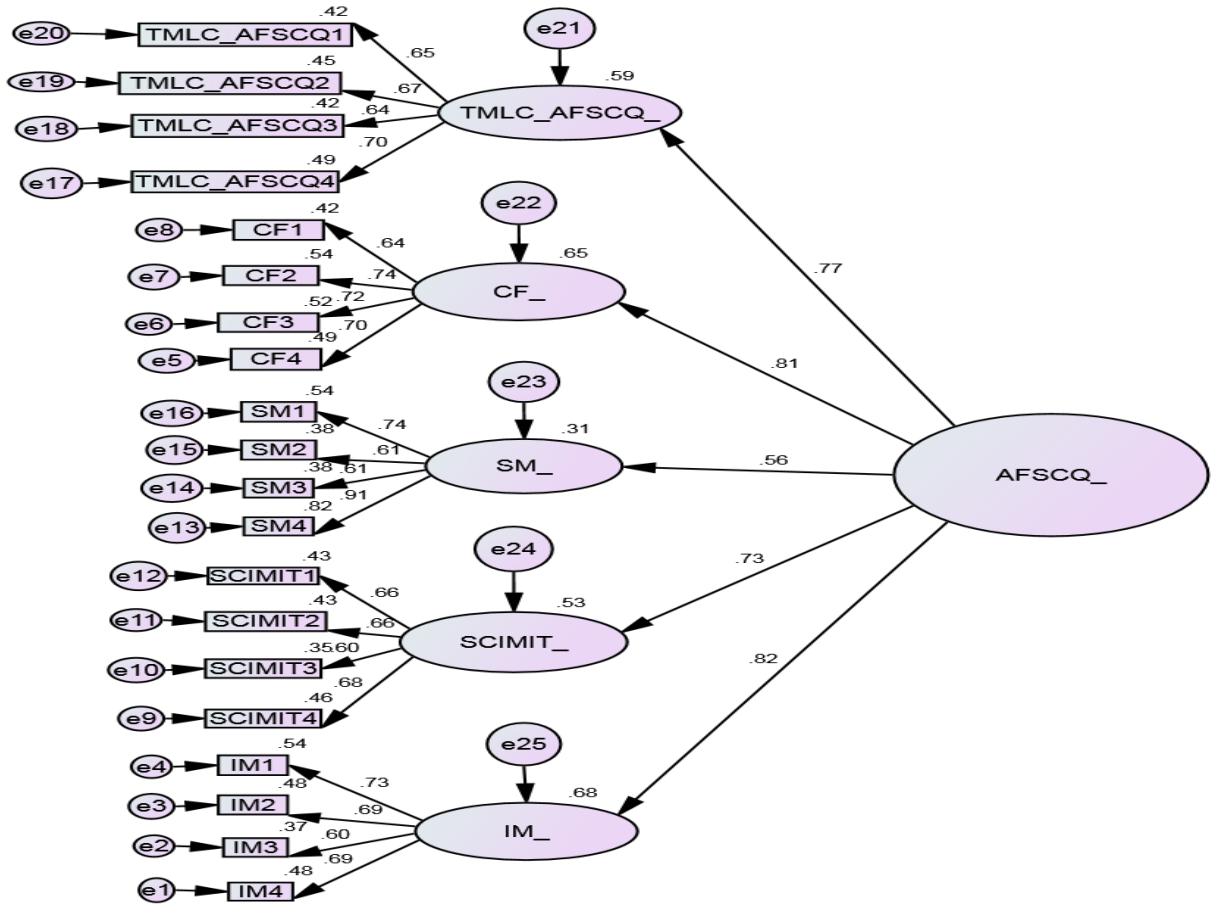


Figure 4.12: Second-order CFA (measurement model)

4.4.2.3. Multi-factor congeneric measurement model to examine the relationship among constructs (AFSCQ, ECS, SOS and ENS)

To examine the relationship among AFSCQ (TMLC_AFSCQ, CF, SM, SCIMIT, and IM), ECS (Economic Sustainability), SOS (Social Sustainability) and ENS (Environmental Sustainability), a multi-factor congeneric measurement model has been established by a number of statistical processes.

Also, a multifactor congeneric structural model has been established to assess the relationship between Agri-fresh Food Supply Chain Quality (AFSCQ) and practices of AFSCQ (H1, H2, H3, H4, and H5), Agri-fresh Food Supply Chain Quality (AFSCQ) and economic sustainability (H6a), AFSCQ and social sustainability (H6b), AFSCQ and environmental sustainability (H6c). To test the hypothesis (H1, H2, H3, H4, H5, H6a, H6b, H6c), a multi-factor structural model is established by the utilization of AMOS 18.0 by means of Maximum Likelihood (ML) estimation method.

Evaluation of multi-factor measurement model

Confirmatory factor analysis was utilized to evaluate the multi-factor measurement model. Each construct in the multi-factor measurement model meets the essential necessities and are consequently counted significant. The outcomes for the AFSCQ, ECS, SOS and ENS were computed by the utilization of CFA.

Unidimensionality determines the level to which observed items or variables in a scale compute the same or identical construct (Venkatraman, 1989). To examine unidimensionality the value of R-squared is calculated by means of CFA. Table 4.22 shows that value of R-squared varying from 0.236 to 0.681. Falk and Miller (1992) suggested that R-squared values should be equal to or greater than 0.10 in order for the variance explained of a distinct endogenous construct to be deemed acceptable. And so, each constructs have goodness of fit and consequently all constructs are unidimensional.

Composite Reliability (CR) is a measure of the overall reliability of a collection of heterogeneous but similar items. Table 4.20 shows that value of CR and Cronbach's alpha is above 0.7 while single value of Cronbach's alpha is .674 which is close to 0.7.

Convergent validity of the measurement model can be assessed by the Average Variance Extracted (AVE). Table 4.22 shows that AVE is varying from 0.498469 to 0.588935 for all research constructs while single value of AVE is 0.498469 which is close to 0.5. Fornell and Larcker (1981) said that if AVE is less than 0.5, but composite reliability is greater than 0.6, the convergent validity of the research construct is still acceptable. Convergent validity is also measured by the utilization of standardized factor loadings. The significance of standardized factor loading reveals that the indicator variables are considerable and illustrative of their latent construct. The factor loadings of latent to observed variables should be above 0.50 (Hair et al., 2006). The factor loading of all observed variables in Table 4.22 are ranging from 0.486 to 0.825 while single value is 0.486 which is close to 0.5.This clearly indicates that observed variables or items are adequate and corresponded to their constructs. So we can confirm the construct convergent validity.

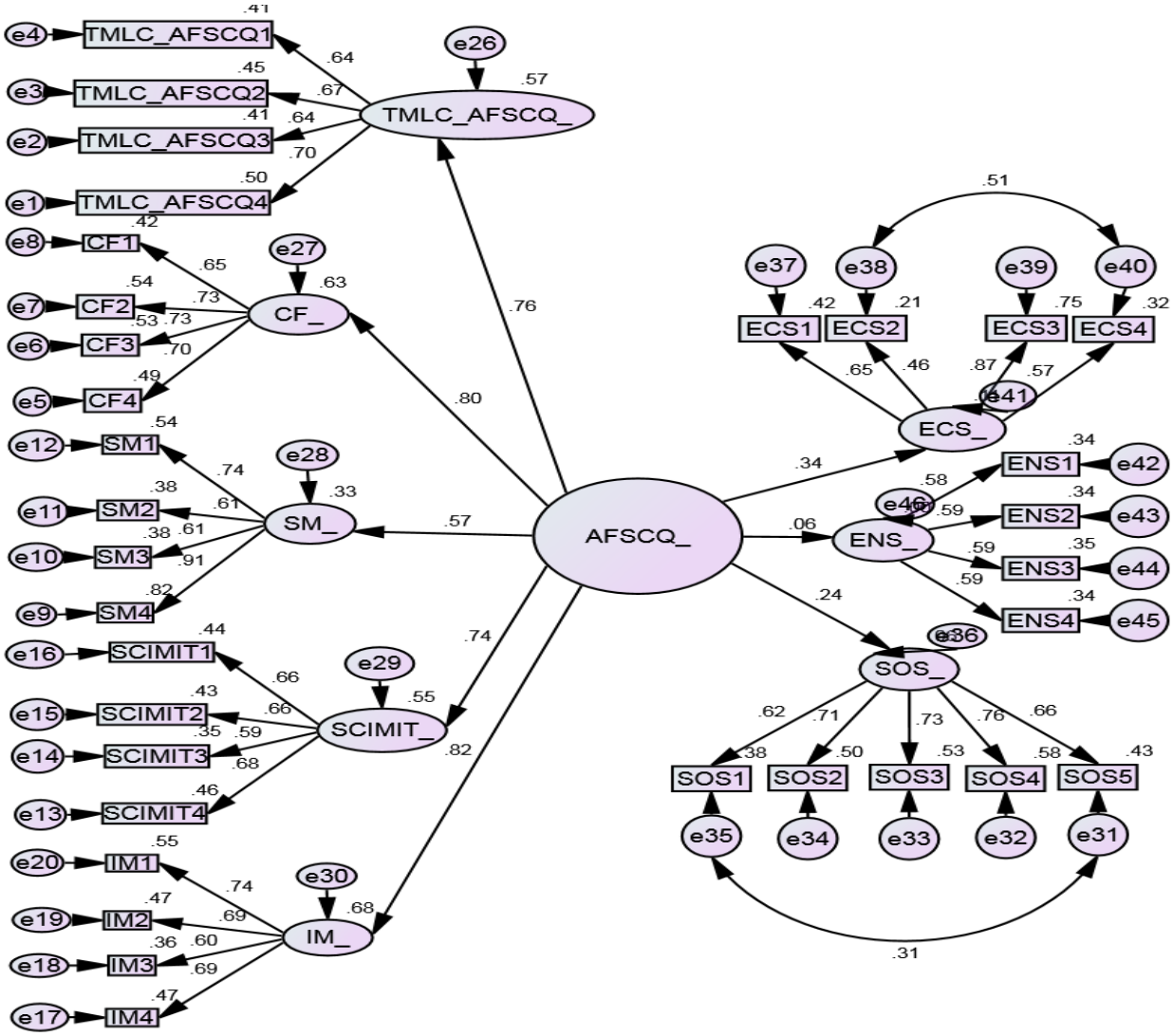
Table 4.22: Outcomes of confirmatory factor analysis for measurement model

Constructs	Items	Estimate (Standardized)	Squared Multiple Correlations (R^2)	AVE	CR	Cronbach's alpha
AFSCQ	TMLC_AFSCQ	0.766	0.587	0.515443	0.760407	0.776
	CF	0.807	0.651			
	SM	0.556	0.310			
	SCIMIT	0.726	0.528			
	IM	0.825	0.681			
ECS	ECS1	0.677	0.458	0.588935	0.850794	0.773
	ECS2	0.486	0.236			
	ECS3	0.806	0.649			
	ECS4	0.617	0.381			
SOS	SOS1	0.613	0.376	0.588004	0.822161	0.830
	SOS2	0.715	0.511			
	SOS3	0.721	0.520			
	SOS4	0.763	0.583			
	SOS5	0.661	0.436			
ENS	ENS1	0.586	0.343	0.498469	0.799008	0.674
	ENS2	0.583	0.340			
	ENS3	0.587	0.344			
	ENS4	0.590	0.348			

Structural model evaluation

A multifactor structural model has been established by the utilization of AMOS program to examine the suggested hypothesises viz. H1, H2, H3, H4, H5, H6a, H6b, and H6c in Figure 4.13. A number of indices are employed to determine the fit of the data to the model (e.g. χ 2/df, GFI,

AGFI, RMR, NFI, CFI, and RMSEA). The overall fit statis-tics for the hypothesized model are χ 2 = 966.506, df = 485, χ 2/df=1.993, GFI = 0.850 AGFI = 0.826, RMR = 0.039, NFI = 0.794, CFI = 0.884 RMSEA = 0.052, which are acceptable in terms of model fit.



(χ2)/df	1.993		
GFI	0.850		
AGFI	0.826		
RMR	0.039	CMIN	966.506
NFI	0.794		
CFI	0.884		
RMSEA	0.052		

Figure 4.13: Multi-factor structural model

4.5 Discussion of various hypotheses

The result **s**hows that in what manner AFSCQ practices are associated with AFSCQ and how AFSCQ is associated with economic, social and environmental sustainability of an organization in Indian context. Table 4.23, displays the standardized estimates (β) as well as consequence of hypothesises.

Table 4.23: Results of the structural model

Hypothesis	Estimates (Standardized) (β)	Standard Error (S.E.)	Critical Ratio (C.R.)	P	Results
H1:AFSCQ–› TMLC_AFSCQ	0.757	0.087	8.476	***	Supported
H2: AFSCQ –›CF	0.797	------	------	***	Supported
H3: AFSCQ –›SM	0.574	0.086	8.068	***	Supported
H4: AFSCQ –›SCIMIT	0.738	0.093	8.129	***	Supported
H5: AFSCQ –›IM	0.822	0.079	8.747	***	Supported
H6a: AFSCQ –›ECS	0.337	0.050	4.513	***	Supported
H6b: AFSCQ –›SOS	0.241	0.061	3.627	***	Supported
H6c: AFSCQ –›ENS	0.055	0.054	0.779	.436 (*)	Not Supported

***P<0.001; *P<0.5

4.5.1. Formation of Agri-fresh Food Supply Chain Quality (AFSCQ) as a result of AFSCQ practices (H1; H2; H3; H4; H5)

Table 4.23 shows hypothesis results of the structural model. It indicates a significant relationship between Agri-fresh Food Supply Chain Quality (AFSCQ) and Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) (β = 0.757; p<0.001), Agri-fresh Food Supply Chain Quality (AFSCQ) and Customer Focus (CF) (β = 0.797; p<0.001), Agri-fresh Food Supply Chain Quality (AFSCQ) and Supplier Management (SM) (β = 0.574; p<0.001), Agri-fresh Food Supply Chain Quality (AFSCQ) and Supply Chain Integration Management using IT (SCIMIT) (β = 0.738; p<0.001), Agri-fresh Food Supply Chain Quality (AFSCQ) and Internal Management (IM) (β = 0.822; p<0.001). This proves the hypotheses H1, H2, H3, H4, and H5.

4.5.2. Relationship of Agri-fresh Food Supply Chain Quality (AFSCQ) with economic sustainability, social sustainability and environmental sustainability (H6a; H6b; H6c)

The Agri-fresh Food Supply Chain Quality (AFSCQ) positively influenced the economic sustainability of an organization in Indian context and validate the hypothesis H6a ($\beta = 0.337$; $p<0.001$). Agri-fresh Food Supply Chain Quality (AFSCQ) positively influenced the social sustainability and validated the hypothesis H6b ($\beta = 0.241$; $p<0.001$). The hypothesis testing results relating to H6c ($\beta = .055$; $P<0.5$) do not support the relationship concerning Agri-fresh Food Supply Chain Quality (AFSCQ) to environmental sustainability of an organization in Indian context. This indicates that Indian firms do not give priority to environmental sustainability, thereby supporting the idea of sustainability through Agri-fresh Food Supply Chain Quality (AFSCQ). Although Indian industry which relates to agri-fresh food have started implementation of AFSCQ practices, i.e., TMLC_AFSCQ, CF, SM, SCIMIT and IM, on the other hand these AFSCQ practices need to be interpreted further in terms of better economic, social and environmental sustainability from the Indian perspective.

4.6 Conclusion

- This chapter describes an empirical investigation of Agri-fresh Food Supply Chain Quality (AFSCQ) and Organizational Sustainability (OS) conceptual model in select Indian industries.
- The data was collected by the utilization of survey questionnaire from select Indian industries. The data collected for this study sustain the main necessity as the sample size is 369.
- The empirical investigation initiates with descriptive statistics of items of research constructs along with examining the profile of respondents and industries.
- In this study factor analysis (PCA) is utilized for data reduction and to extracts research constructs concerned to AFSCQ practices and organizational sustainability. The Principle Component Analysis (PCA) including varimax rotation was used for extraction of the research constructs.
- PCA was performed with varimax rotation that produced eight constructs on the basis of eigenvalues (>1, Kaiser's criteria) which considered 61.951 percent of total variance. By

going throughout all the items for a distinct construct and by taking into consideration factor loading (from rotated component matrix) of items exceeding 0.4, all the items or variables were designated under one construct.

- Structural Equation Modeling (SEM) is utilized to examine the Agri-fresh Food Supply Chain quality (AFSCQ) measurement model in Indian perspective. The AFSCQ model comprises of five constructs viz. Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Supplier Management (SM), Customer Focus (CF), Internal Management (IM) and Supply Chain Integration Management using IT (SCIMIT).
- The multifactor cogeneric measurement model is build up to examine the relationship between Agri-fresh Food Supply Chain Quality (AFSCQ), Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS).
- This study reveals that Indian agri-fresh food industries are aware about Agri-fresh Food Supply Chain Quality (AFSCQ) however there is a necessity of further exploration.
- The benchmark of the proposed framework is that it displays the impact of AFSCQ practices on organizational sustainability as economic, social and environmental sustainability simultaneously.
- Also, study has been done with respect to the complete chain level and not on a single stakeholder.

CHAPTER 5

CASE STUDIES

5.1 Introduction

In this chapter, three case studies were taken for better understanding of Agri-fresh Food Supply Chain Quality (AFSCQ) in select Indian industries and to support findings of the prior research. Case study research method is employed in combination with survey research methodology to build up comprehensiveness of survey findings (Siddh, et al., 2017). The case study method employs quantitative and qualitative approach with the purpose of comprehensive understanding of the study. Gubrium (1988) stated that case study method of research is a scientific method to improve the theoretic conceptions by the means of real time or factual incidents. Yin (2003) stated that case study can be utilized to explore the proposed hypothesis in a research study. Eisenhardt (1989) also advised various advantages of case study research methods such as support to build up grounded theory which are realistic and pertinent.

5.2 Methodology

In this study, three case studies were taken. These were from manufactured (processed) food, conserved (frozen) food, and local (short) food segments. These industries are recorded for numerous practices of Agri-fresh Food Supply Chain Quality (AFSCQ) and dimensions of organizational sustainability such as Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Supply Chain Integration Management using IT (SCIMIT), Internal Management (IM), Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS).

The case study methodology is divided into three parts. The first part contains three stages (specify the objectives, cases selection and questionnaire development), second part contains two stages (collection and analysis of data) and third part also contains two stages (cross case comparison and attaining findings and discussion).

In the primary or first stage, the case study objectives are specified. The main objective of the case study is to acquire comprehensive understanding of AFSCQ practices and dimensions of

organizational sustainability in the food industries. Consequently, build up a significant theory on the basis of real practice consideration.

Second stage is case's selection. For the reason that constructing the case study research the prominent concern is number of case's selection. While, a particular or single case well describes a distinct theory, to examine the appliance of novel theory in a recent system, multiple case studies have a preference. Voss et al., (2002) also stated that multiple case studies make possible cross case evaluation which is considered to be extremely valuable for the generality of theories or hypotheses. Moreover multiple case studies are very effective in conforming the outcomes of exploratory evaluation and to attain immersed understanding of the outcomes attained from the survey assessment.

The third stage consists of administration of case questionnaire. Administered questionnaire was utilized to pick up the measured practices of AFSCQ.

The fourth stage consists of data collection. In the data collection process, case industries are visited by authors in four to five phases. Also telephonic conversations are made. The collection of data is concerned about structured as well as unstructured cross-questioning with senior level managers and heads in the industry. The collected data or information is recorded in appropriate format for the analysis purpose.

Fifth stage consists of analysis of collected data during plant visit. In this stage, all cases are examined widely about the level of adoption AFSCQ practices and organizational sustainability. Outcome of cases are conversed and statements are made in the stage seven. At last cross case comparison is carried out in the stage eight. It is conducted to ensure the generalizability of outcomes. Moreover, case studies and survey outcomes or results are compared by means of previously global or comprehensive studies in addition to studies conducted in the Indian perspective.

Current study is concerned about three multiple cases (Manufactured food, conserved food, and local food segments) aimed at validation of outcomes occurring as of survey.

5.3. Case 1: Manufactured food segment of agri-fresh food products

Based on the methodology discussed in the previous section we have performed three case studies. The questionnaire for the following three cases was same.

5.3.1. Introduction

In order to evaluate the Agri-fresh Food Supply Chain Quality (AFSCQ) model for manufactured food segment of agri-fresh food products, a case study has been designed. It has been carried out in an Indian manufactured food company of agri-fresh food products. The company is marked as XYZ. It is situated in North India**.** The company XYZ is concerned with AFSCQ practices & organizational sustainability. The supply chain partners of the company are taking part in the sustainability oriented programmes. The most important purpose of such case study in manufactured food company of agri-fresh food products is to collect the comprehensive understanding of AFSCQ practices and organizational sustainability implementation. The sources of information are interviews with the production managers, the manager of distribution center, the purchasing managers, wholesaler of a wholesale company, and the managers of supermarkets during case study. The type of interview utilized was a focus interview (Yin, 2003), in which the interview consists of open-ended questions and a set of questions in the form of a questionnaire. The questionnaire consisted of three parts. The first part included general open-ended questions to become familiar with the company. In the second part, interviewees were given definitions of possible AFSCQ practices and organizational sustainability that could be integrated into an AFSCQ framework. Interviewees were asked to judge the feasibility and the measurability of suggested AFSCQ practices and organizational sustainability. They were given the opportunity to suggest new practices and/or to reject the proposed practices and to provide suggestions for better (i.e. feasible) ways to measure the suggested practices. Next, the interviewees were asked to rank the listed practices of AFSCQ and measures of organizational sustainability according to the perceived importance for their company, using an interval ranking (Churchill, 1999). A five-point Likert scale was utilized, with 1 being “not important at all” for measuring performance and 5 being “very important”. The last part of the questionnaire consisted of evaluating the usefulness of the whole AFSCQ practices and organizational sustainability framework in general, where interviewees were asked to judge the AFSCQ

practices and organizational sustainability measures in the framework, and to propose new and/or reject practices for manufactured food segment. Prior to the interviews, pre-test interviews were conducted with three interviewees external to the concerned company in order to test the questionnaire. In the case total 11 interviewees were interviewed. Six food processing managers, two purchasing manager, two distribution center manager, and one wholesaler agreed to participate in the interview.

5.3.2. Evaluating the case of manufactured food company of agri-fresh food products

An evaluation of AFSCQ practices and measures of organizational sustainability conversed in the subsequent part of the section. In the case company, plant managers and head also stated that they implemented AFSCQ practices with guidelines.

Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Manufactured Food Company

The evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) for AFSCQ in the manufactured food company of agri-resh food products is named as XYZ is shown in Table 5.1. Insights from the six food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) are collected on the five point likert scale during plant visit of manufactured food company XYZ of agri-fresh food products.

Table 5.1 displays that the foremost Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) practices for the survey industries are commitment to customer satisfaction (TMLC_AFSCQ1) (4.41) and Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions (TMLC_AFSCQ3) (4.27). In the industry XYZ, the important top management leadership and commitment to AFSCQ implemented are commitment to customer satisfaction (TMLC_AFSCQ1) (3.90) and Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions (TMLC_AFSCQ3) (4.10).

From the case evaluation of the manufactured food company XYZ; all practices of top management leadership and commitment to AFSCQ (TMLC_AFSCQ1-TMLC_AFSCQ4) are like as the survey results. Case evaluation of industry XYZ justifies the survey results. Dangayach and Deshmukh (2001), also utilized the similar approach for case evaluation.

Table 5.1: Evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Manufactured Food Company

Evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)		**Survey responses (Mean)**	**Manufactured food company XYZ (Mean)**
TMLC_AFSCQ1	Commitment to customer satisfaction	4.41	3.90
TMLC_AFSCQ2	Commitment to supplier relationship	3.63	3.30
TMLC_AFSCQ3	Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions	4.27	4.10
TMLC_AFSCQ4	Human resource management	3.75	3.24
Average		4.015	3.635

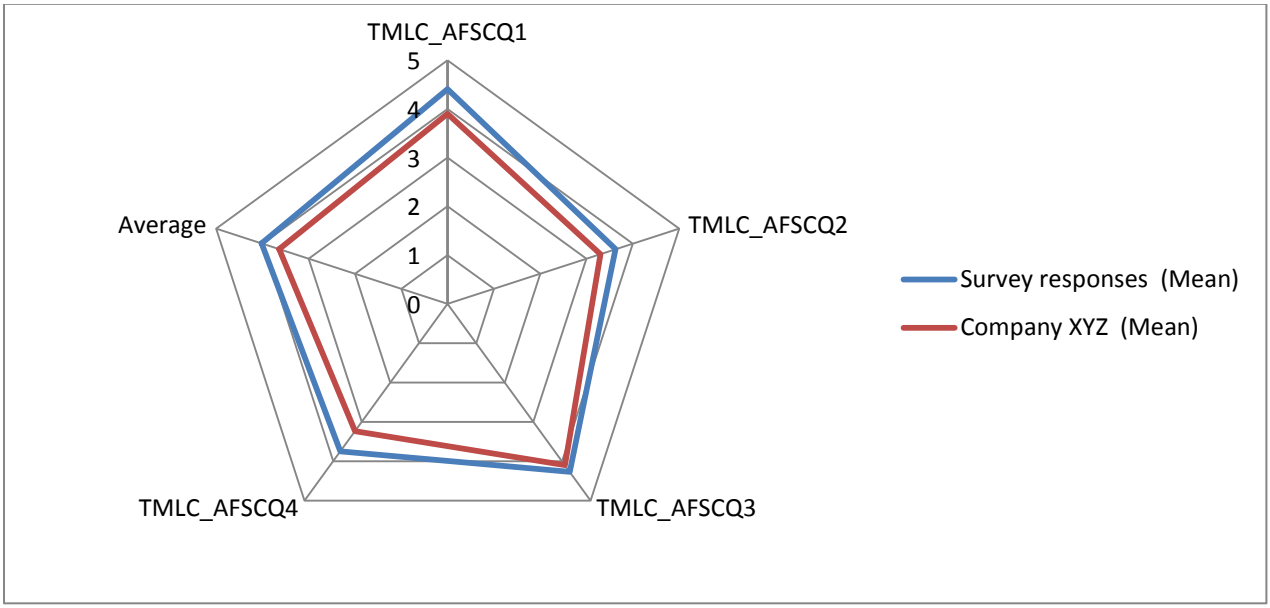


Figure 5.1: Evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Manufactured Food Company

In Figure 5.1 the radar chart is finely representing the resemblance of overall mean for Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in survey industry and case company XYZ of manufactured food of agri-fresh food products.

Customer Focus (CF) in case of Manufactured Food Company

The evaluation of Customer Focus (CF) in the company XYZ is shown in Table 5.2. Perceptions of the six food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, four items or variables of Customer Focus (CF) are collected on five point likert scale during plant visit of manufactured food company XYZ of agri-fresh food products.

Table 5.2: Evaluation of Customer Focus (CF) in case of Manufactured Food Company

Customer Focus (CF)		Survey responses (Mean)	Manufactured food company XYZ (Mean)
CF1	Brand awareness toward to quality of food product	4.54	4.70
CF2	Emphasis on product variety or diversity	3.47	3.55
CF3	Improve customer's convenience by providing significant information on the packaging of food product	3.72	3.44
CF4	Frequently communication with customers, like consistent or routine survey of customer's view	4.23	4.10
Average		3.99	3.95

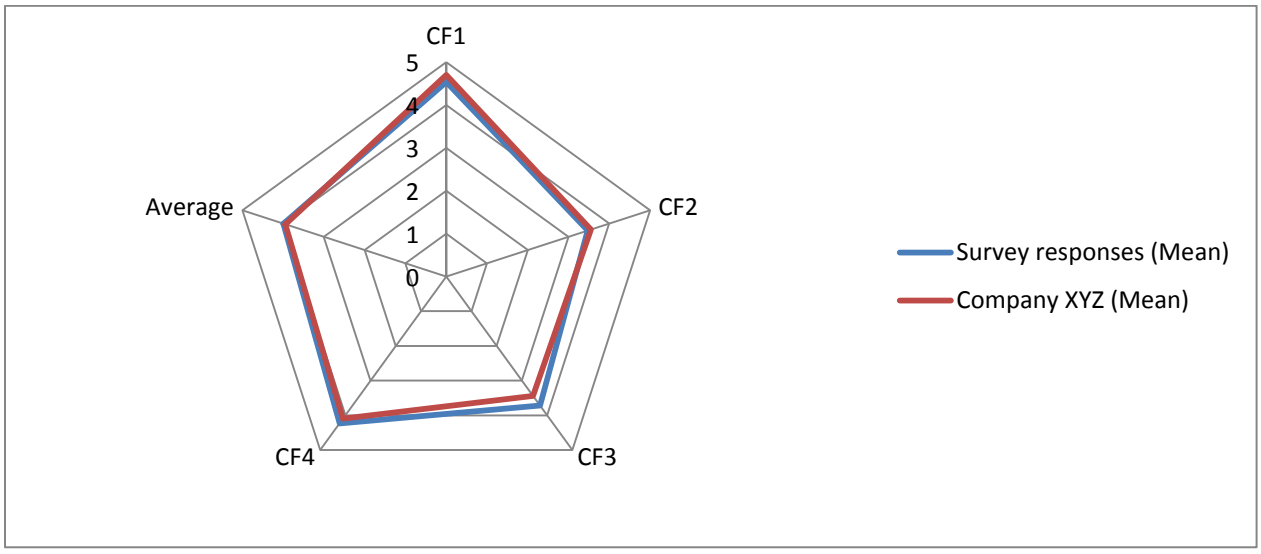


Figure 5.2: Evaluation of Customer Focus (CF) in case of Manufactured Food Company

Table 5.2., displays the foremost Customer Focus (CF) practices that are Brand awareness toward quality of food product (CF1) (4.54) and frequently communication with customers, like consistent or routine survey of customer's view (CF4) (4.23). Evaluation of case company XYZ the best Customer Focus (CF) practices implemented are Brand awareness with reference to quality of food product (CF1) (4.70) and Frequently communication with customers, like consistent or routine survey of customer's view (CF4) (4.10). The results of case industry are near to survey analysis results. Case evaluation of company XYZ justifies the survey results.

In Figure 5.2 the radar chart is finely representing the resemblance of overall mean for Customer Focus (CF) in survey industry and case company XYZ of manufactured food of agri-fresh food products.

Internal Management (IM) in case of Manufactured Food Company

The evaluation of Internal Management (IM) in the XYZ Company is shown in Table 5.3. Insights from the six food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Internal Management (IM) are collected on five point likert scale during plant visit of manufactured food company XYZ of agri-fresh food products.

Table 5.3 displays the important Internal Management (IM) practices for survey industries are, Quality standards to make sure assured quality of food product like chemical, microbiological and physical properties etc. (IM2) (4.20), Standard conditions for storage and transportation of food products (IM3) (4.42) and Inventory Management (IM4) (4.42).

In the case evaluation of company XYZ the important Internal Management (IM) implemented are, Quality standards to make sure assured quality of food product like chemical, microbiological and physical properties etc. (IM2) (4.30), Standard conditions for storage and transportation of food products (IM3) (4.35) and Inventory Management (IM4) (4.12). The results of case company are near to survey analysis results. Case evaluation of company XYZ justifies the results of survey.

In Figure 5.3 the radar chart is finely representing the resemblance of overall mean for Internal Management (IM) in survey industry and case company XYZ of manufactured food of agri-fresh food products.

Table 5.3: Evaluation of Internal Management (IM) in case of Manufactured Food Company

Internal Management (IM)		Survey responses (Mean)	Manufactured food company XYZ (Mean)
IM1	Continuous process improvement for internal process control or improving processing quality	3.62	4.10
IM2	Quality standards to make sure assured quality of food product like chemical, microbiological and physical properties etc..	4.20	4.30
IM3	Standard conditions for storage and transportation of food products	4.42	4.35
IM4	Inventory management	4.42	4.12
Average		4.165	4.217

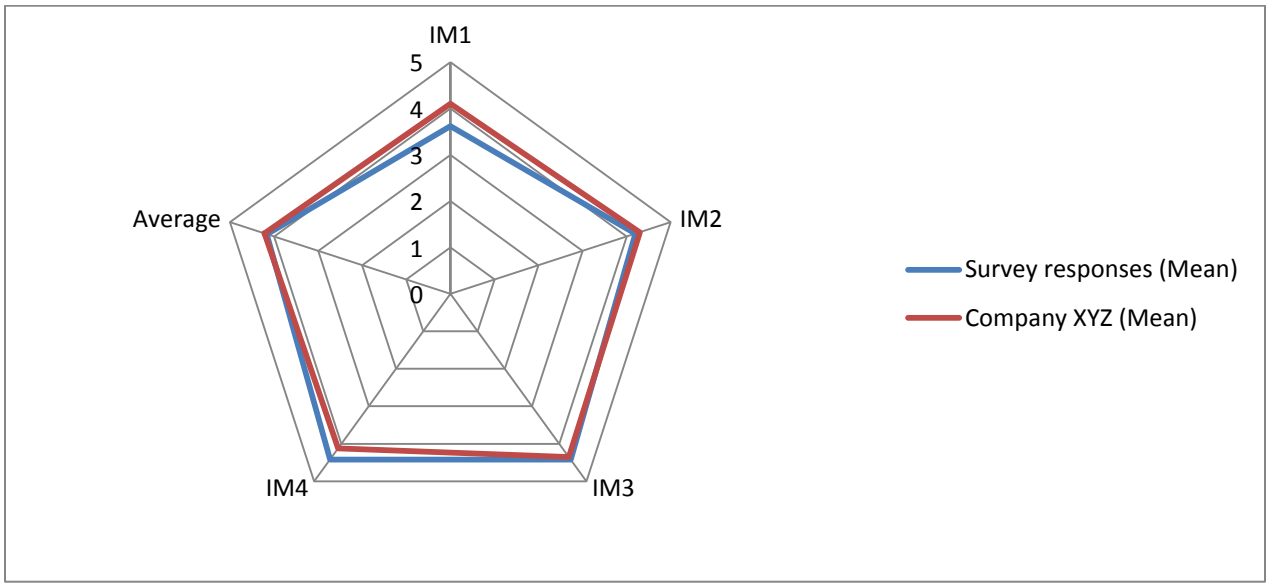


Figure 5.3: Evaluation of Internal Management (IM) in case of Manufactured Food Company

Supplier Management (SM) in case of Manufactured Food Company

The evaluation of Supplier Management (SM) in the industry is shown in Table 5.4. Insights from the six food processing managers, two purchasing manager, two distribution center

manager, and one wholesaler, for four items or variables of Supplier Management (SM) are collected on five point likert scale during plant visit of manufactured food company XYZ of agri-fresh food products.

Table 5.4 displays the most important supplier management practices for survey industries are Quality of supplier's raw food product and process (SM2) (4.21), Set up long-term relationships with suppliers (SM3) (3.91) and Actively supplier's engagement in organizational supply chain quality development courses (SM4) (3.80).

In the case evaluation of company XYZ the important supplier management practices implemented are, Quality of supplier's raw food product and process (SM2) (4.42), Set up long-term relationships with suppliers (SM3) (4.10) and Actively supplier's engagement in organizational supply chain quality development courses (SM4) (3.68). The results of case industry are near to survey analysis results. Case evaluation of company XYZ justifies the results of survey.

Table 5.4: Evaluation of Supplier Management (SM) in case of Manufactured Food Company

Supplier Management (SM)		**Survey responses (Mean)**	**Manufactured food company XYZ (Mean)**
SM1	Collaboration and coordination along with suppliers for attaining environmental friendly goals	3.38	2.76
SM2	Quality of supplier's raw food product and process	4.21	4.42
SM3	Set up long-term relationships with suppliers	3.91	4.10
SM4	Actively supplier's engagement in organizational supply chain quality development courses	3.80	3.68
Average		3.825	3.74

In Figure 5.4 the radar chart is finely representing the resemblance of overall mean for Supplier Management (SM) in survey industry and case company XYZ of manufactured food of agri-fresh food products.

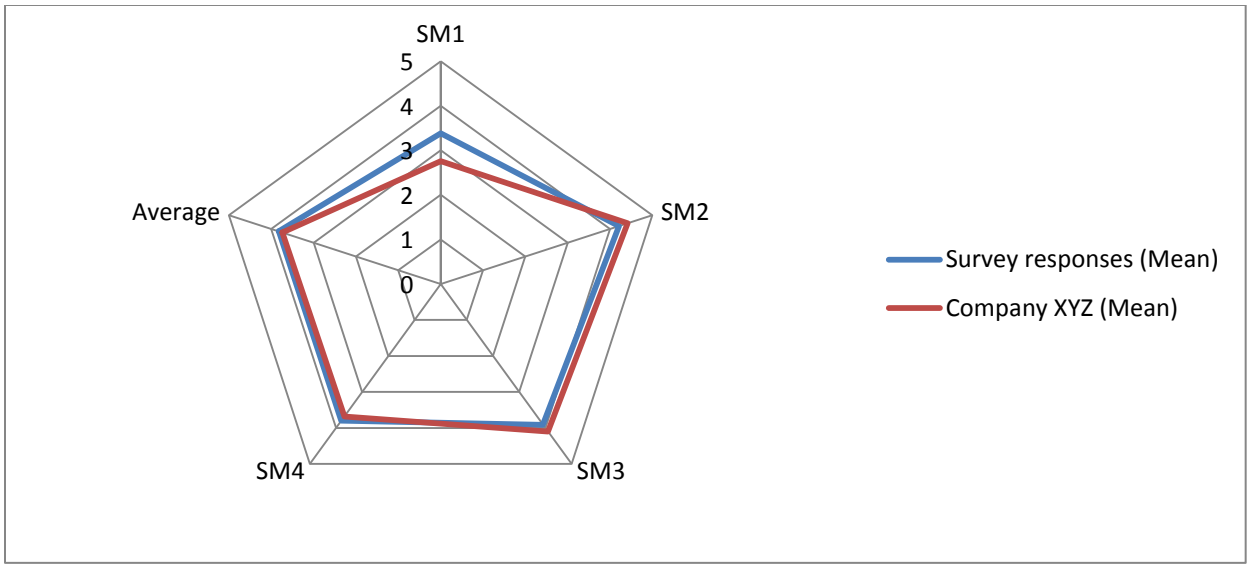


Figure 5.4: Evaluation of Supplier Management (SM) in case of Manufactured Food Company

Supply Chain Integration Management using IT (SCIMIT) in case of Manufactured Food Company

The evaluation of Supply Chain Integration Management using IT (SCIMIT) in the company XYZ is shown in Table 5.5. Insights from the six food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Supply Chain Integration Management using IT (SCIMIT) are collected on five point likert scale during plant visit of manufactured food company XYZ of agri-fresh food products.

Table 5.5 displays the most important Supply Chain Integration Management using IT (SCIMIT) practices for survey industries are, Technological integration and collaborative strategies of the entire supply chain activities and processes (SCIMIT2) (4.24) and Tracking and traceability of the entire supply chain (SCIMIT3) (4.41).

In the case evaluation of company XYZ the important Supply Chain Integration Management using IT (SCIMIT) practices implemented are, Technological integration and collaborative strategies of the entire supply chain activities and processes (SCIMIT2) (3.98) and Tracking and traceability of the entire supply chain (SCIMIT3) (4.56). The results of case company XYZ are near to survey analysis results. Case evaluation of company XYZ justifies the results of survey.

Table 5.5: Supply Chain Integration Management using IT (SCIMIT) in case of Manufactured Food Company

Supply Chain Integration Management using IT (SCIMIT)		Survey responses (Mean)	Manufactured food company XYZ (Mean)
SCIMIT1	E-commerce (Data exchange among supply chain stakeholders)	3.79	4.14
SCIMIT2	Technological integration and collaborative strategies of the entire supply chain activities and processes	4.24	3.98
SCIMIT3	Traceability and Tracking of the entire supply chain	4.41	4.56
SCIMIT4	Fair or unbiased profit distributing among entire supply chain stakeholders to keep long term relationship	3.82	3.60
Average		4.065	4.07

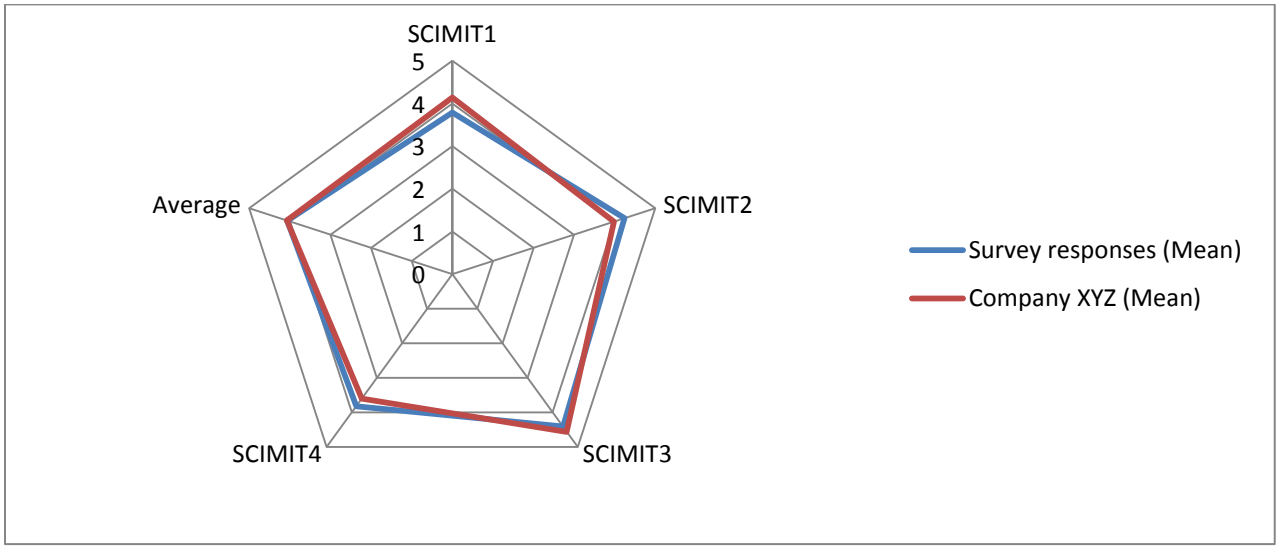


Figure 5.5: Evaluation of supply chain integration management using IT (SCIMIT) in case of Manufactured Food Company

In Figure 5.5 the radar chart is finely representing the resemblance of overall mean for Supply Chain Integration Management using IT (SCIMIT) in survey industry and case company XYZ of manufactured food of agri-fresh food products.

Economic Sustainability (ECS) in case of Manufactured Food Company

The evaluation of Economic Sustainability (ECS) in the company XYZ is shown in table 6.6. Insights from the six food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Economic Sustainability (ECS) are collected on five point likert scale during plant visit of manufactured food company XYZ of agri-fresh food products.

Table 5.6 displays the most important Economic Sustainability (ECS) practices for survey industries are, Focus on reducing cost of distribution (ECS1) (3.95), Emphasis on rising market share (ECS2) (4.17) and Emphasis on to reduce cost of food processing (ECS4) (3.96).

In the case evaluation of industry XYZ the important Economic Sustainability (ECS) practices implemented are, Focus on reducing cost of distribution (ECS1) (4.12), Emphasis on rising market share (ECS2) (4.14) and Emphasis on to reduce cost of food processing (ECS4) (4.42). Case company XYZ justifies the results of survey.

Table 5.6: Economic Sustainability (ECS) in case of Manufactured Food Company

Economic Sustainability (ECS)		**Survey responses (Mean)**	**Manufactured food company XYZ (Mean)**
ECS1	Focus on reducing cost of distribution	3.95	4.12
ECS2	Emphasis on rising market share	4.17	4.14
ECS3	Emphasis on revenues or returns from "green" products and reduce cost of waste management	3.56	3.78
ECS4	Emphasis on to reduce cost of food processing	3.96	4.42
Average		3.91	4.115

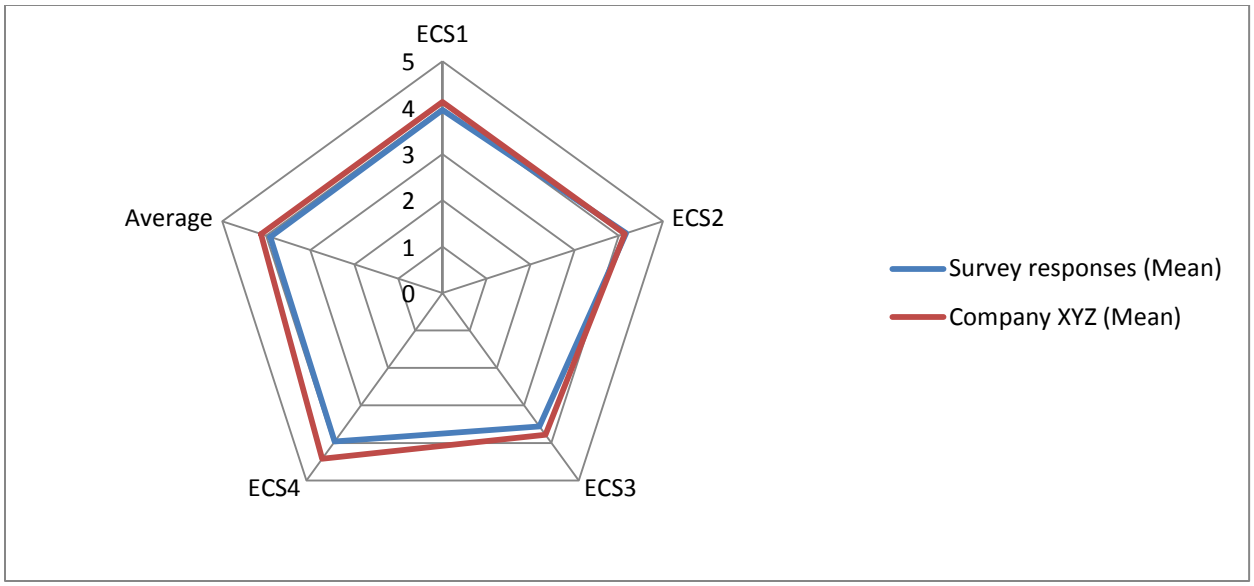


Figure 5.6: Evaluation of Economic Sustainability (ECS) in case of Manufactured Food Company

In Figure 5.6 the radar chart is finely representing the resemblance of overall mean for Economic Sustainability (ECS) in survey industry and case company XYZ of manufactured food of agri-fresh food products.

Social Sustainability (SOS) in case of manufactured food company

The evaluation of Social Sustainability (SOS) in the industry is shown in table 5.7. Insights from the six food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for five items or variables of Social Sustainability (SOS) are collected on five point likert scale during plant visit of manufactured food company XYZ of agri-fresh food products.

Table 5.7 displays the foremost Social Sustainability (SOS) practices for the survey industries are, Food product contributions with value to more population or community (SOS1) (3.85) and Standard working environment (SOS4) (3.57) and Food product quality like fresh, healthy and nutritious ect. in respond to marketplace demand (SOS5) (4.02). In the company XYZ, the important social sustainability implemented are, Food product contributions with value to more population or community (SOS1) (4.32), Build up the social welfare schemes (SOS2) (4.10) and

Food product quality like fresh, healthy and nutritious ect. in respond to marketplace demand (SOS5) (4.46).

From the case evaluation of the manufactured food company XYZ, All the practices of Social Sustainability (SOS1-SOS5) are similar to the survey results. Case evaluation of company XYZ justifies the survey results.

Table 5.7: Social Sustainability (SOS) in case of Manufactured Food Company

Social Sustainability (SOS)		Survey responses (Mean)	Manufactured food company XYZ (Mean)
SOS1	Food product contributions with value to more population or community	3.85	4.32
SOS2	Build up the social welfare schemes	3.49	3.56
SOS3	Diversity of employees	3.34	3.22
SOS4	Standard working environment	3.57	3.44
SOS5	Food product quality like fresh, healthy and nutritious ect. in respond to marketplace demand	4.02	4.46
Average		3.654	3.8

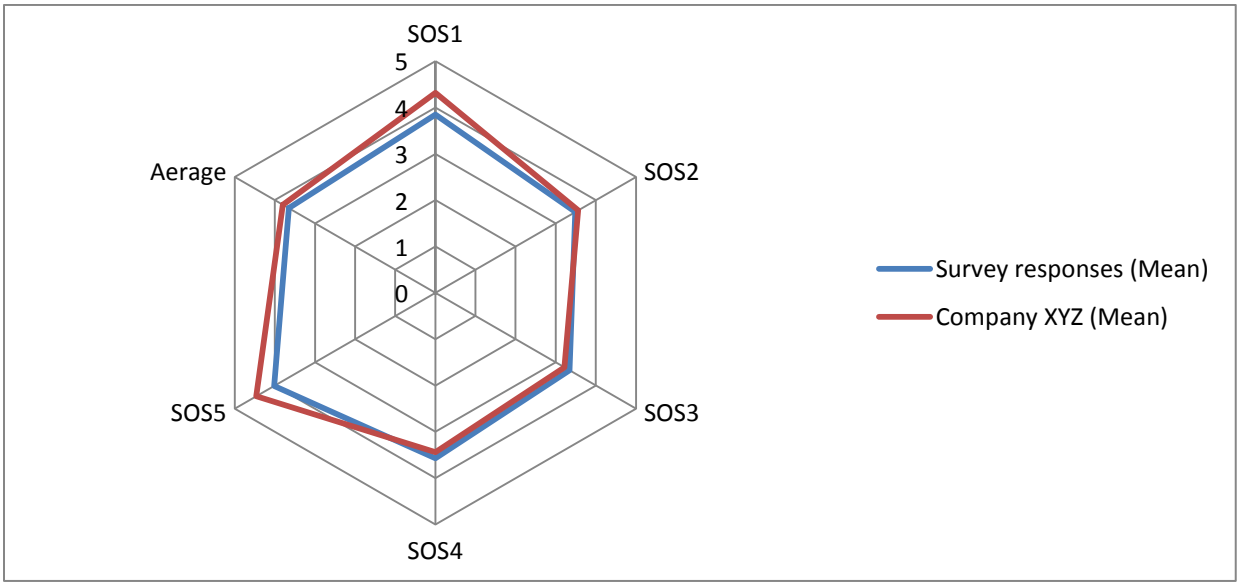


Figure 5.7: Evaluation of Social Sustainability (SOS) in case of Manufactured Food Company

In Figure 5.7 the radar chart is finely representing the resemblance of overall mean for Social Sustainability (SOS) in survey industry and case company XYZ of manufactured food of agri-fresh food products.

Environmental Sustainability (ENS) in case of Manufactured Food Company

The evaluation of Environmental Sustainability (ENS) in the industry is shown in table 6.8. Insights from the six food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Environmental Sustainability (ENS) are collected on five point likert scale during plant visit of manufactured food company XYZ of agri-fresh food products.

Table 6.8 displays the foremost Environmental Sustainability (ENS) practices for the survey industries are, To reduce air emission discharge (ENS1) (3.86), Safe disposal or dumping of packaging substance (ENS3) (3.82) and To reduce utilization of harmful materials like toxic / antibiotics etc. (ENS4) (4.14). In the case company XYZ, the important environmental sustainability practices implemented are, to reduce air emission discharge (ENS1) (4.22), Safe disposal or dumping of packaging substance (ENS3) (4.16) and to reduce utilization of harmful materials like toxic / antibiotics etc. (ENS4) (4.28).

From the case evaluation of the manufactured food company XYZ, All the practices of Environmental Sustainability (ENS1-ENS4) are similar to the survey results. Case evaluation of company XYZ justifies the survey results.

Table 5.8: Environmental Sustainability (ENS) in case of Manufactured Food Company

Environmental Sustainability (ENS)		**Survey responses (Mean)**	**Manufactured food company XYZ (Mean)**
ENS1	To reduce air emission discharge	3.86	4.22
ENS2	Effluent waste reduction	3.34	3.54
ENS3	Safe disposal or dumping of packaging substance	3.82	4.16
ENS4	To reduce utilization of harmful materials like toxic / antibiotics etc.	4.14	4.28
Average		3.79	4.05

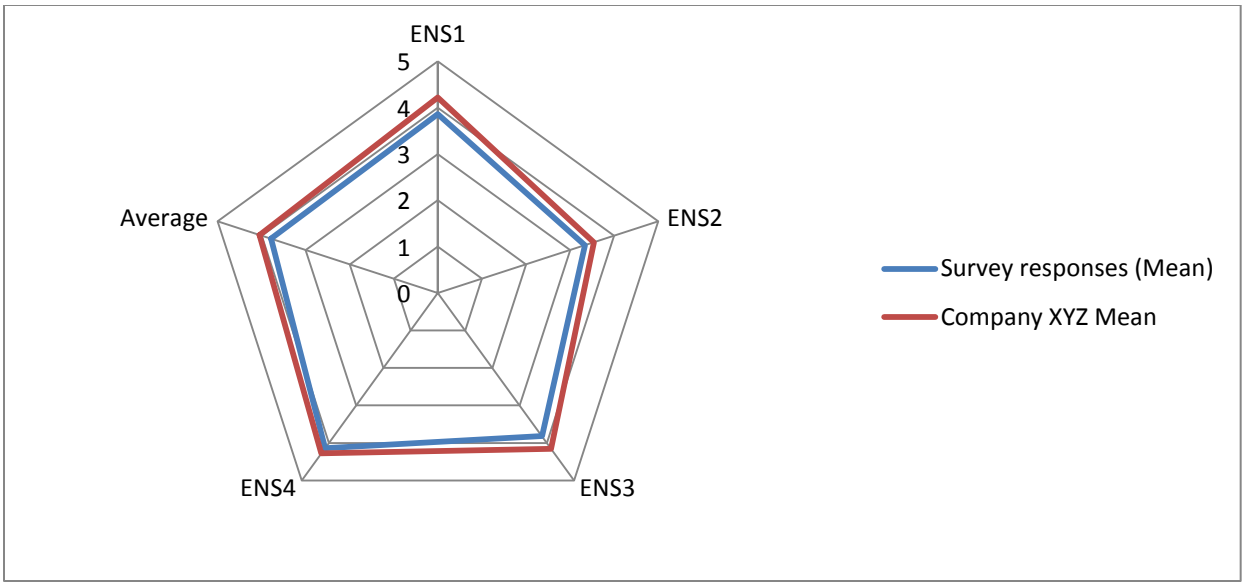


Figure 5.8: Evaluation of Environmental Sustainability (ENS) in case of Manufactured Food Company

In Figure 6.8 the radar chart is finely representing the resemblance of overall mean for Environmental Sustainability (ENS) in survey industry and case company XYZ of manufactured food of agri-fresh food products.

5.3.3. Findings

All interviewees agreed about the necessity of AFSCQ practices with constructs consisting of as Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Internal Management (IM) and Supply Chain Integration Management using IT (SCCIMIT) and dimensions of organizational sustainability as Economic Sustainability (ECS), Social Sustainability (SOS), and Environmental Sustainability (ENS) in case of manufactured food company XYZ of agri-fresh food products.. Some of the suggested initiatives towards AFSCQ practices and organizational sustainability in case of manufactured food company XYZ of agri-fresh food products are;

- Focus on after sale services such as quality claims etc.

- Maintain backorders (Order that is currently not available in stock, on the other hand is being re-ordered and will be available at a time) or reduction in the number of backorders and lost sales.
- Re-use / recycling (Collected used food product from packaging etc. that is separated and processed into recycled food products and distributed as used, without additional processing)
- Higher responsiveness of order fulfillment processes (On time order fulfillment for customer satisfaction)
- Production volume flexibility (Ability to vary production volumes during demand uncertainty without any detrimental effect on quality and efficiency)
- Reduction in food waste during food processing
- Reduce in cost for energy consumption
- Decrease in transaction cost (Cost of contributing in the market such as searching, negotiation, policing and enforcement costs)
- Decrease penalty occurring in environmental accidents
- Reduction in cost of customer returns
- Decrease in cost of waste treatment
- Focus on recycling revenues
- Focus on revenues from “green” products
- Focus on reduction in groundwater pollution
- Standard working conditions or work safety (Safe and hygienic working environment)
- Focus on improving flora and fauna

5.4. Case 2: Conserved or Frozen food segment of agri-fresh food products

5.4.1. Introduction

A case study has been designed to evaluate the Agri-fresh Food Supply Chain Quality (AFSCQ) model for conserved or frozen food segment of agri-fresh food products. An Indian company for frozen or conserved food, marked as ABC situated in north India has been chosen for case study. The company ABC is involved in AFSCQ practices or organizational sustainability. The supply chain partners of the company actively participate in the sustainability oriented programmes. The purpose of case study in conserved or frozen food company of agri-fresh food products is to collect the inclusive understanding of AFSCQ practices and organizational sustainability implementation in the conserved food industry of agri-fresh food products. The collection of information has been done in similar manner as in the case 1 with few changes like, prior to the interviews, pre-test interviews were conducted with four interviewees external to the concerned company in order to test the questionnaire. In the case company in total 12 interviewees were interviewed. Seven plant managers, two purchasing manager, two distribution center manager, and one wholesaler agreed to participate in the interview.

5.4.2. Evaluation of the case of Frozen Food Company ABC of agri-fresh food products

The company ABC implemented AFSCQ practices with guidelines as stated by plant managers and departmental heads. The company ensures economic, social and environmental sustainability to achieve organizational sustainability.

Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Frozen Food Company

The evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) for AFSCQ in the conserved or frozen food company of agri-fresh food products named as ABC is shown in Table 6.9. Insights from the six frozen food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) are collected on the five point likert scale during plant visit of frozen food company of agri-fresh food products.

Table 5.9 displays the foremost Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) practices for the survey industries are commitment to customer satisfaction (TMLC_AFSCQ1) (4.41) and Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions (TMLC_AFSCQ3) (4.27). In the company ABC, the important Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) practices are, commitment to customer satisfaction (TMLC_AFSCQ1) (4.44), Commitment to supplier relationship (TMLC_AFSCQ2) (3.84) and Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions (TMLC_AFSCQ3) (4.38).

From the case evaluation of the company ABC, all practices of top management leadership and commitment to AFSCQ (TMLC_AFSCQ1-TMLC_AFSCQ4) are like as the survey results. Case evaluation of company ABC justifies the survey results.

Table 5.9: Evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Frozen Food Company

Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)		**Survey responses (Mean)**	**Frozen food company ABC (Mean)**
TMLC_AFSCQ1	Commitment to customer satisfaction	4.41	4.44
TMLC_AFSCQ2	Commitment to supplier relationship	3.63	3.84
TMLC_AFSCQ3	Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions	4.27	4.38
TMLC_AFSCQ4	Human resource management	3.75	3.56
Average		4.015	4.055

In Figure 5.9 the radarchart is finely representing the resemblance of overall mean for Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in survey industry and case company ABC of frozen food of agri-fresh food products.

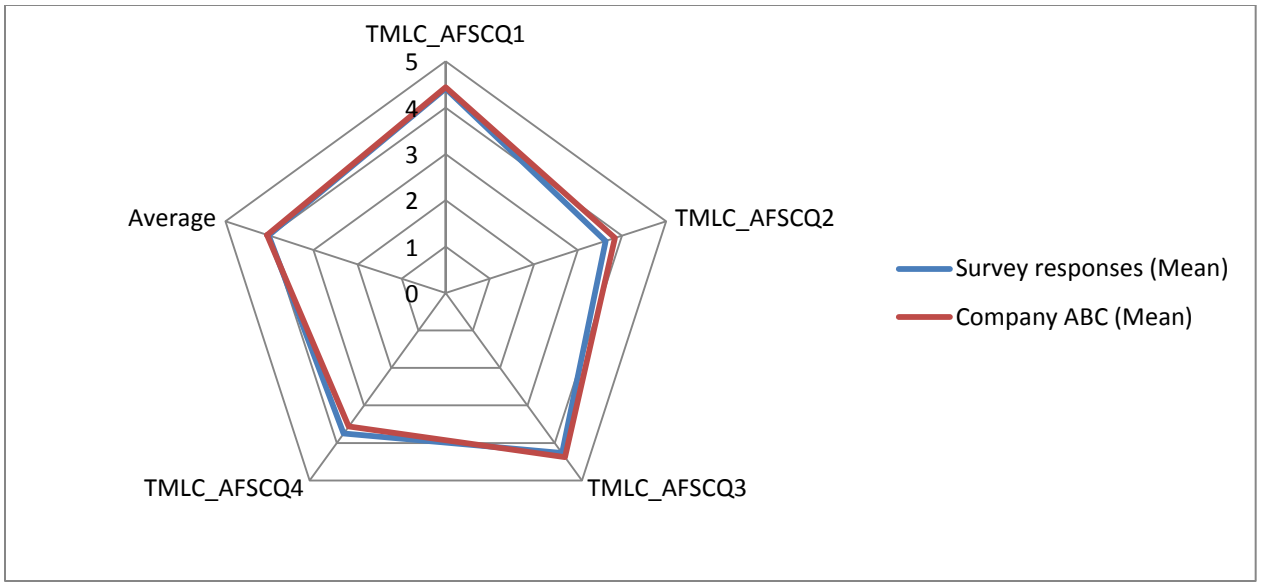


Figure 5.9: Evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Frozen Food Company

Customer Focus (CF) in case of Frozen Food Company

The evaluation of Customer Focus (CF) in the company ABC is shown in Table 5.10. Perceptions of the six frozen food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Customer Focus (CF) are collected on five point likert scale during plant visit of frozen food company of agri-fresh food products.

Table 5.10 displays the foremost Customer Focus (CF) practices for the survey industries are, Brand awareness with reference to quality of food product (CF1) (4.54), Improve customer's convenience by providing significant information on the packaging of food product (CF3) (3.72) and Frequently communication with customers, like consistent or routine survey of customer's view (CF4) (4.23). In the company ABC, the important Customer Focus (CF) practices are, Brand awareness with reference to quality of food product (CF1) (4.66), Emphasis on product variety or diversity (CF2) (3.74) and Frequently communication with customers, like consistent or routine survey of customer's view (CF4) (4.12).

From the case evaluation of the company ABC, all practices of customer focus (CF1-CF4) are similar to the survey results. Case evaluation of company ABC justifies the survey results.

Table 5.10: Evaluation of Customer Focus (CF) in case of Frozen Food Company

Customer Focus (CF)		Survey responses (Mean)	Frozen food company ABC (Mean)
CF1	Brand awareness with reference to quality of food product	4.54	4.66
CF2	Emphasis on product variety or diversity	3.47	3.74
CF3	Improve customer's convenience by providing significant information on the packaging of food product	3.72	3.52
CF4	Frequently communication with customers, like consistent or routine survey of customer's view	4.23	4.12
Average		3.99	4.01

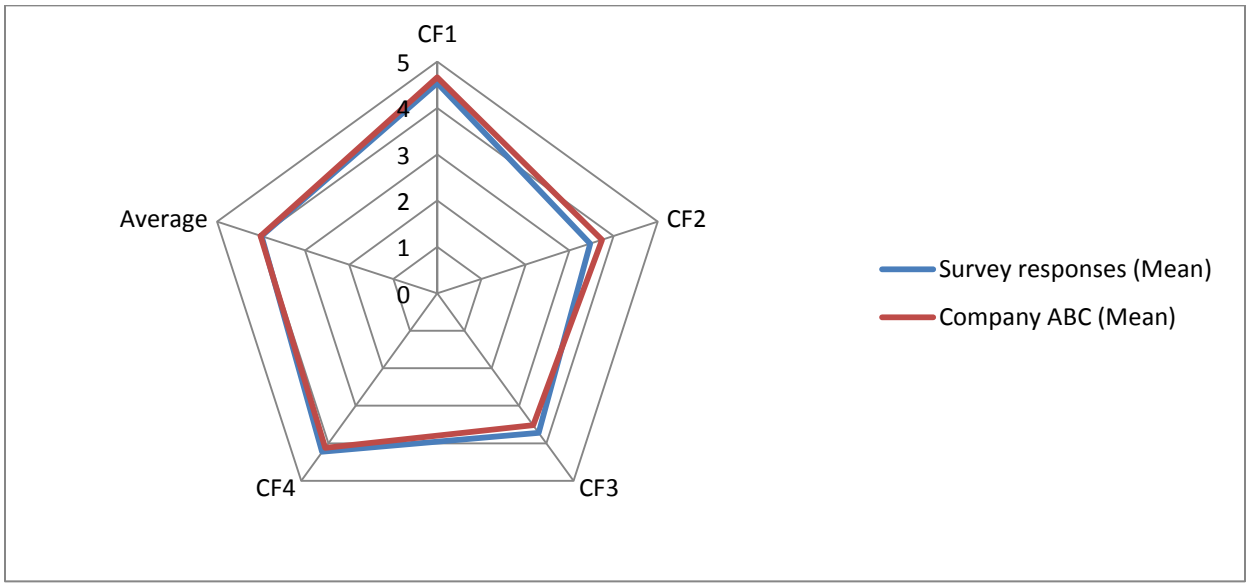


Figure 5.10: Evaluation of Customer Focus (CF) in case of Frozen Food Company

In Figure 5.10 the radar chart for Customer Focus (CF) of case company ABC closely resembles to that of survey industry of frozen food of agri-fresh food products.

Internal Management (IM) in case of Frozen Food Company

The evaluation of Internal Management (IM) or Process Management (PM) or Logistics Management (LM) in the company ABC is shown in Table 5.11. Perceptions of the six frozen food processing managers, two purchasing manager, two distribution center manager, and one

wholesaler, for four items or variables of Internal Management (IM) are collected on five point likert scale during plant visit of frozen food company ABC of agri-fresh food products.

Table 5.11 displays the foremost Internal Management (IM) practices for the survey industries are, Quality standards to make sure assured quality of food product like chemical, microbiological and physical properties etc. (IM2) (4.20), Standard conditions for storage and transportation of food products (IM3) (4.42) and Inventory management (IM4) (4.42). In the company ABC, the important Internal Management (IM) practices are, Continuous process improvement for internal process control (IM1) (4.66), Quality standards to make sure assured quality of food product like chemical, microbiological and physical properties etc.. (IM2) (4.44), Standard conditions for storage and transportation of food products (IM3) (4.46) and Inventory management (IM4) (4.14).

From the case evaluation of the company ABC, all practices of Internal Management (IM1-IM4) are similar to the survey results. Case evaluation of company ABC justifies the survey results.

Table 5.11: Evaluation of Internal Management (IM) in case of Frozen Food Company

Internal Management (IM)		**Survey responses (Mean)**	**Frozen food company XYZ (Mean)**
IM1	Continuous process improvement for internal process control	3.62	4.26
IM2	Quality standards to make sure assured quality of food product like chemical, microbiological and physical properties etc..	4.20	4.44
IM3	Standard conditions for storage and transportation of food products	4.42	4.46
IM4	Inventory management	4.42	4.14
Average		4.165	4.325

In Figure 5.11 the radar chart for Internal Management (IM) of case company ABC closely resembles to that of survey industry of frozen food of agri-fresh food products.

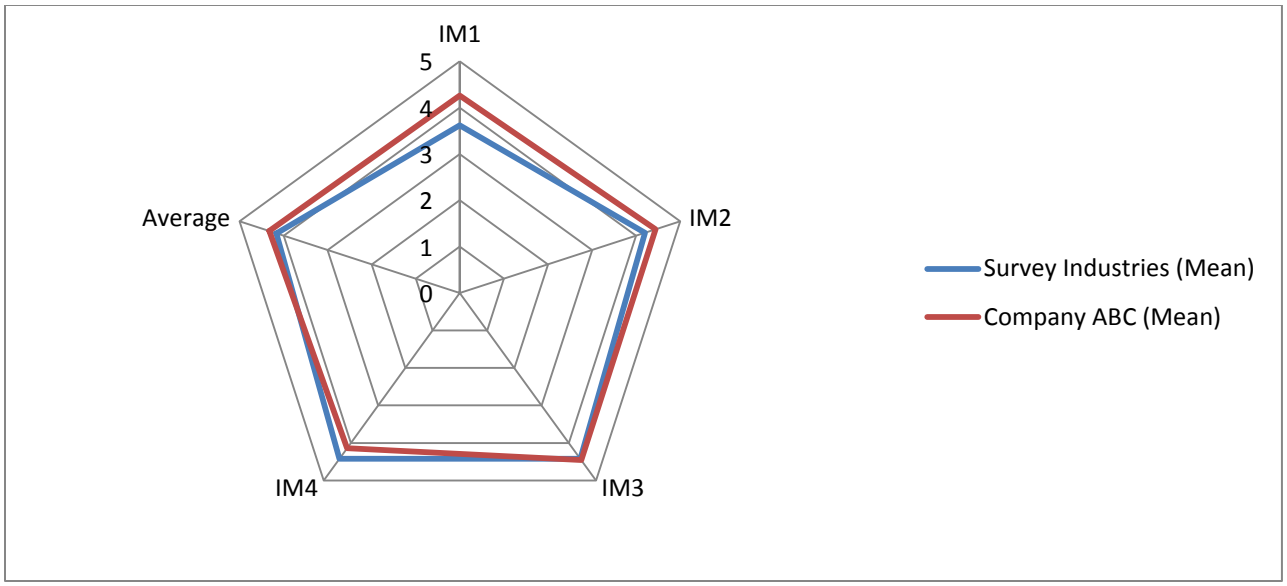


Figure 5.11: Evaluation of Internal Management (IM) in case of Frozen Food Company

Supplier Management (SM) in case of Frozen Food Company

The evaluation of Supplier Management (SM) in the company ABC is shown in Table 5.12. Perceptions of the six frozen food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Supplier Management (SM) are collected on five point likert scale during plant visit of frozen food company ABC of agri-fresh food products.

Table 5.12 displays the foremost Supplier Management (SM) practices for the survey industries are, Quality of supplier's raw food product and process (SM2) (4.21), Set up long-term relationships with suppliers (SM3) (3.91) and Actively supplier's engagement in organizational supply chain quality development courses (SM4) (3.80). In the company ABC, the important Supplier Management (SM) practices are, Quality of supplier's raw food product and process (SM2) (4.48), Set up long-term relationships with suppliers (SM3) (4.12), and actively supplier's engagement in organizational supply chain quality development courses (SM4) (3.96).

From the case evaluation of the company ABC, all practices of Supplier Management (SM1-SM4) are similar to the survey results. Case evaluation of company ABC justifies the survey results.

Table 5.12: Evaluation of Supplier Management (SM) in case of Frozen Food Company

Supplier Management (SM)		Survey responses (Mean)	Frozen food company ABC (Mean)
SM1	Collaboration and coordination along with suppliers for attaining environmental friendly goals	3.38	3.64
SM2	Quality of supplier's raw food product and process	4.21	4.48
SM3	Set up long-term relationships with suppliers	3.91	4.12
SM4	Actively supplier's engagement in organizational supply chain quality development courses	3.80	3.96
Average		3.825	4.05

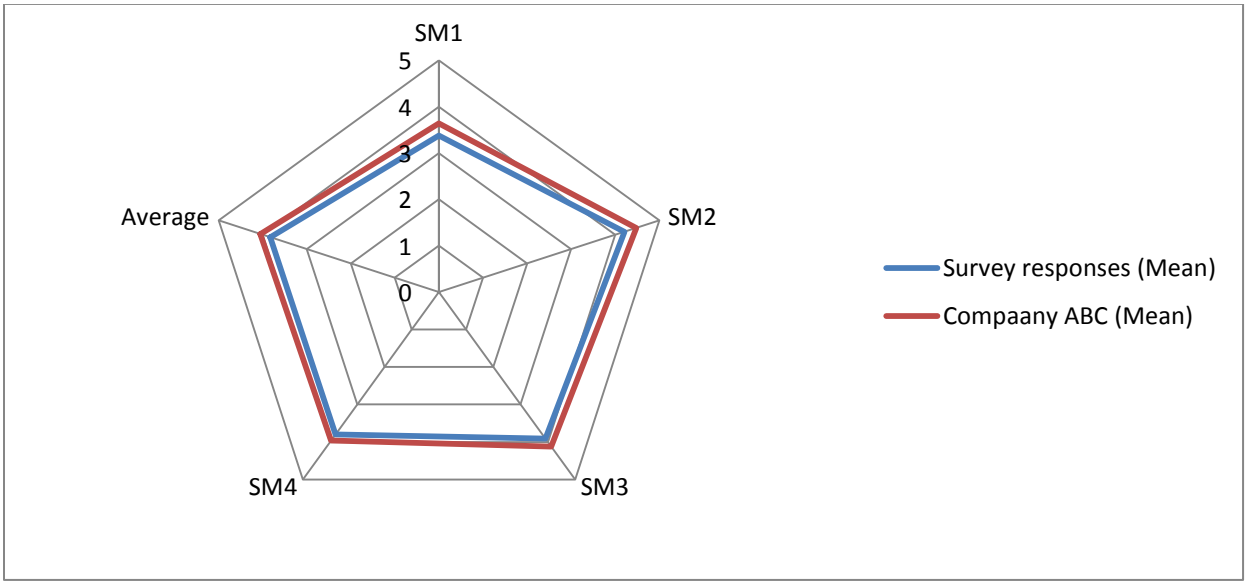


Figure 5.12: Evaluation of Supplier Management (SM) in case of Frozen Food Company

In Figure 5.12 the radar chart for Supplier Management (SM) of case company ABC closely resembles to that of survey industry of frozen food of agri-fresh food products.

Supply Chain Integration Management using IT (SCIMIT) in case of Frozen Food Company

The evaluation of Supply Chain Integration Management using IT (SCIMIT) in the company ABC is shown in Table 5.13. Perceptions of the six frozen food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Supply Chain Integration Management using IT (SCIMIT) are collected on five point likert scale during plant visit of frozen food company ABC of agri-fresh food products.

Table 5.13 displays the foremost Supply Chain Integration Management using IT (SCIMIT) practices for the survey industries are, Technological integration and collaborative strategies of the entire supply chain activities and processes (SCIMIT2) (4.24), Tracking and traceability of the entire supply chain (SCIMIT3) (4.41) and Fair or unbiased profit distributing among entire supply chain stakeholders to keep long term relationship (SCIMIT4) (3.82). In the frozen food company ABC, the important Supply Chain Integration Management using IT (SCIMIT) practices are, E-commerce (Data exchange among supply chain stakeholders) (SCIMIT1) (3.94), Technological integration and collaborative strategies of the entire supply chain activities and processes (SCIMIT2) (4.32), and Tracking and traceability of the entire supply chain (SCIMIT3) (4.54).

From the case evaluation of the frozen company ABC, all practices of Supply Chain Integration Management using IT (SCIMIT1-SCIMIT4) are similar to the survey results. Case evaluation of frozen company ABC justifies the survey results.

Table 5.13: Evaluation Supply Chain Integration Management using IT (SCIMIT) in case of Frozen Food Company

Supply Chain Integration Management using IT (SCIMIT)		**Survey responses (Mean)**	**Frozen food company ABC (Mean)**
SCIMIT1	E-commerce (Data exchange among supply chain stakeholders)	3.79	3.94
SCIMIT2	Technological integration and collaborative strategies of the entire supply chain activities and processes	4.24	4.32
SCIMIT3	Tracking and traceability of the entire supply chain	4.41	4.54
SCIMIT4	Fair or unbiased profit distributing among entire supply chain stakeholders to keep long term relationship	3.82	3.72
Average		4.065	4.13

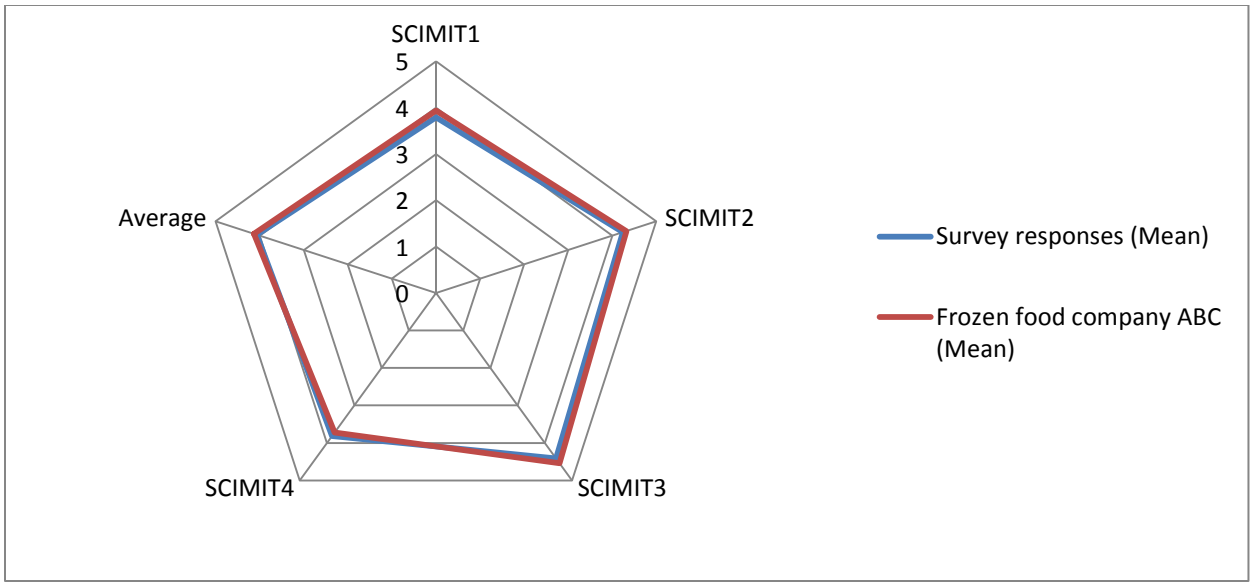


Figure 5.13: Evaluation of Supply Chain Integration Management using IT (SCIMIT) in case of Frozen Food Company

In Figure 5.13 the radar chart for Supply Chain Integration Management using IT (SCIMIT) of case company ABC closely resembles to that of survey industry of frozen food of agri-fresh food products.

Economic Sustainability (ECS) in case of Frozen Food Company

The evaluation of Economic Sustainability (ECS) in the company ABC is shown in Table 5.14. Perceptions of the six frozen food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Economic Sustainability (ECS) are collected on five point likert scale during plant visit of frozen food company ABC of agri-fresh food products.

Table 5.14 displays the foremost Economic Sustainability (ECS) practices for the survey industries are, Focus on reducing cost of distribution (ECS1) (3.95), Emphasis on rising market share (ECS2) (4.17) and Emphasis on to reduce cost of food processing (ECS4) (3.96). In the frozen food company ABC, the important Economic Sustainability (ECS) practices are, Focus on reducing cost of distribution (ECS1) (4.18), Emphasis on rising market share (ECS2) (3.96), and Emphasis on to reduce cost of food processing (ECS4) (4.04).

From the case evaluation of the frozen company ABC, all practices of Economic Sustainability (ECS1-ECS4) are close to the survey results. Case evaluation of frozen company ABC justifies the survey results.

Table 5.14: Evaluation Economic Sustainability (ECS) in case of Frozen Food Company

Economic sustainability (ECS)		Survey responses (Mean)	Frozen food company XYZ (Mean)
ECS1	Focus on reducing cost of distribution	3.95	4.18
ECS2	Emphasis on rising market share	4.17	3.96
ECS3	Emphasis on revenues or returns from "green" products and reduce cost of waste management	3.56	3.74
ECS4	Emphasis on to reduce cost of food processing	3.96	4.28
Average		3.91	4.04

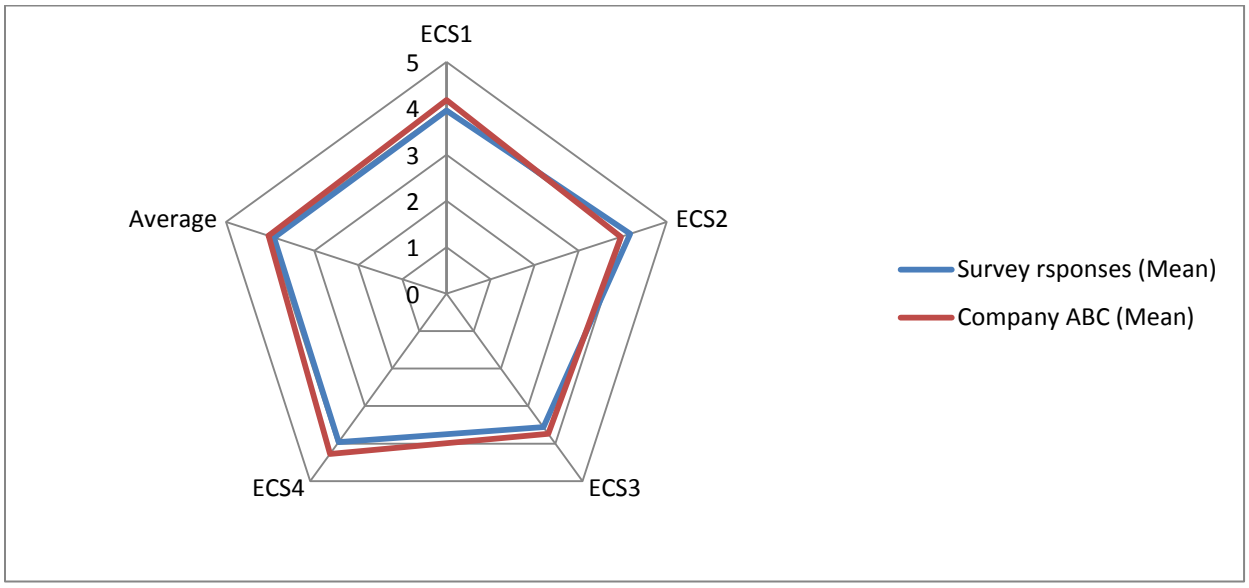


Figure 5.14: Evaluation of Economic Sustainability (ECS) in case of Frozen Food Company

In Figure 5.14 the radar chart for Economic Sustainability (ECS) of case company ABC closely resembles to that of survey industry of frozen food of agri-fresh food products.

Social Sustainability (SOS) in case of Frozen Food Company

The evaluation of Social Sustainability (SOS) in the company ABC is shown in Table 5.15. Perceptions of the six frozen food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for five items or variables of Social Sustainability (SOS) are collected on five point likert scale during plant visit of frozen food company ABC of agri-fresh food products.

Table 5.15 displays the foremost Social Sustainability (SOS) practices for the survey industries are, Food product contributions with value to more population or community (SOS1) (3.85), Standard working environment (SOS4) (3.57) Food product quality like fresh, healthy and nutritious ect. in respond to marketplace demand (SOS5) (4.02). In the frozen food company ABC, the important Social Sustainability (SOS) practices are, Food product contributions with value to more population or community (SOS1) (3.98), Standard working environment (SOS4) (3.88), and Food product quality like fresh, healthy and nutritious ect. in respond to marketplace demand (SOS5) (4.42).

From the case evaluation of the frozen company ABC; all practices of Social Sustainability (SOS1-SOS5) are close to the survey results. Case evaluation of frozen company ABC justifies the survey results.

Table 5.15: Evaluation Social Sustainability (SOS) in case of Frozen Food Company

Social Sustainability (SOS)		**Survey responses (Mean)**	**Frozen food company XYZ (Mean)**
SOS1	Food product contributions with value to more population or community	3.85	3.98
SOS2	Build up the social welfare schemes	3.49	3.56
SOS3	Diversity of employees	3.34	3.44
SOS4	Standard working environment	3.57	3.88
SOS5	Food product quality like fresh, healthy and nutritious ect. in respond to marketplace demand	4.02	4.42
Average		3.654	3.856

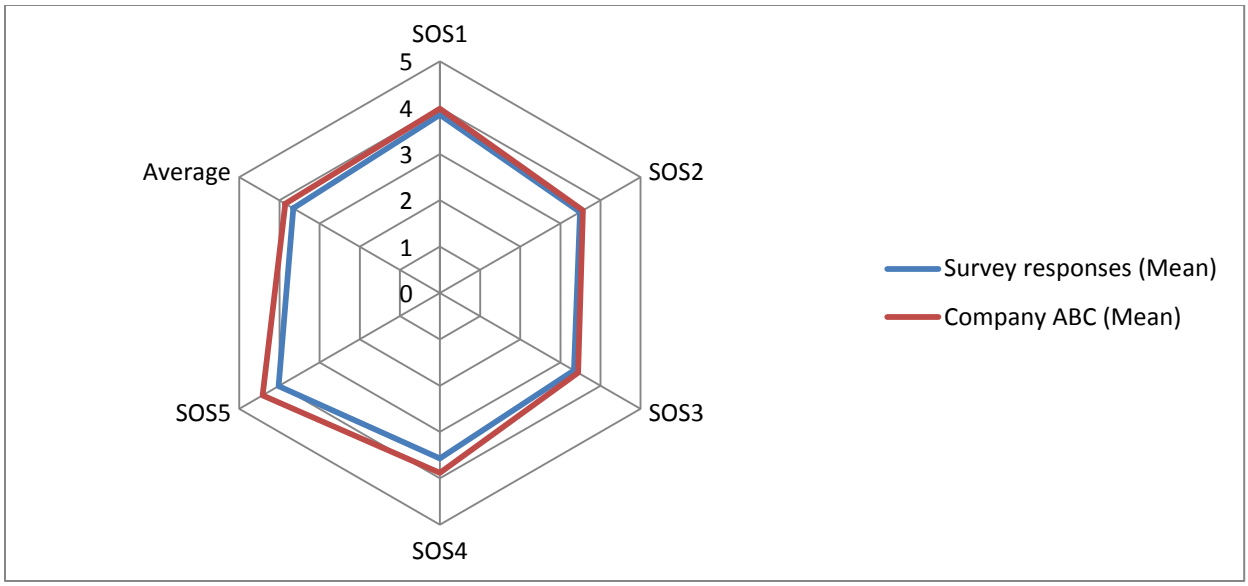


Figure 5.15: Evaluation of Social Sustainability (SOS) in case of Frozen Food Company

In Figure 5.15 the radar chart for Social Sustainability (SOS) of case company ABC closely resembles to that of survey industry of frozen food of agri-fresh food products.

Environmental Sustainability (ENS) in case of Frozen Food Company

The evaluation of Environmental Sustainability (ENS) in the company ABC is shown in Table 5.16. Perceptions of the six frozen food processing managers, two purchasing manager, two distribution center manager, and one wholesaler, for four items or variables of Environmental Sustainability (ENS) are collected on five point likert scale during plant visit of frozen food company ABC of agri-fresh food products.

Table 5.16 displays the foremost Environmental Sustainability (ENS) practices for the survey industries are, To reduce air emission discharge (ENS1) (3.86), Safe disposal or dumping of packaging substance (ENS3) (3.82) and To reduce utilization of harmful materials like toxic / antibiotics etc. (ENS4) (4.14). In the frozen food company ABC, the important Environmental Sustainability (ENS) practices are, to reduce air emission discharge (ENS1) (4.38), Safe disposal or dumping of packaging substance (ENS3) (3.98), and to reduce utilization of harmful materials like toxic / antibiotics etc. (ENS4) (4.34).

From the case evaluation of the frozen company ABC, all practices of Environmental Sustainability (ENS1-ENS4) are close to the survey results. Case evaluation of frozen company ABC justifies the survey results.

Table 5.16: Evaluation Environmental Sustainability (ENS) in case of Frozen Food Company

Environmental Sustainability (ENS)		Survey responses (Mean)	Frozen food company XYZ (Mean)
ENS1	To reduce air emission discharge	3.86	4.38
ENS2	Effluent waste reduction	3.34	3.46
ENS3	Safe disposal or dumping of packaging substance	3.82	3.98
ENS4	To reduce utilization of harmful materials like toxic / antibiotics etc.	4.14	4.34
Average		3.79	4.04

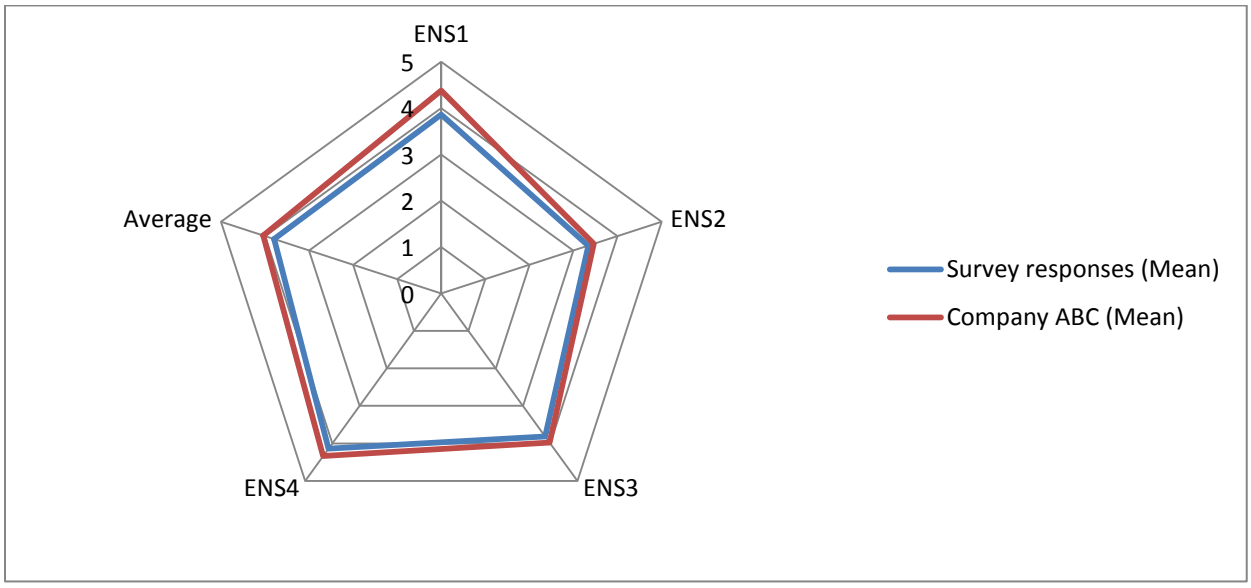


Figure 5.16: Evaluation of Environmental Sustainability (ENS) in case of Frozen Food Company

In Figure 5.16 the radar chart for Environmental Sustainability (ENS) of case company ABC closely resembles to that of survey industry of frozen food of agri-fresh food products.

5.4.3. Findings

All interviewees agreed about the necessity of AFSCQ practices as Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Internal Management (IM) and Supply Chain Integration Management using IT (SCCIMIT) and organizational sustainability as Economic Sustainability (ECS), Social Sustainability (SOS), and Environmental Sustainability (ENS) in case of frozen food company ABC of agri-fresh food products. Some of the suggested initiatives towards AFSCQ practices and organizational sustainability in case of frozen food company ABC of agri-fresh food products are;

- Green packaging for maintain food product quality during logistic operation.
- Focus on research and development activities for environmental sustainability.
- Quality auditing processes to maintain assured food product quality.
- Conservation of ecology
- Focus on safe disposal of packaging material
- Focus on satisfactory cost of food products

5.5. CASE 3: Local food segment of agri-fresh food products

5.5.1. Introduction

In order to evaluate the Agri-fresh Food Supply Chain Quality (AFSCQ) model for local food segment of agri-fresh food products, a case study has been designed. The case study has been carried out in an Indian local food firm or company of agri-fresh food products. The company is marked as LMN. It is also situated in north India**.** The company LMN is concerned to AFSCQ practices and organizational sustainability. The supply chain partners of the company are also taking part in the sustainability oriented programmes. The most important purpose of such case study in local food Company of agri-fresh food products is to collect the comprehensive understanding of AFSCQ practices and organizational sustainability implementation in the local food industry of agri-fresh food products. The sources of information are interviews with the firm or company managers, the manager of distribution center, the purchasing managers, wholesaler of a wholesale company, the managers of supermarkets during the case study. The information was collected exactly in the same manner as in previous two cases. Prior to the interviews, pre-test interviews were conducted with four interviewees external to the concerned company or firm in order to test the questionnaire. In the case company or firm in total 10 interviewees were interviewed. Seven plant managers, two purchasing manager, two distribution center manager, and one wholesaler agreed to participate in the interview.

5.5.2. Evaluation the case of local food company LMN of agri-fresh food products

An evaluation of AFSCQ practices and organizational or firm sustainability conversed in the subsequent section. In the Company LMN, firm managers and head also stated that they implemented AFSCQ practices with guidelines. The company or firm LMN carried out organizational or firm sustainability as economic, social and environmental sustainability.

Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Local Food Company

The evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) for AFSCQ in the local food company or firm of agri-fresh food products named as LMN is shown in table 5.17. Insights from the one local food firm head, four purchasing manager, three

distribution center manager, and two retailers, for four items or variables of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) are collected on the five point likert scale during visit of local food company or firm of agri-fresh food products.

Table 5.17. displays the foremost Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) practices for the survey industries are commitment to customer satisfaction (TMLC_AFSCQ1) (4.41) and Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions (TMLC_AFSCQ3) (4.27). In the firm or company LMN, the important Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) practices are, commitment to customer satisfaction (TMLC_AFSCQ1) (4.32), Commitment to supplier relationship (TMLC_AFSCQ2) (4.14) and Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions (TMLC_AFSCQ3) (3.84).

From the case evaluation of the company LMN, all practices of top management leadership and commitment to AFSCQ (TMLC_AFSCQ1-TMLC_AFSCQ4) are similar to the survey results. Case evaluation of company LMN justifies the survey results.

Table 5.17: Evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Local Food Company

Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ)		**Survey responses (Mean)**	**Local food company LMN (Mean)**
TMLC_AFSCQ1	Commitment to customer satisfaction	4.41	4.32
TMLC_AFSCQ2	Commitment to supplier relationship	3.63	4.14
TMLC_AFSCQ3	Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions	4.27	3.84
TMLC_AFSCQ4	Human resource management	3.75	3.62
Average		4.015	3.98

In Figure 5.17 the radar chart shows that there is close resemblance of overall mean for Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in survey industry and local food case company LMN of agri-fresh food products.

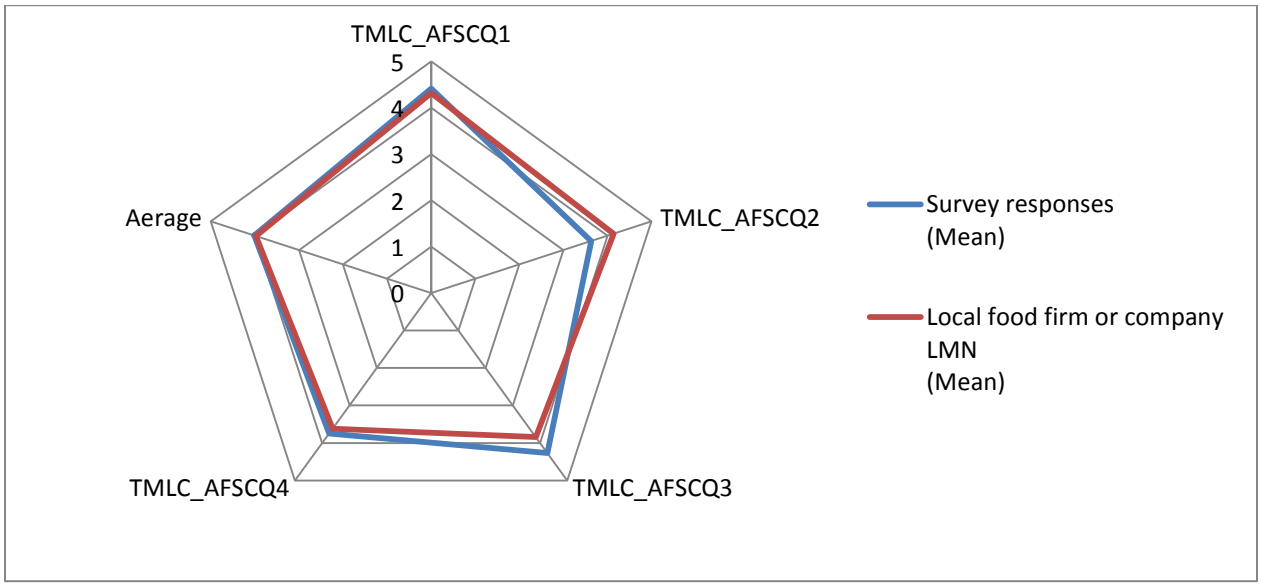


Figure 5.17: Evaluation of Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ) in case of Local Food Company

Customer Focus (CF) in case of Local Food Company

The evaluation of Customer Focus (CF) in the firm or company LMN is shown in Table 5.18. Insights from the one local food firm head, four purchasing manager, three distribution center manager, and two retailers, for four items or variables of Customer Focus (CF) are collected on the five point likert scale during visit of local food company or firm of agri-fresh food products. Table 5.18 displays the foremost Customer Focus (CF) practices for the survey industries are, Brand awareness with reference to quality of food product (CF1) (4.54), Improve customer's convenience by providing significant information on the packaging of food product (CF3) (3.72) and Frequently communication with customers, like consistent or routine survey of customer's view (CF4) (4.23). In the company or firm LMN, the important Customer Focus (CF) practices are, Brand awareness with reference to quality of food product (CF1) (4.24) and Emphasis on product variety or diversity (CF2) (4.38).

From the case evaluation of the company or firm LMN, all practices of customer focus (CF1-CF4) are similar to the survey results. Case evaluation of company LMN justifies the survey results.

Table 5.18: Evaluation of Customer Focus (CF) in case of Local Food Company

Customer Focus (CF)		Survey responses (Mean)	Local food company LMN (Mean)
CF1	Brand awareness with reference to quality of food product	4.54	4.24
CF2	Emphasis on product variety or diversity	3.47	4.38
CF3	Improve customer's convenience by providing significant information on the packaging of food product	3.72	3.54
CF4	Frequently communication with customers, like consistent or routine survey of customer's view	4.23	3.58
Average		3.99	3.935

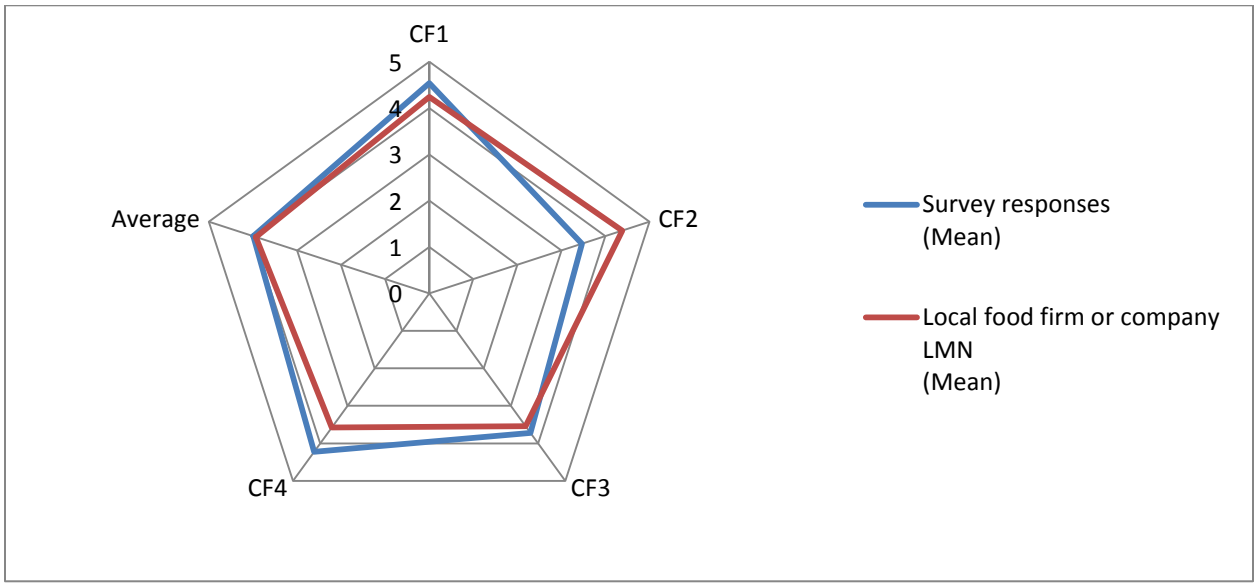


Figure 5.18: Evaluation of Customer Focus (CF) in case of Local Food Company

From the case evaluation of the company or firm LMN, all practices of customer focus (CF1-CF4) are like as the survey results. Case evaluation of company or firm LMN justifies the survey results.

Internal Management (IM) in case of Local Food Company

The evaluation of Internal Management (IM) in the firm or company LMN is shown in Table 5.19. Insight from the one local food firm head, four purchasing manager, three distribution center manager, and two retailers, for four items or variables of Internal Management (IM) are collected on the five point likert scale during visit of local food company or firm of agri-fresh food products.

Table 5.19 displays the foremost Internal Management (IM) practices for the survey industries are, Quality standards to make sure assured quality of food product like chemical, microbiological and physical properties etc.. (IM2) (4.20), Standard conditions for storage and transportation of food products (IM3) (4.42) and Inventory management (IM4) (4.42). In the firm or company LMN, the important Internal Management (IM) practices are, Standard conditions for storage and transportation of food products (IM3) (4.54) and Inventory Management (IM4) (4.58).

From the case evaluation of the company or firm LMN, all practices of Internal Management (IM1-IM4) are similar to the survey results. Case evaluation of company or firm LMN justifies the survey results.

Table 5.19: Evaluation of Internal Management (IM) in case of local food company

Internal Management (IM)		**Survey responses (Mean)**	**Local food company LMN (Mean)**
IM1	Continuous process improvement for internal process control	3.62	3.88
IM2	Quality standards to make sure assured quality of food product like chemical, microbiological and physical properties etc..	4.20	3.82
IM3	Standard conditions for storage and transportation of food products	4.42	4.54
IM4	Inventory management	4.42	4.58
Average		4.165	4.205

In Figure 5.19 the radar chart shows that there is close resemblance of overall mean for Internal Management (IM) in survey industry and local food case company LMN of agri-fresh food products.

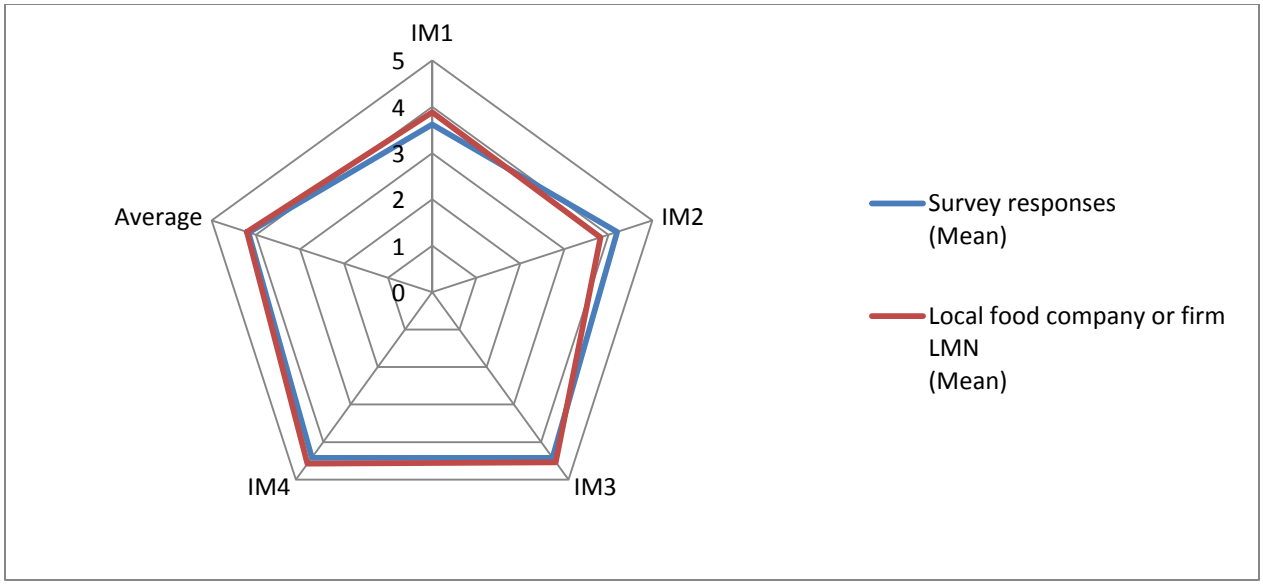


Figure 5.19: Evaluation of Internal Management (IM) in case of local food company

Supplier Management (SM) in case of Local Food Company

The evaluation of Supplier Management (SM) in the company or firm LMN is shown in Table 5.20. Insight from the one local food firm head, four purchasing manager, three distribution center manager, and two retailers, for four items or variables of Supplier Management (SM) are collected on the five point likert scale during visit of local food company or firm LMN of agri-fresh food products.

Table 5.20 displays the foremost Supplier Management (SM) practices for the survey industries are, Quality of supplier's raw food product and process (SM2) (4.21), Set up long-term relationships with suppliers (SM3) (3.91) and Actively supplier's engagement in organizational supply chain quality development courses (SM4) (3.80). In the company or firm LMN, the important Supplier Management (SM) practices are, Quality of supplier's raw food product and process (SM2) (4.78) and Set up long-term relationships with suppliers (SM3) (4.36).

From the case evaluation of the local food company or firm LMN, all practices of Supplier Management (SM1-SM4) are similar to the survey results. Case evaluation of company ABC justifies the survey results.

Table 5.20: Evaluation of Supplier Management (SM) in case of Local Food Company

Supplier Management (SM)		Survey responses (Mean)	Local food company LMN (Mean)
SM1	Collaboration and coordination along with suppliers for attaining environmental friendly goals	3.38	3.26
SM2	Quality of supplier's raw food product and process	4.21	4.78
SM3	Set up long-term relationships with suppliers	3.91	4.36
SM4	Actively supplier's engagement in organizational supply chain quality development courses	3.80	3.54
Average		3.825	3.985

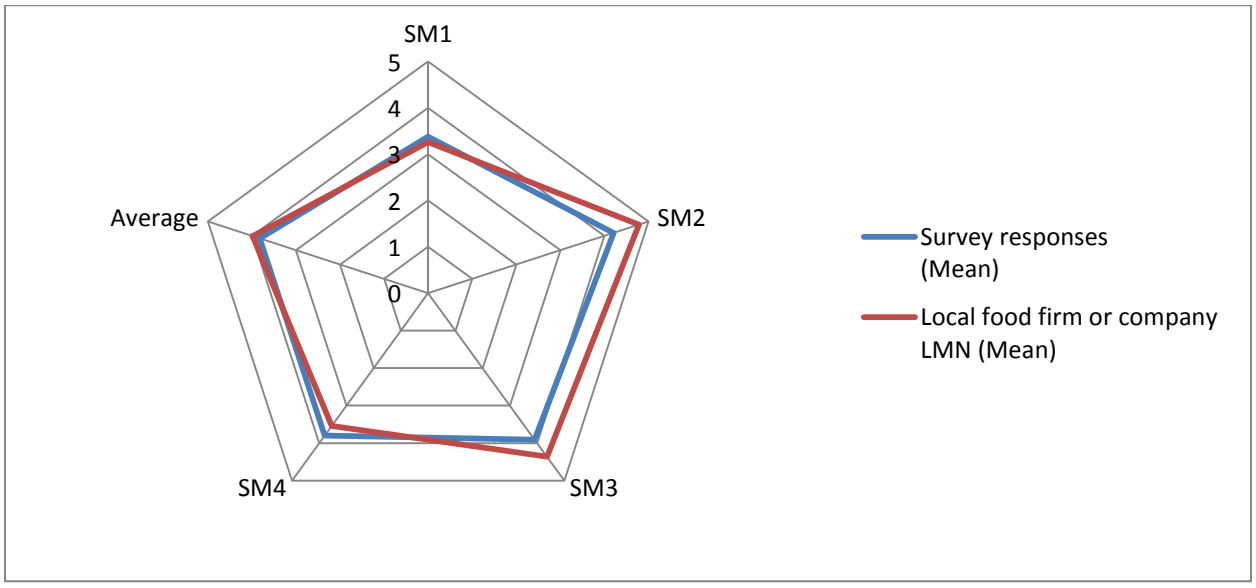


Figure 5.20: Evaluation of Supplier Management (SM) in case of Local Food Company

In Figure 5.20 the radar chart shows that there is close resemblance of overall mean for Supplier Management (SM) in survey industry and local food case company LMN of agri-fresh food products.

Supply Chain Integration Management using IT (SCIMIT) in case of Local Food Company

The evaluation of Supply Chain Integration Management using IT (SCIMIT) in the local food company or firm LMN is shown in Table 5.21. Insight from the one local food firm head, four purchasing manager, three distribution center manager, and two retailers, for four items or

variables of Supplier Chain Integration Management using IT (SCIMIT) are collected on the five point likert scale during visit of local food company or firm LMN of agri-fresh food products.

Table 5.21 displays the foremost Supply Chain Integration Management using IT (SCIMIT) practices for the survey industries are, Technological integration and collaborative strategies of the entire supply chain activities and processes (SCIMIT2) (4.24), Tracking and traceability of the entire supply chain (SCIMIT3) (4.41) and Fair or unbiased profit distributing among entire supply chain stakeholders to keep long term relationship (SCIMIT4) (3.82). In the local food company or firm LMN, the important Supply Chain Integration Management using IT (SCIMIT) practices are, E-commerce (Data exchange among supply chain stakeholders) (SCIMIT1) (4.24), and Tracking and traceability of the entire supply chain (SCIMIT3) (4.26).

From the case evaluation of the local food company or firm LMN, all practices of Supply Chain Integration Management using IT (SCIMIT1-SCIMIT4) are similar to the survey results. Case evaluation of local food company or firm LMN justifies the survey results.

Table 5.21: Supply Chain Integration Management using IT (SCIMIT) in case of Local Food Company

Supply Chain Integration Management using IT (SCIMIT)		**Survey responses (Mean)**	**Local food company LMN (Mean)**
SCIMIT1	E-commerce (Data exchange among supply chain stakeholders)	3.79	4.24
SCIMIT2	Technological integration and collaborative strategies of the entire supply chain activities and processes	4.24	3.58
SCIMIT3	Tracking and traceability of the entire supply chain	4.41	4.26
SCIMIT4	Fair or unbiased profit distributing among entire supply chain stakeholders to keep long term relationship	3.82	3.92
Average		4.065	4

In Figure 5.21 the radar chart shows that there is close resemblance of overall mean for Supply Chain Integration Management using IT (SCIMIT) in survey industry and local food case company LMN of agri-fresh food products.

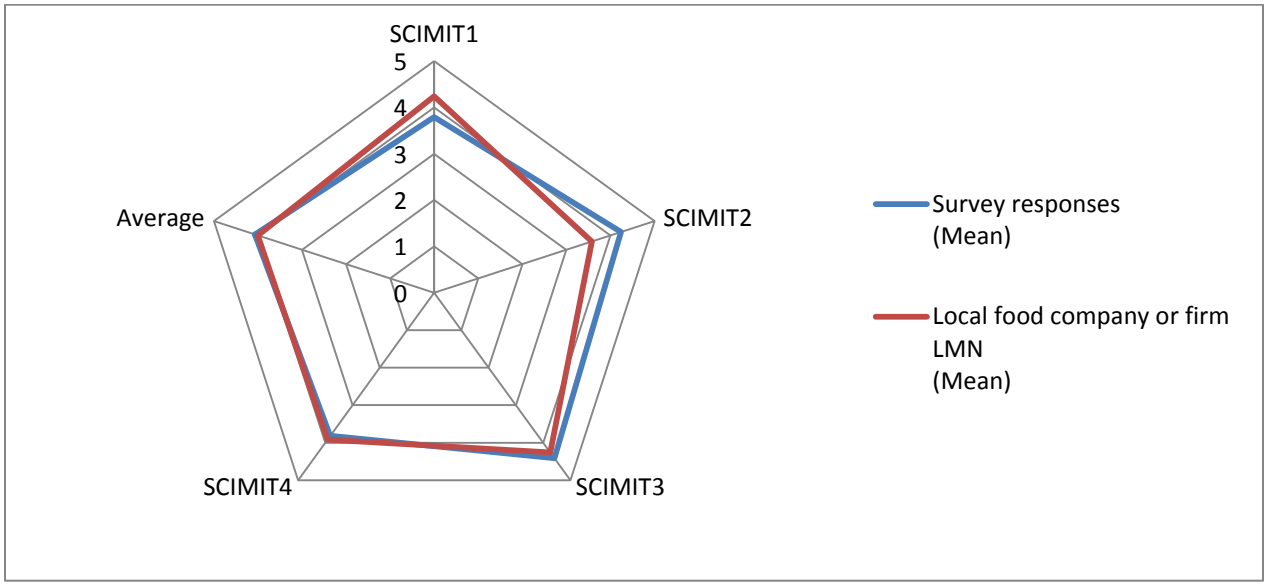


Figure 5.21: Evaluation of Supply Chain Integration Management using IT (SCIMIT) in case of Local Food Company

Economic Sustainability (ECS) in case of Local Food Company

The evaluation of Economic Sustainability (ECS) in the company or firm LMN is shown in Table 5.22. Insight from the one local food firm head, four purchasing manager, three distribution center manager, and two retailers, for four items or variables of Economic Sustainability (ECS) are collected on the five point likert scale during visit of local food company or firm LMN of agri-fresh food products.

Table 5.22 displays the foremost Economic Sustainability (ECS) practices for the survey industries are, Focus on reducing cost of distribution (ECS1) (3.95), Emphasis on rising market share (ECS2) (4.17) and Emphasis on to reduce cost of food processing (ECS4) (3.96). In the local food company or firm LMN, the important Economic Sustainability (ECS) practices are, Focus on reducing cost of distribution (ECS1) (4.56) an Emphasis on to reduce cost of food processing (ECS4) (4.18).

From the case evaluation of the local food company or firm LMN, all practices of Economic Sustainability (ECS1-ECS4) are similar to the survey results. Case evaluation of local food company or firm LMN justifies the survey results.

Table 5.22: Economic Sustainability (ECS) in case of Local Food Company

Economic sustainability (ECS)		Survey responses (Mean)	Local food company LMN (Mean)
ECS1	Focus on reducing cost of distribution	3.95	4.56
ECS2	Emphasis on rising market share	4.17	3.52
ECS3	Emphasis on revenues or returns from "green" products and reduce cost of waste management	3.56	3.32
ECS4	Emphasis on to reduce cost of food processing	3.96	4.18
Average		3.91	3.895

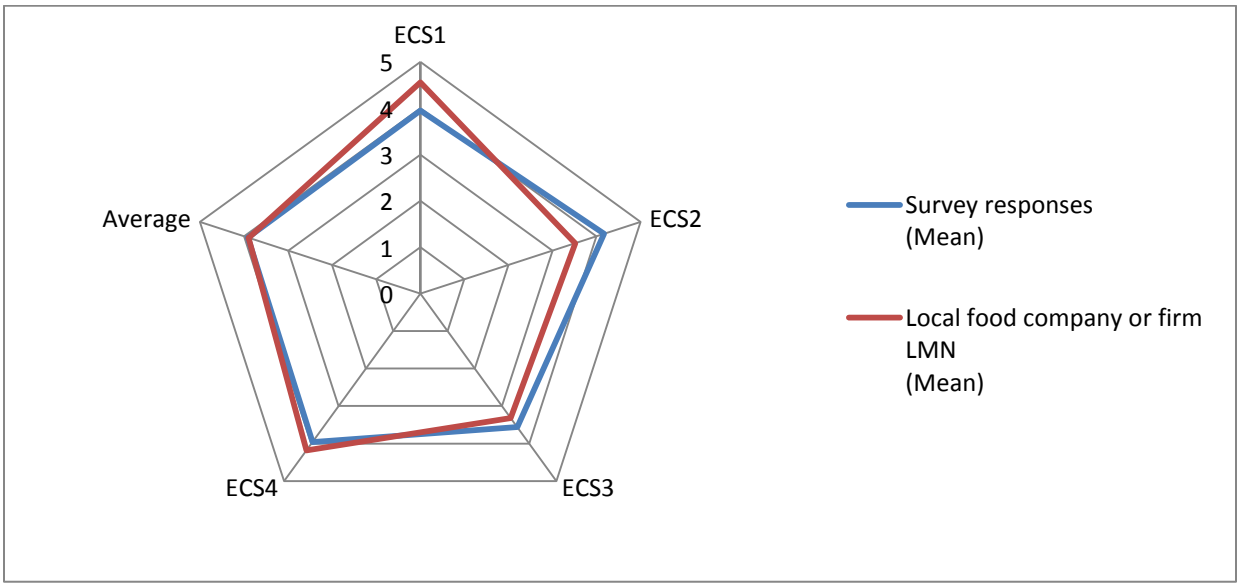


Figure 5.22: Evaluation of Economic Sustainability (ECS) in case of Local Food Company

In Figure 5.22 the radar chart shows that there is close resemblance of overall mean for Economic Sustainability (ECS) in survey industry and local food case company LMN of agri-fresh food products.

Social Sustainability (SOS) in case of Local Food Company

The evaluation of Social Sustainability (SOS) in the company or firm LMN is shown in Table 5.23. Insight from the one local food firm head, four purchasing manager, three distribution center manager, and two retailers, for five items or variables of Social Sustainability (SOS) are

collected on five point likert scale during plant visit of local food company or firm LMN of agri-fresh food products.

Table 5.23 displays the foremost Social Sustainability (SOS) practices for the survey industries are, Food product contributions with value to more population or community (SOS1) (3.85), Standard working environment (SOS4) (3.57) Food product quality like fresh, healthy and nutritious ect. in respond to marketplace demand (SOS5) (4.02). In the local food company or firm LMN, the important Social Sustainability (SOS) practices are, Food product contributions with value to more population or community (SOS1) (4.64) and Food product quality like fresh, healthy and nutritious ect in respond to marketplace demand (SOS5) (4.72).

From the case evaluation of the local food company or firm, all practices of Social Sustainability (SOS1-SOS5) are similar to the survey results. Case evaluation of local food company or firm LMN justifies the survey results.

Table 5.23: Social Sustainability (SOS) in case of Local Food Company

Social Sustainability (SOS)		Survey responses (Mean)	Local food company LMN (Mean)
SOS1	Food product contributions with value to more population or community	3.85	4.64
SOS2	Build up the social welfare schemes	3.49	3.12
SOS3	Diversity of employees	3.34	2.88
SOS4	Standard working environment	3.57	3.38
SOS5	Food product quality like fresh, healthy and nutritious ect. in respond to marketplace demand	4.02	4.72
Average		3.654	3.748

In Figure 5.23 the radar chart shows that there is close resemblance of overall mean for Social Sustainability (SOS) in survey industry and local food case company LMN of agri-fresh food products.

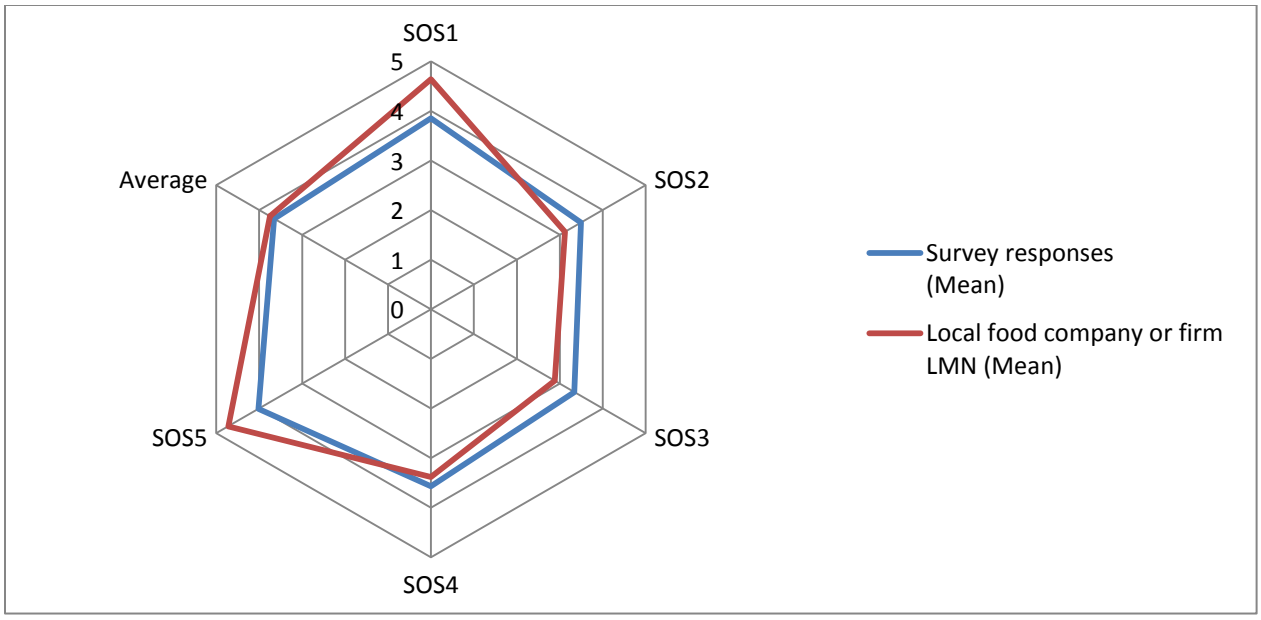


Figure 5.23: Evaluation of Social Sustainability (SOS) in case of Local Food Company

Environmental Sustainability (ENS) in case of Local Food Company

The evaluation of Environmental Sustainability (ENS) in the company or firm LMN is shown in Table 5.24. Insight from the one local food firm head, four purchasing manager, three distribution center manager, and two retailers, for four items or variables of Environmental Sustainability (ENS) are collected on five point likert scale during the visit of local food company or firm LMN of agri-fresh food products.

Table 5.24 displays the foremost Environmental Sustainability (ENS) practices for the survey industries are, To reduce air emission discharge (ENS1) (3.86), Safe disposal or dumping of packaging substance (ENS3) (3.82) and To reduce utilization of harmful materials like toxic / antibiotics etc. (ENS4) (4.14). In the local food company or firm LMN, the important Environmental Sustainability (ENS) practices are, Safe disposal or dumping of packaging substance (ENS3) (4.76), and To reduce utilization of harmful materials like toxic / antibiotics etc. (ENS4) (4.54).

From the case evaluation of the local food company or firm LMN, all practices of Environmental Sustainability (ENS1-ENS4) are similar to the survey results. Case evaluation of local food company or firm LMN justifies the survey results.

Table 5.24: Environmental Sustainability (ENS) in case of local food company

Environmental sustainability (ENS)		Survey responses (Mean)	Local food company or firm LMN (Mean)
ENS1	To reduce air emission discharge	3.86	3.38
ENS2	Effluent waste reduction	3.34	3.18
ENS3	Safe disposal or dumping of packaging substance	3.82	4.76
ENS4	To reduce utilization of harmful materials like toxic / antibiotics etc.	4.14	4.54
Average		3.79	3.965

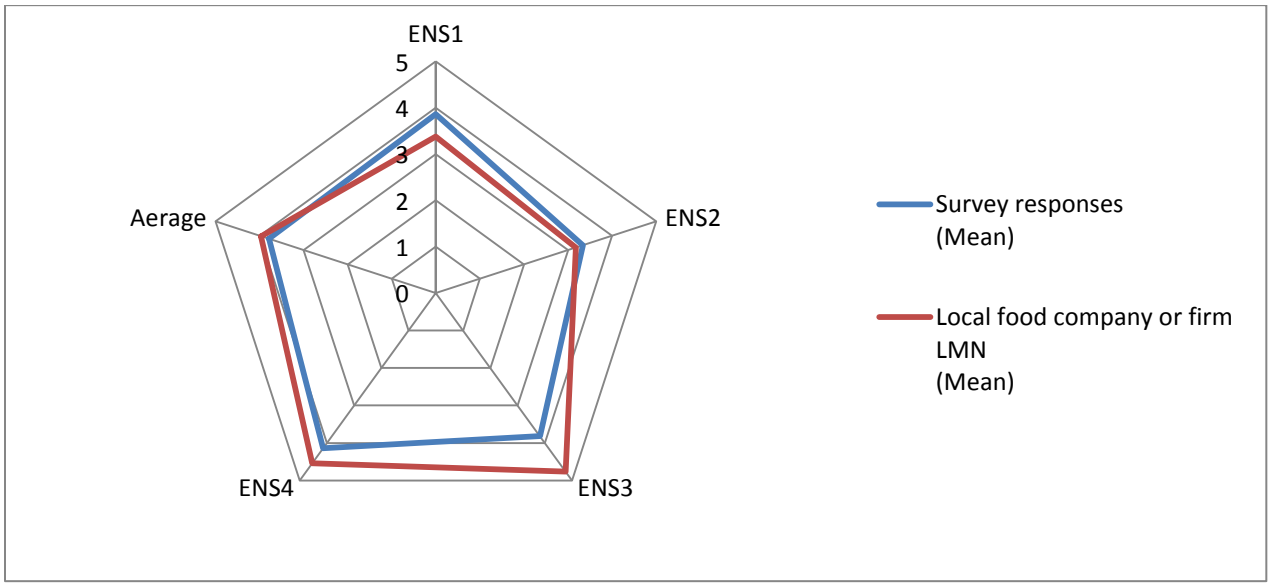


Figure 5.24: Evaluation of Environmental Sustainability (ENS) in case of Local Food Company

In Figure 5.24 the radar chart shows that there is close resemblance of overall mean for Social Sustainability (SOS) in survey industry and local food case company LMN of agri-fresh food products.

5.5.3. Findings

All interviewees are agreed about the necessity of AFSCQ practices as Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Internal Management (IM) and Supply Chain Integration Management using IT (SCCIMIT) and organizational sustainability as Economic Sustainability (ECS), Social Sustainability (SOS), and Environmental Sustainability (ENS) in case of local food company or

firm LMN of agri-fresh food products. Some of the suggested initiatives towards AFSCQ practices and organizational sustainability in case of local food company or firm LMN of agri-fresh food products are;

- Use of appropriate sales forecasting for maintaining the right availability of the product in a competitive environment and reduction in lost sales.
- Sustain modification of order size.
- Green packaging for maintaining food product quality during logistic operation.
- Facility location close to supplier and customer.
- Focus on Wages.
- Quality auditing processes to maintain assured food product quality.
- Focus on safe disposal of packaging material.
- Focus on satisfactory cost of food products.

5.6. Evaluation of cross case

The evaluation of cross case relates to comparisons being made across different places, or of the same place across different times or indeed of different places at different times, but related to each other by the commonality of a theme identified by the researcher (Ryan, C., 2012). The concerned research study conducted multiple case studies relates to AFSCQ practices and organizational sustainable performance for better understanding of empirical results. Table 6.25 displays the comparison of cross companies XYZ, ABC and LMN. All the case companies XYZ, ABC and LMN are using AFSCQ practices and organizational sustainability. From the cross comparison of the case companies, company XYZ is greatly dedicated to AFSCQ practices and organizational sustainability. The suggested initiatives toward AFSCQ practices and organizational sustainability for the company or firm XYZ are, Focus on after sale services such as quality claims etc., Maintain backorders, Re-use / recycling (Collected used food product from packaging etc. that is separated and processed into recycled food

products and distributed as used, without additional processing), Responsiveness of order fulfillment processes (On time order fulfillment for customer satisfaction), Production volume flexibility, Reduction in food waste during food processing, Reduce cost for energy consumption, Decrease transaction cost, Decrease penalty for environmental accidents, Reduction in cost for customer returns, Decrease in cost of waste treatment, Focus on recycling revenues, Focus on revenues from "green" products, Focus on reduction in groundwater Pollution, Standard working conditions or work safety (Safe and hygienic working environment), Focus on flora and fauna. The suggested initiatives toward AFSCQ practices and organizational sustainability for the company or firm ABC are, Green packaging for maintain food product quality during logistic operation, Focus on research and development activities for environmental sustainability, Quality auditing processes to maintain assured food product quality, Conservation of ecology, Focus on safe disposal of packaging material, Focus on satisfactory cost of food products. The suggested initiatives toward AFSCQ practices and organizational sustainability for the company or firm LMN are, Use of appropriate sales forecasting, Focus on safe disposal of packaging material, Green packaging for maintain food product quality during logistic operation, Focus on satisfactory cost of food products, Focus on wages, Sustain modification of order size. From the above discussion, the manufactured food company XYZ is extremely dedicated to AFSCQ practices and organizational sustainability.

Table 5.25: Evaluation of cross cases

Sr. No.	**AFSCQ practices and organizational sustainability measures**	**Manufactured Food Company XYZ of agri-fresh food products**	**Frozen Food Company ABC of agri-fresh food products**	**Local Food Firm or Company of agri-fresh food products**
1	Top Management Leadership & Commitment to AFSCQ (TMLC_AFSCQ)	**Commitment** to customer satisfaction **Effective** adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions	**Commitment** to customer satisfaction **Effective** adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistic conditions	**Commitment** to customer satisfaction **Commitment** to supplier relationship
2	Customer Focus (CF)	**Brand** awareness with reference to quality of food product **Frequently** communication with customers, like regular survey of customer's feedback	**Brand** awareness with reference to quality of food product **Emphasis** on product variety or diversity	**Brand** awareness with reference to quality of food product **Emphasis** on product variety or diversity

Sr. No.	AFSCQ practices and organizational sustainability measures	Manufactured Food Company XYZ of agri-fresh food products	Frozen Food Company ABC of agri-fresh food products	Local Food Firm or Company of agri-fresh food products
3	Internal Management (IM)	**Quality** standards to make sure assured quality of food product like chemical, microbiological and physical properties etc.. **Standard** conditions for storage and transportation of food products **Inventory** management	**Continuous** process improvement for internal process control **Quality** standards to make sure assured quality of food product like chemical, microbiological and physical properties etc.. **Standard** conditions for storage and transportation of food products	**Standard** conditions for storage and transportation of food products **Inventory** management
4	Supplier Management (SM)	**Quality** of supplier's raw food product and process **Set up** long-term relationships with suppliers **Actively** supplier's engagement in organizational supply chain quality development courses	**Quality** of supplier's raw food product and process **Set up** long-term relationships with suppliers **Actively** supplier's engagement in organizational supply chain quality development courses	**Quality** of supplier's raw food product and process **Set up** long-term relationships with suppliers
5	Supply Chain Integration Management using IT (SCIMIT)	**E-commerce** (Data exchange among supply chain stakeholders) **Technological** integration and collaborative strategies of the entire supply chain activities and processes **Tracking** and traceability of the entire supply chain	**E-commerce** (Data exchange among supply chain stakeholders) **Technological** integration and collaborative strategies of the entire supply chain activities and processes **Tracking** and traceability of the entire supply chain	**E-commerce** (Data exchange among supply chain stakeholders) **Tracking** and traceability of the entire supply chain
6	Economic Sustainability (ECS)	**Focus** on reducing cost of distribution **Emphasis** on rising market share **Emphasis** on to reduce cost of food processing	**Focus** on reducing cost of distribution **Emphasis** on rising market share **Emphasis** on to reduce cost of food processing	**Focus** on reducing cost of distribution **Emphasis** on to reduce cost of food processing
7	Social Sustainability (SOS)	**Food product** contributions with value to more population or community **Build up** the social welfare schemes **Food product** quality like fresh, healthy and nutritious ect. in respond to marketplace demand	**Food product** contributions with value to more population or community **Standard** working environment **Food product** quality like fresh, healthy and nutritious ect. in respond to marketplace demand	**Food product** contributions with value to more population or community **Food product** quality like fresh, healthy and nutritious ect. in respond to marketplace demand
8	Environmental Sustainability (ENS)	**To reduce** air emission discharge **Safe** disposal or dumping of packaging substance **To reduce** utilization of harmful materials like toxic / antibiotics etc.	**To reduce** air emission discharge **Safe** disposal or dumping of packaging substance **To reduce** utilization of harmful materials like toxic / antibiotics etc.	**Safe disposal** or dumping of packaging substance **To reduce** utilization of harmful materials like toxic / antibiotics etc.

Sr. No.	AFSCQ practices and organizational sustainability measures	Manufactured Food Company XYZ of agri-fresh food products	Frozen Food Company ABC of agri-fresh food products	Local Food Firm or Company of agri-fresh food products
9	Suggested initiatives toward AFSCQ practices and organizational sustainability	**Focus** on after sale services such as quality claims etc. **Maintain** backorders **Re-use** / recycling (Collected used food product from packaging etc. that is separated and processed into recycled food products and distributed as used, without additional processing) **Responsiveness** of order fulfillment processes (On time order fulfillment for customer satisfaction) **Production** volume flexibility **Reduction** in food waste during food processing **Reduce** cost for energy consumption **Decrease** transaction cost **Decrease** penalty for environmental accidents **Reduction** in cost for customer returns **Decrease** in cost of waste treatment **Focus** on recycling revenues **Focus** on revenues from "green" products **Focus** on reduction in groundwater Pollution **Standard** working conditions or work safety (Safe and hygienic working environment) **Focus** on flora and fauna	**Green** packaging for maintain food product quality during logistic operation **Focus** on research and development activities for environmental sustainability **Quality** auditing processes to maintain assured food product quality **Conservation** of ecology **Focus** on safe disposal of packaging material **Focus** on satisfactory cost of food products	**Use** of appropriate sales forecasting **Focus** on safe disposal of packaging material **Green packaging** for maintain food product quality during logistic operation **Focus** on satisfactory cost of food products **Focus** on Wages **Sustain** modification of order size

5.7. Conclusion

In this chapter, three multiple cases (Manufactured food, conserved food, and local food segments) were studied. The multiple case studies were taken for better understanding of Agri-fresh Food Supply Chain Quality (AFSCQ) and organizational sustainability in select Indian industries and to strengthen the findings of subsequent research study. These case industries are recorded for numerous practices of Agri-fresh Food Supply Chain Quality (AFSCQ) and

dimensions of organizational sustainability such as Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Supply Chain Integration Management using IT (SCIMIT), Internal Management (IM), Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS). The sources of information are focus interviews with the concerned entity. Interviewees were asked to judge the feasibility and the measurability of suggested AFSCQ practices and the dimensions of organizational sustainability and also given the opportunity to suggest new practices and/or to reject the proposed practices and to provide suggestions for better ways to measure the suggested practices. Subsequently, the interviewees were asked to rank the listed practices of AFSCQ and measures of organizational sustainability according to the perceived importance for their company, using an interval ranking.

In the case of manufactured food company XYZ of agri-fresh food products, some of the suggested initiatives towards AFSCQ practices and organizational sustainability are; Focus on after sale services such as quality claims etc.; Maintain backorders; Re-use / recycling; Responsiveness of order fulfillment processes; Production volume flexibility; Reduction in food waste during food processing; Reduce cost for energy consumption; Decrease transaction cost; Decrease penalty for environmental accidents; Reduction in cost for customer returns; Decrease in cost of waste treatment; Focus on recycling revenues; Focus on revenues from “green” products; Focus on reduction in groundwater Pollution; Standard working conditions or work safety and Focus on flora and fauna.

Some of the suggested initiatives towards AFSCQ practices and organizational sustainability in case of frozen food company ABC of agri-fresh food products are; Green packaging for maintain food product quality during logistic operation; Focus on research and development activities for environmental sustainability; Quality auditing processes to maintain assured food product quality; Conservation of ecology; Focus on safe disposal of packaging material; Focus on satisfactory cost of food products.

In the case of local food company LMN of agri-fresh food products, some of the suggested initiatives towards AFSCQ practices and organizational sustainability are; Use of appropriate sales forecasting for maintaining the right availability of the product in a competitive

environment and reduction in lost sales; Sustain modification of order size; Green packaging for maintaining food product quality during logistic operation; Facility location close to supplier and customer; Focus on Wages; Quality auditing processes to maintain assured food product quality; Focus on safe disposal of packaging material; Focus on satisfactory cost of food products.

At last, cross case comparison of multiple case studies was evaluated. From the cross comparison of the case companies, local food industry pays least attention on AFSCQ dimensions as compared to the other two case companies. The manufactured food company XYZ is greatly dedicated to AFSCQ practices and organizational sustainability. While frozen food company ABC of agri-fresh food products have less attention on environmental sustainability.

CHAPTER 6

CONCLUSIONS

Agricultural produce comprises a major portion of the world economy and is the raw food material for numerous food industries. Aggarwal and Srivastava (2016) also stated that in developing countries, the agriculture industry is the backbone of the economy. The agri-fresh food produce have acquired the least consideration among the agricultural produce community (Shukla and Jharkharia, 2013). The supply chain quality of agri-fresh food products, herein after being referred to as agri-fresh food supply chain quality (AFSCQ) includes the process and product quality from farm to delivery of the food products, i.e. from farm to folk. Agri-fresh Food Supply Chain Quality (AFSCQ) is distinct and peculiar in some aspects which makes the management of such supply chain distinctive and challenging. No other type of industry that is similar to food industry signifies the challenge of sustainability. AFSCQ shows a group of organized practices that stress upon advancement of continuous process improvement among supply chain stakeholders in order to enhance organizational sustainability and protect shelf-life of the agri-fresh food product. Hence, there is a necessity to study the AFSCQ practices in select Indian industries and also find out a conclusive set of practices of AFSCQ that can lead to AFSCQ model.

The research is to cultivate a theoretic base for Agri-fresh Food Supply Chain Quality (AFSCQ) from the perception of learning and to propose a conceptual and structural model that includes the impact of AFSCQ practices on Organizational Sustainability (OS). Also, suggested some initiatives towards AFSCQ practices and organizational sustainability by the utilization of case study approach in diverse agri-fresh food segment.

Chapter 2 presents a structured literature review on Agri-fresh Food Supply Chain Quality (AFSCQ), discussing foremost supply chain operational issues responsible for AFSCQ. To sustain this objective, literature is picked from four management science publishers over a period of 23 years (1994-mid2016). The literature review is methodically classified and analyzed to provide a better insight of the research in the past two decades. To sustain the significance of the complete process, the organized research process is followed in both the collection and content investigation of the literature. This structured literature review delivers more opportunities of

further research in the field of AFSCQ. The outcomes of the structured literature review reveal following implications for investigators or researchers.

Agri-fresh food produce comprise a considerable part of the world economy, supplies for numerous food industries and the world price of a lot of foodstuffs. Kalia and Parshad (2015) said that good economic revenues by food growers and retailers can only be harnessed if the enormous post-harvest damages could be reduced during handling and supply chain operations of food products. Research towards AFSCQ is speedily growing due to immense potential that AFSCQ is accomplishing. Consequently, there are many research opportunities in the field of AFSCQ. Another aspect perceived from the review is that fewer articles related to research appeared in developing countries. Akhtar and Khan (2015) deliberated that agri-fresh food supply chain managers from developing countries should be more cautious as they frequently used directive leadership, which might not work in developed countries. Consequently, researchers should build up theories based on aforesaid scenario in such areas.

Researchers should emphasize on validating already surviving theories in AFSCQ as enough volume of literature on theory building is collected and must be validated in diverse circumstances. It is also remarked that literature on AFSCQ needs standardized constructs. Fountas et al. (2015) also stressed on the necessity of standardized quality audit formats grounded on defined data infrastructure essentials in the agri-fresh food segment developed by organizations.

There is notable growth in empirical investigations of AFSCQ from the year 2004. In future, empirical research should to be directed at intra-functional and intra-firm possibilly at organization and supply chain level. If possible, such empirical investigations can focus on entire "network" as well. Otherwise, they should at least focus on the "dyad" level where interface of small farms with distributors is investigated. Kusumastuti et al. (2016) said that research models reflect realism to a limited extent and there is insufficiency of empirical testing research. Future research studies hence may be comprehensive and could investigate realistic research models.

Generally, AFSCQ is affected by material, logistics, supplier, distribution, demand, purchasing, marketing, and information management. Consequently, it relies on numerous issues, among them some are regularly studied by researchers, though other issues are specifically addressed

such as supply chain efficiency, risk management, industrial supply chain quality, supply chain security, supply chain quality, relationship quality, strategic alignment, visibility, end deliverable quality, etc. This may need further attention of researchers towards working on empirical research in the field of AFSCQ. Tsolakis et al. (2014) stated that the design, development, and operation of agri-fresh food supply chains have begun to be met with higher attentiveness in recent management science, while quality of such supply chain remains unexplored. Moreover, the uncertainty of weather, the perishability of produces, the complex food security leading environs, the unpredictable consumers' routine styles, the environmental concerns and the overabundance of stakeholders immersed pose significant challenges in the direction of robust supply chain advancement inside the agri-fresh food segment. Kalia and Parshad (2015) studied important nanotechnology inventions valuable in preservation, packaging, safety, and storage of fruits and fruit-centered food products. The safety and quality assurance of packaged food products are highly prominent concerns in existing day world-wide integrated food supply chains. It reveals that technological interventions may also influence AFSCQ. Zhou et al. (2015) counseled to highlight on the agri-fresh food safety practices of three governance structures: farmer cooperatives, agricultural companies, and family farms. These are also one of the key elements of the supply chain quality. Ding et al. (2015) said that farm production is governed by limited households, and fresh food supply chains comprising large numbers of traders, small brokers and wholesalers, ensuring food safety along the food supply chain represents a major challenge. According to Jack et al. (2014), agri-fresh food segment identifies that in order to keep its competitive benefit in both present and new markets it will requisite a business strategy focused on product, service and process innovation, finally inserting more elements to AFSCQ.

Agri-fresh Food Supply Chain Quality (AFSCQ) has a main impact on organizational sustainability as the AFSCQ practices sum up along the entire length of supply chain. Organizational sustainability comprises economic, social and environmental sustainability. Distinctive from traditional performance measures, not only sales, return, and market share, etc., organizational sustainability consists of economic, social and environmental sustainability. Aggarwal and Srivastava (2016) found that waste reduction is an outcome of supply chain collaborative activities, which has huge social implications. Bisogno (2016) stated that short chain can help to raise the sustainability of interests in a scene of the advancement of the latest way of " doing business " making significance not only in relations of money but also taking

liable attitude toward sustainability issues taking into consideration the environmental and social facets. Researchers may need to incorporate the components of sustainability in various facets of AFSCQ and culminating into proposition of new performance measures.

Chapter 3 cultivates a theoretic base for Agri-fresh Food Supply Chain Quality (AFSCQ) from the perception of learning and to propose a conceptual model that includes the impact of AFSCQ practices on Organizational Sustainability (OS). Organizational sustainability measures are distinct from the usual measures of performance as return on investment, etc. Bisogno (2016) indicated that small supply chain can facilitate the concentration on sustainability in term of money or economic sustainability in addition to economic and environmental sustainability. Researchers or practitioners may require integrating the sustainability in numerous aspects of AFSCQ. Based on comprehensive literature review, AFSCQ practices were defined. These AFSCQ practices were categorized as: Supplier Management (SM), Internal Management (IM), Customer Focus (CF) and supporting practices too. The measurement instrument of organizational sustainability was also built, including three outlooks: Economic Sustainability (ECS), Environmental Sustainability (ENS) and Social Sustainability (SOS). An innovative conceptual framework that shows an inclusive representation covering core dimensions of AFSCQ and numerous views of OS was proposed. In addition, an extensive conceptual model of AFSCQ which directly and indirectly shows the relationship between AFSCQ practices and organizational sustainability was also proposed.

Practitioners can utilize this model like "road map" in support of employing AFSCQ practices. Since major endeavors of any organization must be initiated by the top management leadership. Also, infrastructure supportive practices like Supply Chain Integration Management using IT (SCIMIT), Human Resources Management (HRM), etc. are then used to assists the core or central practices like Supplier Management (SM), Customer Focus (CF) and Internal Management (IM) etc.. As far as future work is concerned, the proposed conceptual model requires testing of reliability and validity. It is desirable to establish rationality of these models by empirical research in distinctive perspectives.

In Chapter 4, an empirical investigation of Agri-fresh Food Supply Chain Quality (AFSCQ) and Organizational Sustainability (OS) conceptual model in select Indian industries is preferred as a

key concern. The data was collected by the utilization of survey questionnaire from select Indian industries for an empirical investigation. The data collected for empirical investigation sustain the key requirement as the sample size is 369. The empirical investigation begins along with descriptive statistics of items of concerned research constructs. The descriptive assessment is accomplished to examine the mean, standard deviation and to measure the shape of data distribution like skewness and kurtosis, which will assist to analyze the Agri-fresh Food Supply Chain Quality (AFSCQ) practices and its influence on organizational sustainability and also to examine the profile of respondents and industries. The respondent profile consists of work experience and position of respondent in the concerned industry.

Factor analysis is primarily utilized to establish the factors or constructs that could be utilized to explain the correlations among a set of items (Mitra & Datta, 2014). In this study factor analysis utilized data reduction and extracts research constructs concerned to AFSCQ practices and organizational sustainability. The Principle Component Analysis (PCA) comprising varimax rotation was utilized to extract the research constructs. PCA was carried out using varimax rotation that produced 08 constructs on the basis of eigenvalues (>1, Kaiser's criteria) which considered 61.951 percent of total variance. By taking into consideration factor loading (from rotated component matrix) of items exceeding 0.4, all the items were designated under one construct.

In the begining, two essential tests were performed namely Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. These two tests assess the relevance of pertaining factor analysis (Field, 2009). In this study the value of KMO measure is (0.843) and value of Bartlett's test is (Sing. 0.000) which shows suitability of data for factor analysis. Internal consistency analysis was utilized to assess reliability of each construct (Nunnally, 1967). The value of cronbach's alpha was estimated for all constructs. Each construct has higher value of Cronbach's alpha from the acceptable range. Three kinds of validity also taken into consideration as content validity, criterion related validity and construct validity during empirical investigation. Structural Equation Modeling (SEM) is utilized to examine structural relationship. SEM method is the combination of both factor analysis and multiple regression analysis, it is also utilized to examine the structural relationship concerning measured items and latent constructs. A SEM comprises of two type models where one is measurement model and another

is structural model. The AFSCQ model contains five constructs viz. Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Supplier Management (SM), Customer Focus (CF), Internal Management (IM) and Supply Chain Integration Management using IT (SCIMIT). Thereafter the multifactor cogeneric measurement model is build up to examine the relationship between Agri-fresh Food Supply Chain Quality (AFSCQ), Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS). The results show that Indian agri-fresh food industries are implementing Agri-fresh Food Supply Chain Quality (AFSCQ) practices and dimensions of organizational sustainability except environmental sustainability.

In Chapter 5, three case studies were taken for better understanding of Agri-fresh Food Supply Chain Quality (AFSCQ) practices and dimensions of organizational sustainability in select Indian industries and to support findings of the subsequent research study. These three cases studies were studied in manufactured food, conserved food, and local food segments.

The case industries are recorded for numerous practices of Agri-fresh Food Supply Chain Quality (AFSCQ) and dimensions of organizational sustainability such as Top Management Leadership and Commitment to AFSCQ (TMLC_AFSCQ), Customer Focus (CF), Supplier Management (SM), Supply Chain Integration Management using IT (SCIMIT), Internal Management (IM), Economic Sustainability (ECS), Social Sustainability (SOS) and Environmental Sustainability (ENS). The sources of information during case studies are focus interviews. Interviewees were asked to judge the feasibility and the measurability of suggested AFSCQ practices and the dimensions of organizational sustainability and were also given the opportunity to suggest new practices and/or to reject the proposed practices and to provide suggestions for better ways to measure the suggested practices.

Some of the suggested initiatives in the case of manufactured food company XYZ, towards AFSCQ practices and organizational sustainability are; Focus on after sale services such as quality claims etc.; maintain backorders; re-use / recycling; responsiveness of order fulfillment processes; production volume flexibility; reduction in food waste during food processing; reduce cost for energy consumption; decrease transaction cost; decrease penalty for environmental accidents; reduction in cost for customer returns; decrease in cost of waste treatment; focus on

recycling revenues; focus on revenues from "green" products; focus on reduction in groundwater pollution; standard working conditions or work safety and focus on flora and fauna.

In case of frozen food company ABC of agri-fresh food products, some of the suggested initiatives are; green packaging to maintain food product quality during logistic operation; focus on research and development activities for environmental sustainability; quality auditing processes to maintain assured food product quality; conservation of ecology; focus on safe disposal of packaging material; focus on satisfactory cost of food products.

Some of the suggested initiatives towards AFSCQ practices and organizational sustainability in the case of local food company LMN of agri-fresh food products are; use of appropriate sales forecasting for maintaining the right availability of the product in a competitive environment and reduction in lost sales; sustain modification of order size; green packaging to maintain food product quality during logistic operation; facility location close to supplier and customer; focus on wages; quality auditing processes to maintain assured food product quality; focus on safe disposal of packaging material and focus on satisfactory cost of food products.

From the cross comparison of the case companies, the manufactured food company XYZ is greatly dedicated to AFSCQ practices and organizational sustainability. While frozen food company ABC of agri-fresh food products have less attention on environmental sustainability.

Managerial Implications

The findings of the study contribute towards several managerial implications for practitioners.

- In this study it is revealed that how probable practices of Agri-fresh Food Supply Chain Quality (AFSCQ) can be utilized to assess organizational sustainability. The commonly noticeable barrier in implementing of AFSCQ practices is overcoming customary practices. As Indian economy is in developing stage as a consequence India is still carry out finest practices from around the world. The old organizations regarding organizational sustainability offer adequate conflict in employing innovative practices. Consequently Indian managers should be trained to instruct and campaign revolution in organizations subsequently to realize tangible advantages of AFSCQ practices. The

AFSCQ practices should communicate to upstream side and downstream side members of supply chain so that supply chain partners can put efforts in synchronization.

- In India majority of the companies are new to Agri-fresh Food Supply Chain Quality (AFSCQ) initiatives. Consequently, this study contributes an understanding towards what are the practices of Agri-fresh Food Supply Chain Quality (AFSCQ) and what constitutes these practices of AFSCQ. Indian managers can utilize these AFSCQ practices in a framework to attain organizational sustainability. The benefit of the concerned research study is that the AFSCQ practices and dimensions of organizational sustainability are empirically developed from select Indian industries.

- One more managerial implication of the concerned research study is that it gives directives for attaining organizational sustainability through AFSCQ initiatives. Moreover it assists a manager to comprehend cause and effect link among numerous important constructs in supply chain. Such type of links can be utilized in identification of any kind of failing in agri-fresh food supply chain. Finally, if a manager of agri-fresh food supply chain envisages organizational sustainability, the AFSCQ practices and their constructs can be counted as main factors which can advance the supply chain partners to the organizational sustainability.

There are some of implications like as managerial implications, which are pertinent for the academicians.

- Researchers should focus on verifying already existing theories in AFSCQ as sufficient volume of literature on theory building is collected and must be verified in different conditions. It is also observed that literature on AFSCQ necessitates standardized constructs.

- Generally, AFSCQ is affected by material, logistics, supplier, distribution, demand, purchasing, marketing, and information management. Consequently, it relies on various issues, among them certain are regularly studied by researchers, while others issues are specifically focused such as supply chain efficiency, risk management, industrial supply chain quality, supply chain security, supply chain quality, relationship quality, strategic

alignment, visibility, end deliverable quality, etc. This may necessitate additional attention of researchers toward carrying out empirical research in the AFSCQ area.

- In future, empirical research necessities to be directed at intra-functional and intra- firm scope at organizational and supply chain level. If possible, such empirical studies can focus on complete "network" as well. Else, they should at least concentrate on the "dyad" level where interaction of small farms with distributors is investigated.

- AFSCQ has a main influence on sustainable performance of an organization as the AFSCQ practices sum up along the complete length of supply chain. Sustainable performance comprises economic, social and environmental sustainability. Distinct from traditional performance measures, not only sales, return, and market share, etc., sustainable performance consists of economic, environment and social sustainability.

- Majority of the research papers are from the developed countries in the field of AFSCQ while there is not as much of awareness in developing countries. Subsequently, there are various research openings in the field of AFSCQ in developing countries.

- The research design focus group and panel study are extremely dispirited by researchers. Research in AFSCQ must be advocated by such kind of designs as well. The qualitative data is utilized by such kind of research design on the basis of respondent's familiarity. Numerous researchers have emphasized that there occurs a gap between theoretical and practical aspects in Agri-fresh Food Supply Chain Quality (AFSCQ) research. So as to fill this gap, panel studies as well as focus group research designs which involve AFSCQ practitioners can significantly improve feasibility of studies in AFSCQ.

- Another concern is that there is a scarcity of utilization of longitudinal data in AFSCQ research. While, longitudinal studies span an extensive phase of research, they can deliver effective depiction of the system or organization and its active or dynamic character contrasted to cross sectional research.

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- Descriptive statistics are imperative however, to set up hypothesis; inferential statistics is indispensable. Therefore it is essential to implement advanced forms of data analysis techniques accompanied by descriptive statistics. Though multi-variate data analysis techniques such as Structural Equation Modeling (SEM) are being utilized in Agri-fresh Food Supply Chain Quality (AFSCQ) but still researchers may use them even more frequently to get deeper insights in the relevant area.

- The suggested conceptual framework for AFSCQ and organizational sustainability assuages aspiring researchers to examine reliability and validity in other settings in order to set up a advanced and comprehensible set of AFSCQ practices and dimensions of organizational sustainability so as to remove the discrepancies in theory of AFSCQ, if any.

Limitations and Direction for future research

The study focuses on various practices associated to Agri-fresh Food Supply Chain Quality (AFSCQ) and dimensions of organizational sustainability in literature of empirical research, select Indian industries and theory. There are numerous issues that remained unattended, hence openings for future research are advised, as follows.

- The literature of empirical research in Agri-fresh Food Supply Chain Quality (AFSCQ) is not restricted merely in four kinds of publication however its existence is sensed in publications throughout the globe, henceforth aspiring researchers can justify the outcomes of current review of literature in publications which were not counted for research article collection.

- The empirical investigation of Agri-fresh Food Supply Chain Quality (AFSCQ) and Organizational Sustainability (OS) is restricted to select Indian industries. This kind of study possibly will be performed in another country by the utilization of related methodology.

- The following assumptions were made. These are sample size should be sufficient; observed variables (items) scale should be continuous; hypothesized model should be authentic; observed variable (items) distribution should be multivariate normal.

- We have used a sample size of 369 which can be increased for an even better approach.

- The study has been performed on select Indian industries. Industries from all over the world can be included in the study and a comparision can be made between Indian industries and other foreign industries.

REFERENCES

Abate, G. (2008), "Local food economies: Driving forces, challenges, and future prospects", *Journal of Hunger & Environmental Nutrition,* Vol. 3 No. 4, pp. 384-399.

Abrahamsson, M., and Rehme, J. (2010), "The Role of Logistics in Retailers′ Corporate Strategy-a Driver for Growth and Customer Value", *Supply Chain Forum: An International Journal,* Vol. 11 No. 4, pp. 14-22.

Acosta, P., Acquier, A. and Delbard, O. (2014), "Just do it? The adoption of sustainable supply chain management programs from a supplier perspective", *Supply Chain Forum: An International Journal,* Vol. 15 No. 1, pp. 76-91.

Adebanjo, D. and Mann, R. (2000), "Identifying problems in forecasting consumer demand in the fast moving consumer goods sector", *Benchmarking: An International Journal,* Vol. 7 No. 3, pp. 223-230.

Adenle, A.A., Manning, L. and Azadi, H. (2017), "Agribusiness innovation: A pathway to sustainable economic growth in Africa", *Trends in food science & technology*, Vol. 59, pp.88-104. https://doi.org/10.1016/j.tifs.2016.11.008

Adeyeye, S.A.O. (2017), "The role of food processing and appropriate storage technologies in ensuring food security and food availability in Africa", *Nutrition & Food Science,* Vol. 47 No. 1, pp. 122-139.

Aggarwal, S. and Srivastava, M.K. (2016), "Towards a grounded view of collaboration in Indian agri-food supply chains: A qualitative investigation", *British Food Journal,* Vol. 118 No. 5, pp. 1085-1106.

Aghazadeh, S. M. (2004), "Improving logistics operations across the food industry supply chain", *International journal of contemporary hospitality management,* Vol. 16 No. 4, pp. 263-268.

Ahire, S.L., and Ravichandran, T. (2001), "An innovation diffusion model of TQM implementation", *IEEE transactions on engineering management,* Vol. 48 No. 4, pp. 445-464.

Ahmed, A., Ahmed, N. and Salman, A. (2005), "Critical issues in packaged food business", *British Food Journal,* Vol. 107 No. 10, pp. 760-780.

Ahumada, O. and Villalobos, J.R. (2009), "Application of planning models in the agri-food supply chain: a review", *European Journal of Operational Research,* Vol. 196 No. 1, pp. 1-20.

Aiello, G., La Scalia G., and Micale, R. (2012), "Simulation analysis of cold chain performance based on time–temperature data", *Production Planning & Control,* Vol. 23 No. 6, pp. 468-476.

Akhtar, P. and Khan, Z. (2015), "The linkages between leadership approaches and coordination effectiveness: a path analysis of selected New Zealand-UK International agri-food supply chains", *British Food Journal,* Vol. 117 No. 1, pp. 443-460.

Akhtar, P., Kaur, S. and Punjaisri, K. (2017), "Chain coordinators' strategic leadership and coordination effectiveness: New Zealand-Euro agri-food supply chains", *European Business Review,* Vol. 29 No. 5, pp. 515-533

Alexander, C., and Smaje, C. (2008), "Surplus retail food redistribution: An analysis of a third sector model", *Resources, conservation and recycling,* Vol. 52 No. 11, pp. 1290-1298.

Alfaro, J.A. and Rábade, L.A. (2009), "Traceability as a strategic tool to improve inventory management: a case study in the food industry", *International Journal of Production Economics,* Vol. 118 No. 1, pp. 104-110.

Ali, J. (2016), "Adoption of innovative agricultural practices across the vegetable supply chain", *International Journal of Vegetable Science,* Vol. 22 No. 1, pp. 14-23.

Ali, J., Kapoor, S. and Moorthy, J. (2010), "Buying behaviour of consumers for food products in an emerging economy", *British Food Journal* Vol. 112 No. 2, pp. 109-124.

Amador, C. and Emond, J.P. (2010), "Evaluation of sensor readability and thermal relevance for RFID temperature tracking", *Computers and Electronics in Agriculture,* Vol. 73 No. 1, pp. 84-90.

Anders, S., Souza-Monteiro, D., and Rouviere, E. (2010), "Competition and credibility of private third-party certification in international food supply", *Journal of International Food & Agribusiness Marketing,* Vol. 22 No. 3-4, pp. 328-341.

Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: A review and recommended two-step approach", *Psychological bulletin*, Vol. 103 No. 3, pp. 411- 423.

Andree, P., Dibden, J., Higgins, V. and Cocklin, C. (2010), "Competitive Productivism and Australia's Emerging 'Alternative'Agri-food Networks: producing for farmers' markets in Victoria and beyond", *Australian Geographer,* Vol. 41 No. 3, pp. 307-322.

Angeles Sanfiel-Fumero, M., Martin Ramos-Dominguez, A., and Ramon Oreja-Rodriguez, J. (2012), "The configuration of power in vertical relationships in the food supply chain in the Canary Islands: an approach to the implementation of food traceability", *British Food Journal,* Vol. 114 No. 8, pp. 1128-1156.

Apaiah, R.K., and Hendrix, E.M. (2005), "Design of a supply chain network for pea-based novel protein foods", *Journal of Food Engineering,* Vol. 70 No. 3, pp. 383-391.

Apaiah, R.K., Hendrix, E.M., Meerdink, G., and Linnemann, A.R. (2005), "Qualitative methodology for efficient food chain design", *Trends in food science & technology,* Vol. 16 No. 5, pp. 204-214.

Aramyan, L., Ingenbleek, P., Backus, G., de Roest, K. and Tranter, R. (2013), "Evaluating the likelihood of the adoption of an animal welfare assessment system in European agri-food supply chains", *International Journal of Quality & Reliability Management*, Vol. 30 No. 1, pp. 59-79.

Aramyan, L.H., Meuwissen, M.P., Oude Lansink, A.G., van der Vorst, J.G., van Kooten, O. and Van der Lans, I.A. (2009), "The perceived impact of quality assurance systems on tomato supply chain performance", *Total Quality Management,* Vol. 20 No. 6, pp. 633-653.

Aramyan, L.H., Oude Lansink, A.G., Van Der Vorst, J.G. and Van Kooten, O. (2007), "Performance measurement in agri-food supply chains: a case study", *Supply Chain Management: An International Journal*, Vol. 12 No. 4, pp. 304-315.

Armstrong, G.D. (1999), "Towards integrated hygiene and food safety management systems: the Hygieneomic approach", *International journal of food microbiology,* Vol. 50 No. (1-2), pp. 19-24.

Armstrong, J.S. and Overton, T.S. (1977), "Estimating nonresponse bias in mail surveys", *Journal of marketing research,* Vol. 14 No.3, pp.396-402.

Atilgan, C. and McCullen, P. (2011), "Improving supply chain performance through auditing: a change management perspective", *Supply Chain Management: An International Journal,* Vol. 16 No. 1, pp. 11-19.

Aubry, C., and Kebir, L. (2013), "Shortening food supply chains: A means for maintaining agriculture close to urban areas? The case of the French metropolitan area of Paris", *Food Policy* Vol. 41, pp. 85-93. https://doi.org/10.1016/j.foodpol.2013.04.006

Azoury, K.S., and Miyaoka, J. (2013), "Managing production and distribution for supply chains in the processed food industry", *Production and Operations Management,* Vol. 22 No. 5 pp. 1250-1268.

Azuara, G., Luis Tornos, J. and Luis Salazar, J. (2012), "Improving RFID traceability systems with verifiable quality", *Industrial Management & Data Systems* Vol. 112 No. 3 pp. 340-359.

Badia-Melis, R., Mc Carthy, U., Ruiz-Garcia, L., Garcia-Hierro, J. and Villalba, J.R. (2018), New trends in cold chain monitoring applications-A review", *Food Control,* Vol. 86, pp. 170-182.

Baert, K., Van Huffel, X., Jacxsens, L., Berkvens, D., Diricks, H., Huyghebaert, A. and Uyttendaele, M., (2012), "Measuring the perceived pressure and stakeholders' response that may impact the status of the safety of the food chain in Belgium", *Food research international,* Vol. 48 No. 1, pp. 257-264.

Baghalian, A., Rezapour, S. and Farahani, R.Z. (2013), "Robust supply chain network design with service level against disruptions and demand uncertainties: a real-life case", *European Journal of Operational Research,* Vol. 227 No. 1, pp. 199-215.

Baines, R.N. and Ryan, P. (2002), "Global trends in quality assurance", paper presented at the trade partners UK and Ministry of Agriculture *"Modern Food Chain"* Seminar, Kuala Lumpur, March 26.

Baker, A., and Smyth, S.J. (2012), "Managing opportunism in value-added supply chains: Lessons from organics," *Journal of International Food & Agribusiness Marketing,* Vol. 24 No. 1, pp. 22-46.

Baker, L.E. (2008), "Local food networks and maize agrodiversity conservation: two case studies from Mexico", *Local Environment,* Vol. 13 No. 3 pp. 235-251.

Balaji, M. and Arshinder, K. (2016), "Modeling the causes of food wastage in Indian perishable food supply chain", *Resources, Conservation and Recycling*, Vol. 114, pp. 153-167. https://doi.org/10.1016/j.resconrec.2016.07.016

Banks, J., and Bristow, G. (1999), "Developing quality in agro-food supply chains: A Welsh perspective", *International Planning Studies,* Vol. 4 No. 3, pp. 317-331.

Banterle, A., and Stranieri, S. (2008), "The consequences of voluntary traceability system for supply chain relationships. An application of transaction cost economics", *Food Policy,* Vol. 33 No. 6, pp. 560-569.

Banterle, A., Cavaliere, A., Carraresi, L. and Stranieri, S. (2014), "Food SMEs face increasing competition in the EU market: Marketing management capability is a tool for becoming a price maker", *Agribusiness,* Vol. 30 No. 2, pp. 113-131.

Banterle, A., Cereda, E. and Fritz, M. (2013), "Labelling and sustainability in food supply networks: a comparison between the German and Italian markets", *British Food Journal*, Vol. 115 No. 5, pp. 769-783.

Bao, L., Huang, Y., Ma, Z., Zhang, J. and Lv, Q. (2012), "On the supply chain management supported by e-commerce service platform for agreement based circulation of fruits and vegetables", *Physics Procedia,* Vol. 33, pp. 1957-1963. https://doi.org/10.1016/j.phpro.2012.05.308

Barling, D., Sharpe, R. and Lang, T. (2009), "Traceability and ethical concerns in the UK wheat-bread chain: from food safety to provenance to transparency", *International Journal of Agricultural Sustainability,* Vol. 7 No. 4, pp. 261-278.

Bastian, J., and Zentes, J. (2013), "Supply chain transparency as a key prerequisite for sustainable agri-food supply chain management" *The International Review of Retail, Distribution and Consumer Research,* Vol. 23 No. 5 pp. 553-570.

Bayraktar, E., Gunasekaran, A. Koh, S.L. Tatoglu, E. Demirbag, M. and Zaim. S. (2010), "An efficiency comparison of supply chain management and information systems practices: a study of Turkish and Bulgarian small-and medium-sized enterprises in food products and beverages", *International Journal of Production Research,* Vol. 48 No. 2, pp. 425-451.

Bechini, A., Cimino, M.G. Marcelloni, F. and Tomasi, A. (2008), "Patterns and technologies for enabling supply chain traceability through collaborative e-business", *Information and Software Technology,* Vol. 50 No. 4, pp. 342-359.

Beckeman, M. and Skjöldebrand, C. (2007), "Clusters/networks promote food innovations", *Journal of Food Engineering,* Vol. 79 No. 4, pp. 1418-1425.

Beckeman, M., Bourlakis, M. and Olsson, A. (2013), "The role of manufacturers in food innovations in Sweden", *British Food Journal,* Vol. 115 No. 7, pp. 953-974.

Beer, S. and Lemmer, C. (2011), "A critical review of "green" procurement: Life cycle analysis of food products within the supply chain", *Worldwide Hospitality and Tourism Themes,* Vol. 3 No. 3, pp. 229-244.

Belaya, V., and Hanf, J.H. (2014), "Power and Conflict in Processor-Supplier Relationships: Empirical Evidence from Russian Agri-Food Business", *Supply Chain Forum: An International Journal,* Vol. 15 No. 2 pp. 60-80.

Bell, R., Davies, R. and Howard, E. (1997), "The changing structure of food retailing in Europe: the implications for strategy" *Long Range Planning,* Vol. 30 No. 6, pp. 853-861.

Bergstrom, K., Soler, C. and Shanahan, H. (2005), "Professional food purchasers' practice in using environmental information", *British Food Journal,* Vol. 107 No. 5, pp. 306-319.

Bertolini, M., Bevilacqua, M. and Massini, R. (2006), "FMECA approach to product traceability in the food industry", *Food Control,* Vol. 17 No. 2 pp. 137-145.

Bessel, K.M., Hobbs, J.E. and Kerr, W.A. (2006), "Food Safety and Private International Law:Liability, Traceability and Transboundary Marketing", *Journal of International Food & Agribusiness Marketing,* Vol. 18 No. (1-2), pp. 29-48.

Beulens, A.J., Broens, D.F., Folstar, P. and Hofstede, G.J. (2005), "Food safety and transparency in food chains and networks Relationships and challenges", *Food control*, Vol. 16 No. 6, pp. 481- 486.

Beverland, M. (2001), "Creating value through brands: the ZESPRITM kiwi fruit case", *British Food Journal*, Vol. 103 No. 6, pp. 383-399.

Beverland, M. (2005), "Creating value for channel partners: the Cervena case", *Journal of Business & Industrial Marketing,* Vol. 20 No. 3, pp. 127-135.

Bevilacqua, M., Ciarapica, F.E. and Giacchetta, G. (2009), "Business process reengineering of a supply chain and a traceability system: a case study", *Journal of Food Engineering,* Vol. 93 No. 1, pp. 13-22.

Bezuidenhout, C.N., Bodhanya, S. and Brenchley, L. (2012), "An analysis of collaboration in a sugarcane production and processing supply chain", *British Food Journal,* Vol. 114 No. 6, pp. 880-895.

Bhaskaran, S., Polonsky, M., Cary, J. and Fernandez, S. (2006), "Environmentally sustainable food production and marketing: opportunity or hype?", *British food journal*, Vol. 108 No. 8, pp. 677-690.

Bhattarai, S., C. Lyne, M. and K. Martin, S. (2013), "Assessing the performance of a supply chain for organic vegetables from a smallholder perspective", *Journal of Agribusiness in Developing and Emerging Economies,* Vol. 3 No. 2, pp. 101 - 118.

Bibi, F., Guillaume, C., Gontard, N. and Sorli, B. (2017), "A review: RFID technology having sensing aptitudes for food industry and their contribution to tracking and monitoring of food products", *Trends in Food Science & Technology*, Vol. 62, pp. 91-103. https://doi.org/10.1016/j.tifs.2017.01.013

Bigliardi, B., and Bottani, E. (2010), "Performance measurement in the food supply chain: a balanced scorecard approach", *Facilities,* Vol. 28 No. 5/6, pp. 249-260.

Bisogno, M. (2016), "Corporate Social Responsibility and Supply Chains: Contribution to the Sustainability of Well-being", *Agriculture and Agricultural Science Procedia,* Vol. 8, pp. 441-448. https://doi.org/10.1016/j.aaspro.2016.02.041

Blackburn, J. and Scudder , G. (2009), "Supply chain strategies for perishable products: the case of fresh produce", *Production and Operations Management,* Vol. 18 No. 2, pp. 129-137.

Blandon, J., Henson, S. and Cranfield, J. (2009), "Small-scale farmer participation in new agri-food supply chains: Case of the supermarket supply chain for fruit and vegetables in Honduras", *Journal of International Development,* Vol. 21 No. 7 pp. 971-984.

Blundel, R.K. and Hingley, M. (2001), "Exploring growth in vertical inter-firm relationships: small-medium firms supplying multiple food retailers", *Journal of Small Business and Enterprise Development,* Vol. 8 No. 3, pp. 245-265.

Blundel, R.K. and Hingley, M. (2001), "Exploring growth in vertical inter-firm relationships:small-medium firms supplying multiple food retailers", *Journal of Small Business and Enterprise Development,* Vol. 8 No. 3, pp. 245-265.

Bodini, A. and Zanoli, R. (2011), "Competitive factors of the agro-food e-commerce" *Journal of Food Products Marketing,* Vol. 17 No. (2-3), pp. 241-260.

Bogataj, M., Bogataj, L. and Vodopivec, R. (2005), "Stability of perishable goods in cold logistic chains", *International Journal of Production Economics,* Vol. 93, pp. 345-356. https://doi.org/10.1016/j.ijpe.2004.06.032

Bosona, T. and Gebresenbet, G. (2013), "Food traceability as an integral part of logistics management in food and agricultural supply chain", *Food Control*, Vol. 33 No. 1, pp. 32- 48.

Bosona, T.G., and Gebresenbet, G. (2011), "Cluster building and logistics network integration of local food supply chain", *Biosystems engineering*, Vol. 108 No. 4, pp. 293-302.

Bossu, V., Estampe, D., Favre-Bertin, M., Greset, D., Micaud, F. and Pavie, A. (2004), "What the Supply Chain Manager's position entails", *Supply Chain Forum: An International Journal*, Vol. 5 No. 2 pp. 14-23.

Bourlakis, C. and Bourlakis, M. (2005), "Information technology safeguards, logistics asset specificity and fourth-party logistics network creation in the food retail chain", *Journal of Business & Industrial Marketing*, Vol. 20 No. 2, pp. 88-98.

Bourlakis, M., Maglaras, G. and Fotopoulos, C. (2012), "Creating a "best value supply chain"? Empirical evidence from the Greek food chain", *The International Journal of Logistics Management*, Vol. 23 No. 3, pp. 360-382.

Bremmers, H., Omta, O. Kemp, R. and Haverkamp, D.J. (2007), "Do stakeholder groups influence environmental management system development in the Dutch agri-food sector?", *Business Strategy and the Environment*, Vol. 16 No. 3, pp. 214-231.

Burgess, K., Singh, P.J. and Koroglu, R. (2006), "Supply chain management: a structured literature review and implications for future research", *International Journal of Operations & Production Management*, Vol. 26 No. 7, pp. 703-729.

Bustos, C.A. and Moors, E.H. (2018), "Reducing post-harvest food losses through innovative collaboration: Insights from the Colombian and Mexican avocado supply chains", *Journal of Cleaner Production*, Vol. 199, pp. 1020-1034.

Cadilhon, J.J., Fearne, A.P., Moustier, P. and Poole, N.D. (2003), "Modelling vegetable marketing systems in South East Asia: phenomenological insights from Vietnam", *Supply Chain Management: An International Journal*, Vol. 8 No. 5, pp. 427-441.

Cadilhon, J.J., Fearne, A.P., ThiGiac Tam, P., Moustier, P. and Poole, N.D. (2005), "Collaborative commerce or just common sense? Insights from vegetable supply chains in Ho Chi Minh City", *Supply Chain Management: An International Journal,* Vol. 10 No. 3, pp. 147-149.

Cadilhon, J.J., Moustier, P., Poole, N.D., Tam, P.T.G. and Fearne, A.P. (2006), "Traditional vs. modern food systems? Insights from vegetable supply chains to Ho Chi Minh City (Vietnam)", *Development Policy Review,* Vol. 24 No. 1, pp. 31-49.

Cagliano, A.C., De Marco, A. and Rafele, C. (2017), "E-grocery supply chain management enabled by mobile tools", *Business Process Management Journal*, Vol. 23 No. 1, pp. 47-70

Cagliano, R., Caniato, F. and Worley, C. (2016), *Organizing supply chain processes for sustainable innovation in the agri-food industry*. Emerald Group Publishing.

Cai, R. and Ma, W. (2015), "Trust, transaction costs, and contract enforcement: evidence from apple farmers in China", *British Food Journal,* Vol. 117 No. 10, pp. 2598-2608.

Cai, X., Chen, J. Xiao, Y. Xu, X. and Yu. G. (2013), "Fresh-product supply chain management with logistics outsourcing", *Omega,* Vol. 41 No. 4, pp. 752-765.

Calza, F. and Passaro, R. (1997), "EDI network and logistics management at Unilever-Sagi", *Supply Chain Management: An International Journal*, Vol. 2 No. 4, pp. 158-170.

Canavari, M., Centonze, R., Hingley, M. and Spadoni, R. (2010), "Traceability as part of competitive strategy in the fruit supply chain", *British Food Journal,* Vol. 112 No. 2, pp. 171-186.

Cante, C.J., Calluzzo, V.J., Schwartz, D.P. and Schwartz, T.M. (2004), "Strategic alliances in food and beverage and executive recruiting industries", *Supply Chain Management: An International Journal,* Vol. 9 No. 3, pp. 230-240.

Carbone, V., Moatti, V. and Wood. C.H. (2012), "Diffusion of sustainable supply chain management: Toward a conceptual framework", *Supply Chain Forum: An International Journal,* Vol. 13 No. 4, pp. 26-39.

Carter, C.R., and Rogers, D.S. (2008), "A framework of sustainable supply chain management: moving toward new theory", *International journal of physical distribution & logistics management,* Vol. 38 No. 5, pp. 360-387.

Charlebois, S. (2008), "The gateway to a Canadian market-driven agricultural economy: a framework for demand chain management in the food industry", *British Food Journal* Vol. 110 No. 9, pp. 882-897.

Chaudhuri, A., Dukovska-Popovska, I., Subramanian, N., Chan, H.K. and Bai, R. (2018), "Decision-making in cold chain logistics using data analytics: a literature review", *The International Journal of Logistics Management*. https://doi.org/10.1108/IJLM-03-2017-0059

Chauhan, A., Debnath, R.M. and Singh, S.P. (2018), "Modelling the drivers for sustainable agri-food waste management", *Benchmarking: An International Journal,* Vol. *25* No. 3, pp. 981-993.

Chen, M.F. (2012), "Segmentation of Taiwanese consumers based on trust in the food supply system", *British Food Journal,* Vol. 114 No. 1, pp. 70-84.

Cheng, M., Luo, H., Zhong, R.Y., Lan, S. and Huang, G.Q. (2014), "Cloud-based auction tower for perishable supply chain trading", *Procedia CIRP*, Vol. 25, pp. 329-336.

Chiffoleau, Y. (2009), "From politics to co - operation: the dynamics of embeddedness in alternative food supply chains", *Sociologia Ruralis,* Vol. 49 No. 3, pp. 218-235.

Chkanikova, O. and Mont, O. (2015), "Corporate supply chain responsibility: drivers and barriers for sustainable food retailing", *Corporate Social Responsibility and Environmental Management,* Vol. 22 No. 2, pp. 65-82.

Chrysochou, P., Chryssochoidis, G. and Kehagia, O. (2009), "Traceability information carriers. The technology backgrounds and consumers' perceptions of the technological solutions", *Appetite,* Vol. 53 No. 3, pp. 322-331.

Clark, J.K., Sharp, J.S. and Dugan, K.L. (2015), "The agrifood system policy agenda and research domain", *Journal of Rural Studies,* Vol. 42, pp. 112-122. https://doi.org/10.1016/j.jrurstud.2015.10.004

Clasadonte, L., de Vries, E., Trienekens, J., Arbeletche, P. and Tourrand, J.F. (2013), "Network companies: a new phenomenon in South American farming", *British Food Journal*, Vol. 115 No. 6, pp. 850-863.

Clements, M.D., Lazo, R.M. and Martin, S.K. (2008), "Relationship connectors in NZ fresh produce supply chains", *British Food Journal*, Vol. 110 No. (4/5), pp. 346-360.

Collins, A., Henchion, M. and O' Reilly, P. (1999), "The impact of coupled-consolidation: experiences from the Irish food industry", *Supply Chain Management: An International Journal*, Vol. 4 No. 2, pp. 102-111.

Collins, R., Sun, X. and Li, C.G. (2012), "Are supply-chain relationships more influenced by buyer-supplier relationships or the business environment of the country itself? Evidence from the'China-Australia'trading relationship", *Asia Pacific Business Review*, Vol. 18 No. 3, pp. 391-405.

Comrey, A.L. and Lee, H.B. (1992), A First Course in Factor Analysis . Hillsdale, NJ, Lawrence Eribaum Associates. *Inc., Publishers*.

Conner, D.S., Abate, G., Liquori, T., Hamm, M.W. and Peterson, H.C. (2010), "Prospects for more healthful, local, and sustainably produced food in school meals", *Journal of Hunger & Environmental Nutrition*, Vol. 5 No. 4, pp. 416-433.

Connolly, C. (2007), "Sensor trends in processing and packaging of foods and pharmaceuticals", *Sensor Review*, Vol. 27 No. 2, pp. 103-108.

Cox, A., Chicksand, D. and Yang, T. (2007), "The proactive alignment of sourcing with marketing and branding strategies: a food service case", *Supply Chain Management: An International Journal*, Vol. 12 No. 5, pp. 321-333.

Cox, H., Mowatt, S. and Prevezer, M. (2003), "New product development and product supply within a network setting: the chilled ready-meal industry in the UK", *Industry and Innovation*, Vol. 10 No. 2, pp. 197-217.

Custódio, A.L. and Oliveira, R.C. (2006), "Redesigning distribution operations: a case study on integrating inventory management and vehicle routes design", *International Journal of Logistics: Research and Applications*, Vol. 9 No. 2, pp. 169-187.

Dabbene, F., Gay, P. and Sacco, N. (2008), "Optimisation of fresh-food supply chains in uncertain environments, Part I: Background and methodology", *Biosystems Engineering*, Vol. 99 No. 3, pp. 348-359.

Dangayach, G.S. and Deshmukh, S.G. (2001), "Implementation of manufacturing strategy: a select study of Indian process companies", *Production Planning & Control*, Vol. *12* No. 1, pp. 89-105.

Darkow, I.L., Foerster, B. and von der Gracht, H.A. (2015), "Sustainability in food service supply chains: future expectations from European industry experts toward the environmental perspective", *Supply Chain Management: An International Journal*, Vol. 20 No. 2, pp. 163-178.

Darroch, M.A. and Mushayanyama, T. (2006), "Improving working relationships for smallholder farmers in formal organic crop supply chains: Evidence from KwaZulu-Natal, South Africa", *Agrekon*, Vol. 45 No. 3, pp. 339-360.

de Castro Souza, R. and Amato Neto, J. (2012), "An investigation about Brazilian mango and grape exports", *British Food Journal*, Vol. 114 No. 10, pp. 1432-1444.

Degeneffe, D., Kinsey, J., Stinson, T. and Ghosh, K. (2009), "Segmenting consumers for food defense communication strategies" *International Journal of Physical Distribution & Logistics Management*, Vol. 39 No. 5, pp. 365-403.

Del Borghi, A., Gallo, M., Strazza, C. and Del Borghi, M. (2014), "An evaluation of environmental sustainability in the food industry through life cycle assessment: the case study of tomato products supply chain", *Journal of Cleaner Production*, Vol. 78, pp. 121-130. https://doi.org/10.1016/j.jclepro.2014.04.083

Dellino, G., Laudadio, T., Mari, R., Mastronardi, N. and Meloni, C. (2018), "A reliable decision support system for fresh food supply chain management", *International Journal of Production Research*, Vol. 56 No. 4, pp. 1458-1485.

Demirta ş, N. and Tuzkaya, U.R. (2012), "Strategic planning of layout of the distribution center: an approach for fruits and vegetables hall", *Procedia-Social and Behavioral Sciences*, Vol. 58, pp. 159-168.

Deng, L., Wang, R., Dong, T., Feng, J. and Weisong, M. (2016), "Assessing the table grape supply chain performance in China–a value chain analysis perspective", *British Food Journal,* Vol. 118 No. 5, pp. 1129 - 1145.

Díaz, A., Claes, B., Solís, L. and Lorenzo, O. (2011), "Benchmarking logistics and supply chain practices in Spain", *Supply Chain Forum: an International Journal,* Vol. 12 No. 2, pp. 82-90.

Digal, L.N. (2005), "Quality grading in the supply chain: The case of vegetables in southern Philippines", *Journal of International Food & Agribusiness Marketing,* Vol. 17 No. 1, pp. 71-93.

DING, J.P., Huang, J.K., Jia, X.P., Bai, J.F., Boucher, S. and Carter, M. (2015), "Direct farm, production base, traceability and food safety in China", *Journal of Integrative Agriculture,* Vol. 14 No. 11, pp. 2380-2390.

Djekic, I., Dragojlovic, S., Miloradovic, Z., Miljkovic-Zivanovic, S., Savic, M. and Kekic, V. (2016), "Improving the confectionery industry supply chain through second party audits", *British Food Journal*, Vol. 118 No. 5, pp. 1041-1066.

Donnelly, K.M., Thakur, M. and Sakai, J. (2013), "Following the mackerel–Cost and benefits of improved information exchange in food supply chains", *Food control,* Vol. 33 No. 1, pp. 25-31.

Dorling, K., Scott, J. and Deakins, E. (2005), "An organisation-level framework for the NZ food industry-its development and application", *International Journal of Physical Distribution & Logistics Management,* Vol. 35 No. 10, pp. 728-743.

Doyer, O.T. and Van Rooyen, C.J. (2001), "Challenging the paradigm: How to extend conventional agricultural economic analysis to support agribusiness in the new global economy", *Agrekon,* Vol. 40 No. 2, pp. 215-230.

du Plessis, H. and du Rand, G. (2012), "Retracted: Food traceability in the context of Karoo lamb: supply chain and consumer perspectives", *International Journal of Consumer Studies,* Vol. *36* No. 4, pp. 401-407.

Duan, Y., Xu, X., Liu, X., Zografos, K. and Bemeleit, B. (2007), "Accelerating internet adoption in China's fresh produce supply chain: a VEGNET approach", *New Zealand Journal of Agricultural Research*, Vol. 50 No. 5, pp. 1299-1305.

Dües, C.M., Tan, K.H. and Lim, M. (2013), "Green as the new Lean: how to use Lean practices as a catalyst to greening your supply chain", *Journal of Cleaner Production,* Vol. 40, pp. 93-100.

Dunne, A.J. 2008. "The impact of an organization's collaborative capacity on its ability to engage its supply chain partners", *British Food Journal*, Vol. 110 No. (4/5), pp. 361-375.

Dzever, S., Merdji, M. and Saives, A.L. (2001), "Purchase decision making and buyer-seller relationship development in the French food processing industry", *Supply chain management: An international Journal,* Vol. 6 No. 5, pp. 216-229.

Eden, S., Bear, C. and Walker, G. (2008), "Understanding and (dis) trusting food assurance schemes: consumer confidence and the 'knowledge fix'", *Journal of Rural Studies,* Vol. 24 No. 1, pp. 1-14.

Edwards-Jones, G., Plassmann, K., York, E.H., Hounsome, B., Jones, D.L. and i Canals, L.M. (2009), "Vulnerability of exporting nations to the development of a carbon label in the United Kingdom", *environmental science & policy,* Vol. 12 No. 4, pp. 479-490.

Eisenhardt, K.M. (1989), "Building theories from case study research", The Academy of Management Review. Vol.14, No. 4, pp. 532-550.

Elghannam, A., Arroyo, J., Eldesouky, A. and Mesias, F.J. (2018), "A cross-cultural consumers' perspective on social media-based short food supply chains", *British Food Journal*, Vol. *120* No. 10, pp. 2210-2221.

El Bilali, H. and Allahyari, M.S. (2018), "Transition towards sustainability in agriculture and food systems: Role of information and communication technologies", *Information Processing in Agriculture*, Vol. 5 Iss.4, pp. 456-464

Ellis, N., Jack, G. and Higgins, M. (2005), "(De) constructing the market for animal feeds: A discursive study", *Journal of Marketing Management,* Vol. 21 No. 1-2, pp. 117-146.

Ellram, L.M. 1995. "A managerial guideline for the development and implementation of purchasing partnerships", *International Journal of Purchasing and Materials Management,* Vol. 31 No. 1, pp. 9-16.

Emongor, R. and Kirsten, J. (2009), "The impact of South African supermarkets on agricultural development in the SADC: a case study in Zambia, Namibia and Botswana", *Agrekon,* Vol. 48 No. 1, pp. 60-84.

Engelseth, P. (2009), "Food product traceability and supply network integration", *Journal of Business & Industrial Marketing,* Vol. 24 No. 5/6, pp. 421-430.

Engelseth, P. and Felzensztein, C. (2012), "Intertwining relationship marketing with supply chain management through Alderson's transvection", *Journal of Business & Industrial Marketing,* Vol. 27 No. 8, PP. 673-685.

Escanciano, C. and Santos-Vijande, M.L. (2014), "Reasons and constraints to implementing an ISO 22000 food safety management system: Evidence from Spain", *Food Control,* Vol. 40, pp. 50-57. https://doi.org/10.1016/j.foodcont.2013.11.032

Esterhuizen, D., Van Rooyen, C.J. and D'Haese, L. (2001), "Determinants of competitiveness in the South African agro-food and fibre complex", *Agrekon,* Vol. 40 No. 1, pp. 25-34.

Fabbe-Costes, N. and Jahre, M. (2008), "Supply chain integration and performance: a review of the evidence", *The International Journal of Logistics Management*, Vol. 19 No. 2, pp. 130-154.

Faisal, M.N. and Talib, F. (2016), "Implementing traceability in Indian food-supply chains: An interpretive structural modeling approach", *Journal of foodservice business research,* Vol. 19 No. 2, pp. 171-196.

Falk, R.F. and Miller, N.B. (1992), *A primer for soft modeling*. University of Akron Press.

Farina, E.M., Gutman, G.E., Lavarello, P.J., Nunes, R. and Reardon, T. (2005), "Private and public milk standards in Argentina and Brazil", *Food Policy* Vol. 30 No. 3, pp. 302-315.

Fearne, A. and Hughes, D. (1999), "Success factors in the fresh produce supply chain: insights from the UK", *Supply Chain Management: An International Journal*, Vol. 4 No. 3, pp. 120-131.

Fearne, A., Duffy, R. and Hornibrook, S. (2005), "Justice in UK supermarket buyer-supplier relationships: an empirical analysis", *International Journal of Retail & Distribution Management*, Vol. 33 No. 8, pp. 570-582.

Fidler, D.G. (1990), "Due diligence and quality assurance in the UK", *Food Control*, Vol. 1 No. 2,pp. 117-121.

Field, A. (2009), "Discovering statistics using SPSS", Sage publications.

Fischer, C. 2013. "Trust and communication in European agri-food chains", *Supply Chain Management: An International Journal*, Vol. 18 No. 2, pp. 208-218.

Flynn, B.B., Sakakibara, R.G., Bates, K.A., and Flynn, E.J. (1990), "Empirical research methods in operations management", *Journal of Operations Management*, Vol. 9, No. 2, pp. 250-284.

Flynn, B.B., Schroeder, R.G. and Sakakibara, S. (1995), "The impact of quality management practices on performance and competitive advantage", *Decision sciences*, Vol. 26 No. 5, pp. 659-691.

Folinas, D., Manikas, I. and Manos, B. (2006), "Traceability data management for food chains", *British Food Journal*, Vol. 108 No. 8, pp. 622-633.

Folkerts, H. and Koehorst, H. (1997), "Challenges in international food supply chains: vertical co-ordination in the European agribusiness and food industries", *Supply Chain Management: An International Journal*, Vol. 2 No. 1, pp. 11-14.

Folkerts, H., and Koehorst, H. (1997), "Challenges in international food supply chains: vertical co-ordination in the European agribusiness and food industries", *Supply Chain Management: An International Journal,* Vol. 2 No. 1, pp. 11-14.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of marketing research*, Vol. 18, No. 1, pp.39-50.

Forsman-Hugg, S., Katajajuuri, J.M., Riipi, I., Mäkelä, J., Järvelä, K. and Timonen, P. (2013), "Key CSR dimensions for the food chain", *British Food Journal,* Vol. 115 No. 1, pp. 30-47.

Foster Jr, S.T. (2008), "Towards an understanding of supply chain quality management", *Journal of Operations Management,* Vol. 26 No. 4, pp. 461- 467.

Foster Jr, S.T., Wallin, C. and Ogden, J. (2011), "Towards a better understanding of supply chain quality management practices", *International Journal of Production* Research, Vol. 49 No. 8, pp. 2285- 2300.

Fountas, S., Carli, G., Sørensen, C.G., Tsiropoulos, Z., Cavalaris, C., Vatsanidou, A., Liakos, B., Canavari, M., Wiebensohn, J. and Tisserye, B. (2015), "Farm management information systems: Current situation and future perspectives", *Computers and Electronics in Agriculture*, Vol. 115, pp. 40-50. https://doi.org/10.1016/j.compag.2015.05.011

Fritz, M. (2007), "E-commerce partnering due diligence: A methodology for trust in e-commerce in food networks", *ActaAgriculturaeScand Section C,* Vol. 4 No. 1, pp. 13-20.

Fritz, M., and Schiefer, G. (2009), "Tracking, tracing, and business process interests in food commodities: A multi-level decision complexity", *International Journal of Production Economics,* Vol. 117 No. 2, pp. 317-329.

Fulconis, F., Saglietto, L. and Paché, G. (2006), "Exploring new competences in the logistics industry: the intermediation role of 4PL." *Supply Chain Forum: An International Journal* Vol. 7 No. 2, pp. 68-77.

Gallardo, R.K., Li, H., McCracken, V., Yue, C., Luby, J. and McFerson, J.R. (2015), "Market intermediaries ' willingness to pay for apple, peach, cherry, and strawberry quality attributes", *Agribusiness,* Vol. 31 No. 2, pp. 259-280.

Gallardo, R.K., Li, H., McCracken, V., Yue, C., Luby, J. and McFerson, J.R. (2015), "Market Intermediaries' Willingness to Pay for Apple, Peach, Cherry, and Strawberry Quality Attributes", *Agribusiness* Vol. 31 No. 2, pp. 259-280.

Galvez, J.F., Mejuto, J.C. and Simal-Gandara, J. (2018), "Future challenges on the use of blockchain for food traceability analysis", *TrAC Trends in Analytical Chemistry, Vol.107, pp.222-232.* https://doi.org/10.1016/j.trac.2018.08.011

Gattuso, D., Cassone, G.C. and Pellicano, D.S. (2014), "A Micro-Simulation Model for an Intelligent Logistics Platform: Specification and Calibration Results", *Supply Chain Forum: An International Journal,* Vol. 15 No. 4, pp. 52-69.

Gerbens-Leenes, P.W., Moll, H.C. and Uiterkamp, A.S. (2003), "Design and development of a measuring method for environmental sustainability in food production systems", *Ecological Economics,* Vol. 46 No. 2, pp. 231-248.

Gessner, G.H., Volonino, L. and Fish, L.A. (2007), "One-up, one-back ERM in the food supply chain", *Information systems management,* Vol. 24 No. 3, pp. 213-222.

Giampietri, E., Finco, A. and Del Giudice, T. (2016), "Exploring consumers' behaviour towards short food supply chains", British Food Journal, Vol. 118 No. 3, pp. 618-631.

Gimenez, C. (2006), "Logistics integration processes in the food industry", *International Journal of Physical Distribution & Logistics Management,* Vol. 36 No. 3, pp. 231-249.

Gold, S., Hahn, R. and Seuring, S. (2013), "Sustainable supply chain management in "Base of the Pyramid" food projects—A path to triple bottom line approaches for multinationals?", *International Business Review,* Vol. 22 No. 5, pp. 784-799.

Gong, W., Li, D., Liu, X., Yue, J. and Fu, Z. (2007), "Improved two-grade delayed particle swarm optimisation (TGDPSO) for inventory facility location for perishable food distribution centres in Beijing", *New Zealand Journal of Agricultural Research,* Vol. 50 No. 5, pp. 771-779.

Gopal, P.R.C. and Thakkar, J. (2016), "Sustainable supply chain practices: an empirical investigation on Indian automobile industry", *Production Planning & Control*, Vol. *27* No. 1 pp. 49-64.

Gopalakrishnan, B., Banta, L. and Bhave, G. (2006), "Modelling steam-based energy supply chain in an integrated steel manufacturing facility: a simulation-based approach", *International Journal of Industrial and Systems Engineering*, Vol. 2 No. 1, pp. 1-29.

Gorton, M., Dumitrashko, M. and White, J. (2006), "Overcoming supply chain failure in the agrifood sector: A case study from Moldova", *Food Policy,* Vol. 31 No. 1 PP. 90-103.

Gorton, M., Zari ć, V., Lowe, P. and Quarrie, S. (2011), "Public and private agri-environmental regulation in post-socialist economies: evidence from the Serbian Fresh Fruit and Vegetable Sector", *Journal of Rural Studies*, Vol. 27 No. 2, pp. 144-152.

Gotschol, A., De Giovanni, P., & Vinzi, V. E. (2014). Is environmental management an economically sustainable business? Journal of environmental management, Vol. 144, pp. 73-82, https://doi.org/10.1016/j.jenvman.2014.05.001

Grundvag Ottesen, G. (2006), "Do upstream actors in the food chain know end-users' quality perceptions? Findings from the Norwegian salmon farming industry", *Supply Chain Management: An International Journal*, Vol. 11 No. 5, pp. 456-463.

Gubrium, J.F. (1988), Analyzes field reality, Newbury Park, CA, Sage Publication.

Gulati, A., Minot, N., Delgado, C. and Bora, S. (2007), "Growth in high-value agriculture in Asia and the emergence of vertical links with farmers", *Global supply chains: standards and the poor: how the globalization of food systems and standards affects rural development and poverty*, pp. 98-108.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2006), Multivariate data analysis 6th ed. *Uppersaddle River: Pearson Prentice Hall*.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance.

Hamdar, B.C. (1999), "A new era for efficient food manufacturing in the Lebanon: the experience of Conserves ModernesChtaura", *Supply Chain Management: An International Journal*, Vol. 4 No. 1, pp. 14-17.

Hamister, J.W. (2012), "Supply chain management practices in small retailers", *International Journal of Retail & Distribution Management*, Vol. 40 No. 6, pp. 427 - 450.

Hamprecht, J., Corsten, D., Noll, M. and Meier, E. (2005), "Controlling the sustainability of food supply chains", *Supply Chain Management: An International Journal*, Vol. 10 No. 1, pp. 7-10.

Han, J., Lu, H., Trienekens, J.H. and Omta, S.W.F. (2013), "The impact of supply chain integration on firm performance in the pork processing industry in China", *Chinese Management Studies*, Vol. 7 No. 2, pp. 230-252.

Handayati, Y., Simatupang, T.M. and Perdana, T. (2015), "Value co-creation in agri-chains network: an agent-based simulation", *Procedia Manufacturing*, Vol. 4, pp. 419-428.

Handayati, Y., Simatupang, T.M. and Perdana, T. (2015), "Value Co-creation in Agri-chains Network: An Agent-Based Simulation", *Procedia Manufacturing*, Vol. 4, pp. 419-428. https://doi.org/10.1016/j.promfg.2015.11.058

Handayati, Y., Simatupang, T.M. and Perdana, T. (2015), "Value co-creation in agri-chains network: an agent-based simulation", *Procedia Manufacturing*, Vol. 4, pp. 419-428.

Hansen, E.G., Grosse-Dunker, F. and Reichwald, R. (2009), "Sustainability innovation cube - A framework to evaluate sustainability-oriented innovations", *International Journal of Innovation Management*, Vol. 13 No. 4, pp. 683-713.

Haverkamp, D.J., Bremmers, H. and Omta, O. (2010), "Stimulating environmental management performance: Towards a contingency approach", *British Food Journal,* Vol. 112 No. 11, pp. 1237-1251.

Heiman, A., Zilberman, D. and Baylis, K. (2001), "The role of agricultural promotions in reducing uncertainties of exported fruits and vegetables", *Journal of International Food & Agribusiness Marketing,* Vol. 12 No. 3, pp. 1-26.

Heiman, A., Zilberman, D. and Baylis, K. (2001), "The role of agricultural promotions in reducing uncertainties of exported fruits and vegetables", *Journal of International Food & Agribusiness Marketing,* Vol. 12 No. 3, pp. 1-26.

Heising, J.K., Dekker, M., Bartels, P.V. and Van Boekel, M.A.J.S. (2014), "Monitoring the quality of perishable foods: opportunities for intelligent packaging", *Critical reviews in food science and nutrition* Vol. 54 No. 5, pp. 645-654.

Henchion, M. and McIntyre, B. (2004), "Developments in the Irish food supply chain: Impacts and responses by SMEs", *Journal of International Food & Agribusiness Marketing,* Vol. 16 No. 2, pp. 103-122.

Henson, S. and Reardon, T. (2005), "Private agri-food standards: Implications for food policy and the agri-food system", *Food policy,* Vol. 30 No. 3, pp. 241-253.

Heyder, M., Theuvsen, L. and Hollmann-Hespos, T. (2012), "Investments in tracking and tracing systems in the food industry: a PLS analysis", *Food Policy,* Vol. 37 No. 1, pp. 102-113.

Higgins, V., Dibden, J. and Cocklin, C. (2008), "Building alternative agri-food networks: Certification, embeddedness and agri-environmental governance", *Journal of Rural Studies,* Vol. 24 No. 1, pp. 15-27.

Higgins, V., Dibden, J. and Cocklin, C. (2015), "Private agri-food governance and greenhouse gas abatement: constructing a corporate carbon economy", *Geoforum*, Vol. 66, pp. 75-84. https://doi.org/10.1016/j.geoforum.2015.09.012

Hingley, M. (2001), "Relationship management in the supply chain", *The International Journal of Logistics Management*, Vol. 12 No. 2, pp. 57-71.

Hingley, M., Lindgreen, A. and Casswell, B. (2006), "Supplier-retailer relationships in the UK fresh produce supply chain", *Journal of International Food & Agribusiness Marketing*, Vol. 18 No. (1-2), pp. 49-86.

Hingley, M., Sodano, V. and Lindgreen, A. (2008), "Differentiation strategies in vertical channels: a case study from the market for fresh produce", *British Food Journal*, Vol. 110 No. 1, pp. 42-61.

Hingley, M.K. (2005), "Power imbalance in UK agri-food supply channels: Learning to live with the supermarkets?", *Journal of Marketing Management*, Vol. 21 No. (1-2), pp. 63-88.

Hingley, M.K. (2005), "Power imbalanced relationships: cases from UK fresh food supply", *International Journal of Retail & Distribution Management*, Vol. 33 No. 8, pp. 551-569.

Hingley, M.K., Lindgreen, A. and Beverland, M.B. (2010), "Barriers to network innovation in UK ethnic fresh produce supply", *Entrepreneurship and Regional Development*, Vol. 22 No. 1, pp. 77-96.

Hobbs, J.E. (1998), "Innovation and Future Direction of Supply Chain Management in the Canadian Agri-food Industry", *Canadian Journal of Agricultural Economics/Revue canadienned'agroeconomie*, Vol. 46 No. 4, pp. 525-537.

Hobbs, J.E. and Young, L.M. (2000), "Closer vertical co-ordination in agri-food supply chains: a conceptual framework and some preliminary evidence", *Supply Chain Management: An International Journal*, Vol. 5 No. 3, pp. 131-143.

Hodgkins, C., Raats, M.M., Egan, M.B., Fragodt, A., Buttriss, J. and McKevith, B. (2010), "Optimising food composition data flow within the UK food supply chain and to external stakeholders", *Journal of food composition and analysis*, Vol. 23 No. 7, pp. 749-752.

Hoegl, M. and Wagner, S.M. (2005), "Buyer-supplier collaboration in product development projects", *Journal of Management* Vol. 31 No. 4, pp. 530-548.

Hollingsworth, A. (2004), "Increasing retail concentration: Evidence from the UK food retail sector", *British Food Journal,* Vol. 106 No. 8, pp. 629-638.

Holmström, J., Louhiluoto, P., Vasara, A. and Hoover JR, W.E. (2001), "The other end of the supply chain", *Supply Chain Forum: an International Journal,* Vol. 2 No. 1, pp. 22-25.

Holt, G.C., Henchion, M., Reynolds, C., Baviera, B., Calabrese, J., Contini, L., Cowan, C., Dowgielwicz, T., Luscher, C., Maraglino, A. and Prugger, R. (2007), "Research agenda for SMEs in electronic platforms for the European food industry", *Foresight,* Vol. 9 No. 3, pp. 42-53.

Holweg, C., Lienbacher, E. and Zinn, W. (2010), "Social supermarkets-a new challenge in supply chain management and sustainability", *Supply Chain Forum: An International Journal,* Vol. 11 No. 4, pp. 50-58.

Hong, I.H., Dang, J.F., Tsai, Y.H., Liu, C.S., Lee, W.T., Wang, M.L. and Chen, P.C. (2011), "An RFID application in the food supply chain: A case study of convenience stores in Taiwan", *Journal of food engineering,* Vol. 106 No. 2, pp. 119-126.

Horn, C. and Brem, A. (2013), "Strategic directions on innovation management - A conceptual framework," *Management Research Review,* Vol. 36 No. 10, pp. 939-954.

Hou, M.A., Grazia, C. and Malorgio, G. (2015), "Food safety standards and international supply chain organization: a case study of the Moroccan fruit and vegetable exports", *Food Control*, Vol. 55, pp. 190-199.

Hou, M.A., Grazia, C. and Malorgio, G. (2015), "Food safety standards and international supply chain organization: A case study of the Moroccan fruit and vegetable exports", *Food Control,* Vol. 55, pp. 190-199. https://doi.org/10.1016/j.foodcont.2015.02.023

Hovelaque, V., Duvaleix-Tréguer, S. and Cordier, J. (2009), "Effects of constrained supply and price contracts on agricultural cooperatives", *European Journal of Operational Research,* Vol. 199 No. 3, pp. 769-780.

Hsiao, H.I., Van der Vorst, J.G.A.J., Kemp, R.G.M. and Omta, S.W.F. (2010), "Developing a decision-making framework for levels of logistics outsourcing in food supply chain networks", *International Journal of Physical Distribution & Logistics Management,* Vol. 40 No. 5, pp. 395-414.

Hu, J., Zhang, X., Moga, L.M. and Neculita, M. (2013), "Modeling and implementation of the vegetable supply chain traceability system", *Food Control,* Vol. 30 No. 1, pp. 341-353.

Hughes, D. and Merton, I. (1996), "'Partnership in produce': the J Sainsbury approach to managing the fresh produce supply chain", *Supply Chain Management: An International Journal,* Vol. 1 No. 2, pp. 4-6.

Huq, F., Asnani, S., Jones, V. and Cutright, K. (2005), "Modeling the influence of multiple expiration dates on revenue generation in the supply chain", *International Journal of Physical Distribution & Logistics Management,* Vol. 35 No. 3, pp. 152-160.

Hutcheson G and Sofroniou N. (1999), The multivariate social scientist: introductory statistics using generalized linear models. Thousand Oaks, CA: SAGE.

Ilbery, B. and Maye, D. (2005), "Food supply chains and sustainability: evidence from specialist food producers in the Scottish/English borders", *Land Use Policy,* Vol. 22 No. 4, pp. 331-344.

Ilbery, B., Watts, D., Simpson, S., Gilg, A. and Little, J. (2006), "Mapping local foods: evidence from two English regions", *British Food Journal,* Vol. 108 No. 3, pp. 213-225.

Iliopoulos, C., Theodorakopoulou, I. and Lazaridis, P. (2012), "Innovation implementation strategies for consumer driven fruit supply chains", *British Food Journal,* Vol. 114 No. 6, pp. 798-815.

Irani, Z. and Sharif, A.M. (2016), "Sustainable food security futures: perspectives on food waste and information across the food supply chain", *Journal of enterprise information management,* Vol. 29 No. 2, pp. 171-178.

Jack, C., Anderson, D. and Connolly, N. (2014), "Innovation and skills: implications for the agri-food sector", *Education + Training,* Vol. 56 No. 4, pp. 271-286.

Jaffee, S. and Masakure, O. (2005), "Strategic use of private standards to enhance international competitiveness: Vegetable exports from Kenya and elsewhere", *Food Policy*, Vol. 30 No. 3, pp. 316-333.

Jain, K. and Dubey, A. (2005), "Supply chain collaboration: A governance perspective", *Supply Chain Forum: An International Journal,* Vol. 6 No. 2, pp. 50-57.

Jakhar, M. and Srivastava, M.K. (2018), "Prioritization of drivers, enablers and resistors of agri-logistics in an emerging economy using fuzzy AHP", *British Food Journal*, Vol. *120* No. 9, pp. 2166-2181.

Jan Hofstede, G., Fritz, M., Canavari, M., Oosterkamp, E. and van Sprundel, G.J. (2010), "Towards a cross-cultural typology of trust in B2B food trade", *British Food Journal*, Vol. 112 No. 7, pp. 671-687.

Jansen-Vullers, M.H., J.C. Wortmann, and A.J.M. Beulens. 2004. "Application of labels to trace material flows in multi-echelon supply chains", *Production Planning & Control,* Vol. 15 No. 3, pp. 303-312.

Janvier-James, A.M. (2012), "A new introduction to supply chains and supply chain management: definitions and theories perspective", *International Business Research*, Vol. 5 No. 1, pp. 194-207.

Jedermann, R., Behrens, C., Westphal, D. and Lang, W. (2006), "Applying autonomous sensor systems in logistics – combining sensor networks, RFIDs and software agents", *Sensors and Actuators A: Physical*, Vol. 132 No. 1, pp. 370-375.

Ji, W., Koutsidis, G., Luo, R., Hutchings, J., Akhtar, M., Megias, F. and Butterworth, M. (2013), "A digital imaging method for measuring banana ripeness", *Color Research & Application*, Vol. 38 No. 5, pp. 364-374.

Jiang, S.T. (2010), "The Quality Control Status of Cobia, Rachycentroncanadum, and Grouper, Epinephelusmalabaricus, in Taiwan", *Journal of the World Aquaculture Society*, Vol. 41 No. 2, pp. 266-273.

Jie, F., Parton, K.A. and Cox, R.J. (2013), "Linking supply chain practices to competitive advantage: An example from Australian agribusiness", *British Food Journal*, Vol. 115 No. 7, pp. 1003-1024.

Jones, P., Clarke-Hill, C., Comfort, D., Hillier, D. and Shears, P. (2005), "Radio frequency identification and food retailing in the UK", *British Food Journal*, Vol. 107 No. 6, pp. 356-360.

Joshi, R., Banwet, D.K. and Shankar, R. (2009), "Indian cold chain: modeling the inhibitors", *British Food Journal*, Vol. 111 No. 11, pp. 1260-1283.

Joshi, R., Banwet, D.K., Shankar, R. and Gandhi, J. (2012), "Performance improvement of cold chain in an emerging economy", *Production Planning & Control*, Vol. 23 No. (10-11), pp. 817-836.

Jraisat, L., Gotsi, M. and Bourlakis, M. (2013), "Drivers of information sharing and export performance in the Jordanian agri-food export supply chain: A qualitative study", *International Marketing Review*, Vol. 30 No. 4, pp. 323 - 356.

Jraisat, L.E. and Sawalha, I.H. (2013), "Quality control and supply chain management: a contextual perspective and a case study", *Supply Chain Management: An International Journal*, Vol. 18 No. 2, pp. 194-207.

Kaipia, R., Dukovska-Popovska, I. and Loikkanen, L. (2013), "Creating sustainable fresh food supply chains through waste reduction", *International journal of physical distribution & logistics management*, Vol. 43 No. 3, pp. 262 - 276.

Kalia, A. and Parshad, V.R. (2015), "Novel trends to revolutionize preservation and packaging of fruits/fruit products: microbiological and nanotechnological perspectives", *Critical Reviews in Food Science and Nutrition*, Vol. 55 No. 2, pp. 159-182.

Kamalahmadi, M. and Parast, M.M. (2016), "A review of the literature on the principles of enterprise and supply chain resilience: major findings and directions for future research", *International Journal of Production Economics*, Vol. 171, Part 1, pp. 116-133.

Kannan, V.R. and Tan, K.C. (2002), "Quality Management, Supply Chain Management, and Just in Time: A Model of their Impact on Business Performance", *Supply Chain Forum: An International Journal,* Vol. 3 No. 2, pp. 58-72.

Kaplan, R.S. and D.P. Norton (1992), "The balanced scorecard-measures that drive performance", *Harvard Business Review,* Vol. 70 No. 1, pp. 71-79.

Karlsen, K.M. and Olsen, P. (2011), "Validity of method for analysing critical traceability points", *Food Control,* Vol. 22 No. 8, pp. 1209-1215.

Karlsen, K.M., Donnelly, K.M. and Olsen, P. (2011), "Granularity and its importance for traceability in a farmed salmon supply chain", *Journal of Food Engineering,* Vol. 102 No. 1, pp. 1-8.

Kaynak, H. and Hartley, J.L. (2008), "A replication and extension of quality management into the supply chain", *Journal of Operations Management*, Vol. 26 No. 4, pp. 468-489.

Kelepouris, T., Pramatari, K. and Doukidis, G. (2007), "RFID-enabled traceability in the food supply chain", *Industrial Management & Data Systems,* Vol. 107 No. 2, pp. 183-200.

Kennett, J., Fulton, M., Molder, P. and Brooks, H. (1998), "Supply chain management: the case of a UK baker preserving the identity of Canadian milling wheat", *Supply Chain Management: An International Journal,* Vol. 3 No. 3, pp. 157-166.

Kerr, W.A. (1999), "Genetically modified organisms, consumer scepticism and trade law: implications for the organisation of international supply chains", *Supply Chain Management: An International Journal,* Vol. 4 No. 2, pp. 67-74.

Kirezieva, K., Jacxsens, L., Uyttendaele, M., Van Boekel, M.A. and Luning, P.A. (2013), "Assessment of food safety management systems in the global fresh produce chain", *Food Research International*, Vol. 52 No. 1, pp. 230-242.

Kittipanya-ngam, P., Shi, Y. and Gregory, M.J. (2011), "Exploring geographical dispersion in Thailand-based food supply chain (FSC)", *Benchmarking: An International Journal,* Vol. 18 No. 6, pp. 802-833.

Kizos, T. and Vakoufaris, H. (2011), "Valorisation of a local asset: The case of olive oil on Lesvos Island, Greece", *Food Policy,* Vol. 36 No. 5, pp. 705-714.

Kline, R.B. (2005), Methodology in the social sciences.

Knickel, K., Zerger, C., Jahn, G. and Renting, H. (2008), "Limiting and enabling factors of collective farmers' marketing initiatives: results of a comparative analysis of the situation and trends in 10 European countries", *Journal of Hunger & Environmental Nutrition,* Vol. 3 No. 2-3, pp. 247-269.

Knoppen, D. and Christiaanse, E. (2007), "Interorganizational adaptation in supply chains: a behavioral perspective", *The International Journal of Logistics Management,* Vol. 18 No. 2, pp. 217-237.

Kohli, A.S. and Jensen, J.B. (2010), "Assessing effectiveness of supply chain collaboration: an empirical study", *Supply chain forum: An international journal,* Vol. 11 No. 2, pp. 2-16.

Kotzab, H. and Teller, C. (2005), "Development and empirical test of a grocery retail instore logistics model", *British Food Journal,* Vol. 107 No. 8, pp. 594-605.

Kretschmer, A., Spinler, S. and Van Wassenhove, L.N. (2014), "A school feeding supply chain framework: Critical factors for sustainable program design", *Production and Operations Management,* Vol. 23 No. 6, pp. 990-1001.

Kronborg Jensen, J., Balslev Munksgaard, K. and Stentoft Arlbjørn, J. (2013), "Chasing value offerings through green supply chain innovation", *European Business Review,* Vol. 25 No. 2, pp. 124-146.

Kuei, C.H., Madu, C.N., Lin, C. and Chow, W.S. (2002), "Developing supply chain strategies based on the survey of supply chain quality and technology management", *International Journal of Quality & Reliability Management,* Vol. 19 No. 7, pp. 889-901.

Kühne, B., Gellynck, X. and Weaver, R.D. (2013), "The influence of relationship quality on the innovation capacity in traditional food chains", *Supply Chain Management: An International Journal* Vol. 18 No. 1 pp. 52-65.

Kumar, S. 2008. “A study of the supermarket industry and its growing logistics capabilities”, *International Journal of Retail & Distribution Management,* Vol. 36 No. 3, pp. 192-211.

Kumar, S., Hong, Q.S. and Haggerty, L.N. (2011), “A global supplier selection process for food packaging”, *Journal of Manufacturing Technology Management*, Vol. 22 No. 2, pp. 241-260.

Kumar, S., Niedan-Olsen, K. and Peterson, L. (2009), “Educating the supply chain logistics for humanitarian efforts in Africa: a case study”, *International Journal of Productivity and Performance Management,* Vol. 58 No. 5, pp. 480-500.

Kumar, V., Purbey, S.K. and Anal, A.K.D. (2016), “Losses in litchi at various stages of supply chain and changes in fruit quality parameters”, *Crop Protection*, Vol. 79, pp.97-104. https://doi.org/10.1016/j.cropro.2015.10.014

Kuo, J.C. and Chen, M.C. (2010), “Developing an advanced multi-temperature joint distribution system for the food cold chain”, *Food Control,* Vol. 21 No. 4, pp. 559-566.

Kusumastuti, R.D., van Donk, D.P. and Teunter, R. (2016), “Crop-related harvesting and processing planning: a review”, *International Journal of Production Economics*, Vol. 174, pp. 76-92. https://doi.org/10.1016/j.ijpe.2016.01.010

Kusumastuti, R.D., van Donk, D.P. and Teunter, R. (2016), “Crop-related harvesting and processing planning: a review”, International Journal of Production Economics, Vol. 174, pp. 76-92.

Kırcı, M. and Seifert, R. (2015), “Dynamic Capabilities in Sustainable Supply Chain Management: A Theoretical Framework”, *Supply Chain Forum: An International Journal,* Vol. 16 No. 4, pp. 2-15.

La Scalia, G., Nasca, A., Corona, O., Settanni, L. and Micale, R. (2017). “An innovative shelf life model based on smart logistic unit for an efficient management of the perishable food supply chain”, *Journal of Food Process Engineering,* Vol. 40 No. 1. https://doi.org/10.1111/jfpe.12311

Lakhal, L., Pasin, F. and Limam, M. (2006), "Quality management practices and their impact on performance", *International Journal of Quality & Reliability Management*, Vol. 23 No. 6, pp. 625-646.

Lamprinopoulou, C., and Tregear. A. (2011), "Inter-firm relations in SME clusters and the link to marketing performance", *Journal of business & industrial marketing*, Vol. 26 No. 6, pp. 421-429.

Lamprinopoulou, C., Renwick, A., Klerkx, L., Hermans, F. and Roep, D. (2014), "Application of an integrated systemic framework for analysing agricultural innovation systems and informing innovation policies: Comparing the Dutch and Scottish agrifood sectors", *Agricultural Systems*, Vol. 129, pp. 40-54. https://doi.org/10.1016/j.agsy.2014.05.001

Lao, S.I., Choy, K.L., Ho, G.T. and Yam, R.C. (2012), "An RFRS that combines RFID and CBR technologies", *Industrial Management & Data Systems,* Vol. 112 No. 3, pp. 385-404.

Lau, H., Nakandala, D. and Shum, P.K. (2018), "A business process decision model for fresh-food supplier evaluation", Business Process Management Journal, Vol. 24 No. 3, pp. 716-744.

Larson, P.D. and Gammelgaard, B. (2001), "Logistics in Denmark: a survey of the industry", *International Journal of Logistics*, Vol. 4 No. 2, pp. 191-206.

Lazaridesa, H.N. (2011), "Food processing technology in a sustainable food supply chain", *Procedia Food Science*, Vol. 1, pp. 1918-1923. https://doi.org/10.1016/j.profoo.2011.09.282

Le Heron, R. (2003), "Creating food futures: reflections on food governance issues in New Zealand's agri-food sector", *Journal of Rural Studies*, Vol. 19 No. 1, pp. 111-125.

Lee, H.L., Padmanabhan, V. and Whang, S. (1997), "The bullwhip effect in supply chains", *MIT Sloan Management Review*, Vol. 38 No. 3, pp. 93.

Lee, P.D. 2005. "Measuring supply chain integration: a social network approach", *Supply Chain Forum: An International Journal,* Vol. 6 No. 2, pp. 58-67.

Lee, S.Y., Lee, S.J., Choi, D.S. and Hur, S.J. (2015), "Current topics in active and intelligent food packaging for preservation of fresh foods", *Journal of the Science of Food and Agriculture*, Vol. 95 No. 14, pp. 2799-2810.

Lehtinen, U. (2012), "Sustainability and local food procurement: a case study of Finnish public catering", *British Food Journal*, Vol. 114 No. 8, pp. 1053-1071.

Lejars, C., Le Gal, P.Y. and Auzoux, S. (2008), "A decision support approach for cane supply management within a sugar mill area", *Computers and electronics in agriculture,* Vol. 60 No. 2, pp. 239-249.

Li, S., Ragu-Nathan, B., Ragu-Nathan, T.S. and Subba Rao, S. (2006), "The impact of supply chain management practices on competitive advantage and organizational performance", *Omega*, Vol. 34 No. 2, pp. 107-124.

Li, Y., Kramer, M.R., Beulens, A.J. and van der Vorst, J.G. (2010), "A framework for early warning and proactive control systems in food supply chain networks", *Computers in Industry* Vol. 61 No. 9, pp. 852-862.

LI, Z.M., SU, N.S., DONG, X.X., YANG, Y.T., WANG, Y.T. and XIAO, H.L. (2015), "Edible agro-products quality and safety in China", *Journal of Integrative Agriculture*, Vol. 14 No. 11, pp. 2166-2175.

Liang, K., Thomasson, J.A., Shen, M.X., Armstrong, P.R., Ge, Y., Lee, K.M. and Herrman, T.J. (2013), "Ruggedness of 2D code printed on grain tracers for implementing a prospective grain traceability system to the bulk grain delivery system", *Food Control*, Vol. 33 No. 2, pp. 359-365.

Liljestrand, K. (2017), "Logistics solutions for reducing food waste", *International Journal of Physical Distribution & Logistics Management*, Vol. 47 No. 4, pp. 318-339.

Lillford, P.J., and Howker, R. (2000), "And what would you like for lunch Dr Frankenstein? The food supply chain: past history and future visions", *Journal of the Science of Food and Agriculture,* Vol. 80 No. 15, pp. 2165-2168.

Liu, A.H., Bui, M. and Leach, M. (2013), "Considering Technological Impacts When Selecting Food Suppliers: Comparing Retailers' Buying Behavior in the United States and Europe", *Journal of Business-to-Business Marketing* Vol. 20 No. 2, pp. 81-98.

Loader, R. (1997), "Assessing transaction costs to describe supply chain relationships in agri-food systems", *Supply Chain Management: An International Journal,* Vol. 2 No. 1, pp. 23-35.

Loader, R., and Hobbs, J.E. (1999), "Strategic responses to food safety legislation", *Food policy,* Vol. 24 No. 6, pp. 685-706.

Lockie, S., Travero, J. and Tennent, R. (2015), "Private food standards, regulatory gaps and plantation agriculture: social and environmental (ir) responsibility in the Philippine export banana industry", *Journal of Cleaner Production,* Vol. 107, pp. 122-129. https://doi.org/10.1016/j.jclepro.2014.03.039

Louw, A., Jordaan, D., Ndanga, L. and Kirsten, J.F. (2008), "Alternative marketing options for small-scale farmers in the wake of changing agri-food supply chains in South Africa", *Agrekon,* Vol. 47 No. 3, pp. 287-308.

Louw, A., Troskie, G. and Geyser, M. (2013), "Small millers' and bakers' perceptions of the limitations of agro-processing development in the wheat-milling and baking industries in rural areas in South Africa", *Agrekon,* Vol. 52 No. 3, pp. 101-122.

Louw, A., Vermeulen, H., Kirsten, J. and Madevu 1, H. (2007), "Securing small farmer participation in supermarket supply chains in South Africa", *Development Southern Africa,* Vol. 24 No. 4, pp. 539-551.

Lu, H.U.A.L.I.A.N.G., Trienekens, J.H., Omta, S.W.F. and Feng, S.H.U.Y.I. (2008), "Influence of guanxi, trust and farmer-specific factors on participation in emerging vegetable markets in China", *NJAS-Wageningen Journal of Life Sciences,* Vol. 56 No. (1/2), pp. 21-38.

Lynch, J. and Whicker, L. (2008), "Do logistics and marketing understand each other? An empirical investigation of the interface activities between logistics and marketing", *International Journal of Logistics: Research and Applications,* Vol. 11 No. 3, pp. 167-178.

Macfadyen, S., Tylianakis, J.M., Letourneau, D.K., Benton, T.G., Tittonell, P., Perring, M.P., Gómez-Creutzberg, C., Báldi, A., Holland, J.M., Broadhurst, L. and Okabe, K. (2015), "The role of food retailers in improving resilience in global food supply", *Global Food Security*, Vol. 7, pp. 1-8. https://doi.org/10.1016/j.gfs.2016.01.001

Macharia, J., Collins, R. and Sun. T. (2013), "Value-based consumer segmentation: the key to sustainable agri-food chains", *British Food Journal*, Vol. 115 No. 9, pp. 1313-1328.

MacKenzie, C.A. and Apte, A. (2017), "Modeling disruption in a fresh produce supply chain", *The International Journal of Logistics Management*, Vol. 28 No. 2, pp. 656-679.

Maertens, M. and Swinnen, J.F. (2009), "Trade, standards, and poverty: evidence from Senegal", *World Development*, Vol. 37 No. 1, pp. 161-178.

Magnan, A. (2011), "Bread in the economy of qualities: the creative reconstitution of the Canada - UK commodity chain for wheat", *Rural Sociology*, Vol. 76 No. 2, pp. 197-228.

Mahajan, R., Garg S.K., and Sharma. P.B. (2017), "Processed food supply chain: a framework for literature review," *Journal of Advances in Management Research*, Vol. 14 No. 1 pp. 91-109.

Makkar, S. and Jha, P.C. (2012). "Single-Source, Multiple-Destination coordination of multi item EOQ model for perishable products with quantity discounts incorporating Partial/Full truckload policy under fuzzy environment", *Journal of Information and Optimization Sciences*, Vol. 33 No. (2-3), pp. 385-399.

Malhotra, N., K. & Dash, S. (2011), "Marketing Research: An applied Orientation", (6th ed.). NJ: Pearson Education.

Mangla, S.K., Luthra, S., Rich, N., Kumar, D., Rana, N.P. and Dwivedi, Y.K. (2018), "Enablers to implement sustainable initiatives in agri-food supply chains", International Journal of Production Economics, Vol. 203, pp.379-393. https://doi.org/10.1016/j.ijpe.2018.07.012

Manikas, I. and Manos, B. (2009), "Design of an integrated supply chain model for supporting traceability of dairy products", *International journal of dairy technology*, Vol. 62 No. 1, pp. 126-138.

Manikas, I. and Terry, L.A. (2009), "A case study assessment of the operational performance of a multiple fresh produce distribution centre in the UK", *British Food Journal*, Vol. 111 No. 5, pp. 421-435.

Manning, L. (2013a), "A knowledge exchange and diffusion of innovation (KEDI) model for primary production", *British Food Journal*, Vol. 115 No. 4, pp. 614-631.

Manning, L. (2013b), "Corporate and consumer social responsibility in the food supply chain", *British Food Journal*, Vol. 115 No. 1, pp. 9-29.

Manning, L. and Soon, J.M. (2016), "Development of sustainability indicator scoring (SIS) for the food supply chain", British Food Journal, Vol. 118 No. 9, pp. 2097-2125.

Manning, L., Baines, R.N. and Chadd, S.A. (2006), "Quality assurance models in the food supply chain", *British Food Journal*, Vol. 108 No. 2, pp. 91-104.

Manos, B. and Manikas, I. (2010), "Traceability in the Greek fresh produce sector: drivers and constraints", *British food journal*, Vol. 112 No. 6, pp. 640-652.

Manzini, R., Accorsi, R., Ayyad, Z., Bendini, A., Bortolini, M., Gamberi, M., Valli, E. and Gallina Toschi, T. (2014), "Sustainability and quality in the food supply chain. A case study of shipment of edible oils", *British Food Journal* Vol. 116 No. 12 pp. 2069-2090.

Manzini, R., and Accorsi, R. (2013), "The new conceptual framework for food supply chain assessment", *Journal of Food Engineering*, Vol. 115 No. 2, pp. 251-263.

Martikainen, A., Niemi, P. and Pekkanen, P. (2014), "Developing a service offering for a logistical service provider—Case of local food supply chain", *International Journal of Production Economics*, Vol. 157, pp. 318-326. https://doi.org/10.1016/j.ijpe.2013.05.026

Martindale, W. (2014), "Using consumer surveys to determine food sustainability", *British Food Journal*, Vol. 116 No. 7, pp. 1194 – 1204.

Martindale, W. and Schiebel, W. (2017), "The impact of food preservation on food waste", *British Food Journal*, Vol. 119 No. 12, pp. 2510-2518.

Matopoulos, A., Barros, A.C. and Van der Vorst, J.G.A.J. (2015), "Resource-efficient supply chains: a research framework, literature review and research agenda", *Supply Chain Management: An International Journal*, Vol. 20 No. 2 pp. 218 - 236.

Matopoulos, A., Vlachopoulou, M. and Manthou, V. (2007), "Exploring the impact of e-business adoption on logistics processes: empirical evidence from the food industry", *International Journal of Logistics*, Vol. 10 No. 2, pp. 109-122.

Matopoulos, A., Vlachopoulou, M. and Manthou, V. (2009), "Understanding the factors affecting e-business adoption and impact on logistics processes." *Journal of Manufacturing Technology Management*, Vol. 20 No. 6 pp. 853-865.

Matopoulos, A., Vlachopoulou, M., Manthou, V. and Manos, B. (2007), "A conceptual framework for supply chain collaboration: empirical evidence from the agri-food industry", *Supply Chain Management: An International Journal*, Vol. 12 No. 3, pp. 177-186.

McCarthy, U., Uysal, I., Laniel, M., Corkery, G., Butler, F., McDonnell, K.P. and Ward, S. (2013), "Sustainable global food supply networks", *Sustainable Food Processing*, pp. 521-538.

McDonagh, P. and Commins, P. (1999), "Food chains, small-scale food enterprises and rural development: Illustrations from Ireland" *International Planning Studies*, Vol. 4 No. 3, pp. 349-371.

McKinnon, A.C., and Ge. Y. (2004), "Use of a synchronised vehicle audit to determine opportunities for improving transport efficiency in a supply chain", *International Journal of Logistics Research and Applications*, Vol. 7 No. 3 pp. 219-238.

McKinnon, A.C., and Ge. Y. (2006), "The potential for reducing empty running by trucks: a retrospective analysis", *International Journal of Physical Distribution & Logistics Management*, Vol. 36 No. 5, pp. 391-410.

Mellat-Parast, M. (2013), "Supply chain quality management, an inter-organizational learning perspective", *International Journal of Quality & Reliability Management*, Vol. 30 No. 5, pp. 511-529.

Menachof, D.A., Bourlakis, M.A. and Makios , T. (2009), "Order lead-time of grocery retailers in the UK and Greek markets", *Supply Chain Management: An International Journal,* Vol. 14 No. 5, pp. 349-358.

Menkhaus, D.J., Yakunina, A.V. and Herz, P.J. (2005), "Food retailing and supply chain linkages in the Russian Federation", *Journal of East-West Business,* Vol. 10 No. 3, pp. 53-73.

Mercier, S., Mondor, M., Villeneuve, S. and Marcos, B. (2018), "The Canadian food cold chain: A legislative, scientific, and prospective overview", *International Journal of Refrigeration,* Vol. 88.pp. 637-645. https://doi.org/10.1016/j.ijrefrig.2018.01.006

Mercier, S., Villeneuve, S., Mondor, M. and Uysal, I. (2017), "Time–temperature management along the food cold chain: A review of recent developments", *Comprehensive Reviews in Food Science and Food Safety,* Vol. 16 No. 4, pp. 647-667.

Mergenthaler, M., Weinberger, K. and Qaim, M. (2009), "Quality assurance programs and access to international markets: the case of horticultural processors in Vietnam", *Supply Chain Management: An International Journal,* Vol. 14 No. 5, pp. 359-368.

Mikkola, M. (2008), "Coordinative structures and development of food supply chains", *British Food Journal,* Vol. 110 No. 2, pp. 189-205.

Minegishi, S. and Thiel, D. (2000), "System dynamics modeling and simulation of a particular food supply chain", *Simulation Practice and Theory,* Vol. 8 No. 5, pp. 321-339.

Minten, B., Randrianarison, L. and Swinnen, J.F. (2009), "Global retail chains and poor farmers: evidence from Madagascar", *World Development,* Vol. 37 No. 11, pp. 1728-1741.

Mitra, S. & Datta, P. P. (2014), "Adoption of green supply chain management practices and their impact on performance: an exploratory study of Indian manufacturing firms", *International Journal of Production Research,* Vol. 52 No. 7, pp. 2085-2107.

Mohan, S., Gopalakrishnan, M. and Mizzi, P.J. (2013), "Improving the efficiency of a non-profit supply chain for the food insecure", *International Journal of Production Economics,* Vol. 143 No. 2, pp. 248-255.

Montanari, R. (2008), "Cold chain tracking: a managerial perspective", *Trends in Food Science & Technology*, Vol. 19 No. 8, pp. 425-431.

Morganti, E. and Gonzalez-Feliu, J. (2015), "City logistics for perishable products: the case of the Parma's Food Hub", *Case Studies on Transport Policy*, Vol. 3 No. 2, pp. 120-128.

Moustier, P., Tam, P.T.G., Anh, D.T. Binh, V.T. and Loc. N.T.T. (2010), "The role of farmer organizations in supplying supermarkets with quality food in Vietnam", *Food Policy*, Vol. 35 No. 1, pp. 69-78.

Mutonyi, S., Beukel, K. Gyau, A. and Hjortso, C.N. (2016), "Price satisfaction and producer loyalty: the role of mediators in business to business relationships in Kenyan mango supply chain", *British Food Journal*, Vol. 118 No. 5, pp. 1067 - 1084.

Myae, A.C. and Goddard, E. (2012), "Importance of traceability for sustainable production: a cross-country comparison", *International Journal of Consumer Studies*, Vol. 36 No. 2 pp. 192-202.

Myae, A.C., Goddard, E., and Aubeeluck, A. (2011), "The role of psychological determinants and demographic factors in consumer demand for farm-to-fork traceability systems", *Journal of Toxicology and Environmental Health, Part A*, Vol. 74 No. 22-24, pp. 1550-1574.

Nabhani, F. and Shokri, A. (2009), "Reducing the delivery lead time in a food distribution SME through the implementation of six sigma methodology", *Journal of manufacturing technology Management*, Vol. 20 No. 7, pp. 957-974.

Nakandala, D., Lau, H., and Zhang, J. (2016), "Cost-optimization modelling for fresh food quality and transportation", *Industrial Management & Data Systems*, Vol. 116 No. 3, pp. 564 - 583.

Nakandala, D., Samaranayake, P. Lau, H. and Ramanathan., K. (2017), "Modelling information flow and sharing matrix for fresh food supply chains", *Business Process Management Journal*, Vol. 23 No. 1, pp. 108-129.

Naik, G. and Suresh, D.N. (2018) “Challenges of creating sustainable agri-retail supply chains”, *IIMB Management Review*. https://doi.org/10.1016/j.iimb.2018.04.001

Narasimhan, R. and Kim, S.W. (2002), “Effect of supply chain integration on the relationship between diversification and performance: evidence from Japanese and Korean firms”, *Journal of Operations Management,* Vol. 20 No. 3, pp. 303-323.

Narrod, C., Roy, D., Okello, J., Avendano, B., Rich, K. and Thorat, A. (2009), “Public–private partnerships and collective action in high value fruit and vegetable supply chains”, *Food Policy* Vol. 34 No. 1, pp. 8-15.

Naspetti, S., and Zanoli, R. (2009), “Organic food quality and safety perception throughout Europe”, *Journal of Food Products Marketing,* Vol. 15 No. 3, pp. 249-266.

Naspetti, S., Lampkin, N. Nicolas, P. Stolze, M. and Zanoli, R. (2011), “Organic supply chain collaboration: a case study in eight EU Countries”, *Journal of Food Products Marketing,* Vol. 17 No. 2-3, pp. 141-162.

Nayha, A., and Horn, S. (2012), “Environmental sustainability-aspects and criteria in forest bio refineries”, *Sustainability Accounting, Management and Policy Journal,* Vol. 3 No. 2, pp. 161-185.

Neng Chiu, H. (1995), “The integrated logistics management system: a framework and case study”, *International Journal of Physical Distribution & Logistics Management,* Vol. 25 No. 6, pp. 4-22.

Ngai, E.W.T. and Cheng, T.C.E. (1997), “Identifying potential barriers to total quality management using principal component analysis and correspondence analysis”, *International Journal of Quality & Reliability Management,* Vol. 14 No. 4, pp.391-408.

Nganje, W., Miljkovic, D. and Ndembe, E. (2010), “Offsetting behavior and the benefits of food safety policies in vegetable preparation and consumption”, *Agribusiness,* Vol. 26 No. 4, pp. 557-572.

Nguyen, P.M., Goujon, A., Sauvegrain, P. and Vitrac, O. (2013), "A computer-aided methodology to design safe food packaging and related systems", *AIChE Journal,* Vol. 59 No. 4, pp. 1183-1212.

Nicolaas Bezuidenhout, C., Bodhanya, S. and Brenchley, L. (2012), "An analysis of collaboration in a sugarcane production and processing supply chain", *British Food Journal,* Vol. 114 No. 6, pp. 880-895.

Niemi, P. and Pekkanen, P. (2016), "Estimating the business potential for operators in a local food supply chain", British Food Journal, Vol. 118 No. 11, pp. 2815-2827.

Nunes, B., Bennett, D. and Junior, S.M. (2014), "Sustainable agricultural production: an investigation in Brazilian semi-arid livestock farms", *Journal of cleaner production,* Vol. 64, pp. 414-425. https://doi.org/10.1016/j.jclepro.2013.07.023

Nunnally, J.C., Bernstein, I.H. and Berge, J.M.T. (1967), Psychometric theory (Vol. 226). New York: McGraw-Hill.

Nyamah, E.Y., Jiang, Y., Feng, Y. and Enchill, E. (2017), "Agri-food supply chain performance: an empirical impact of risk", *Management Decision,* Vol. *55* No. 5, pp.872-891.

Oakland, J.S. (1993), Total Quality Management, The Route to Improving Performance, *Butterworth-Heinemann,* Oxford.

O'Donovan, I., Quinlan, T. and Barry, T. (2012), "From farm to fork: Direct supply chain relationships in the hospitality industry in the south east of Ireland", *British Food Journal,* Vol. 114 No. 4, pp. 500-515.

Olsen, P., and Aschan, M. (2010), "Reference method for analyzing material flow, information flow and information loss in food supply chains", *Trends in food science & technology*, Vol. 21 No. 6, pp. 313-320.

Ortmann, G.F., and King, R.P. (2007), "Agricultural cooperatives II: can they facilitate access of small-scale farmers in South Africa to input and product markets?", *Agrekon,* Vol. 46 No. 2, pp. 219-244.

Ostapenko, N.V. (2011), “The global burger war: Russians are looking for the best fast food option”, *Competitiveness Review: An International Business Journal,* Vol. 21 No. 4, pp. 397-406.

Owens, S.F. and Levary, R.R. (2002), “Evaluating the impact of electronic data interchange on the ingredient supply chain of a food processing company”, *Supply Chain Management: An International Journal,* Vol. 7 No. 4, pp. 200-211.

Paksoy, T., Pehlivan, N.Y. and Ozceylan, E. (2012), “Application of fuzzy optimization to a supply chain network design: a case study of an edible vegetable oils manufacturer”, *Applied Mathematical Modelling,* Vol. 36 No. 6, pp. 2762-2776.

Park, Y.S., Egilmez, G. and Kucukvar, M. (2016), “Emergy and end-point impact assessment of agricultural and food production in the United States: a supply chain-linked ecologically-based life cycle assessment”, *Ecological Indicators,* Vol. 62, pp. 117-137. https://doi.org/10.1016/j.ecolind.2015.11.045

Pazos Corella, V., Chalmeta Rosaleñ, R. and Martinez Simarro, D. (2013), “SCIF-IRIS framework: a framework to facilitate interoperability in supply chains” *International Journal of Computer Integrated Manufacturing* Vol. 26 No. (1-2), pp. 67-86.

Penker, M. and Wytrzens, H.K. (2005), “Scenarios for the Austrian food chain in 2020 and its landscape impacts”, *Landscape and Urban planning,* Vol. 71 No. 2, pp. 175-189.

Pérez Mesa, J.C. and Galdeano-Gómez, E. (2015), “Collaborative firms managing perishable products in a complex supply network: an empirical analysis of performance”, *Supply Chain Management: An International Journal,* Vol. 20 No. 2, pp. 128 - 138.

Perez, C., de Castro, R. and Font i Furnols, M. (2009), “The pork industry: a supply chain perspective”, *British Food Journal,* Vol. 111 No. 3, pp. 257-274.

Petit, C., Aubry, C. and Rémy-Hall, E. (2011), “Agriculture and proximity to roads: how should farmers and retailers adapt? Examples from the Ile-de-France region”, *Land Use Policy,* Vol. 28 No. 4, pp. 867-876.

PetterStrate, E. (2008), "Modes of qualities in development of speciality food", *British Food Journal*, Vol. 110 No. 1, pp. 62-75.

Pieter van Donk, D., Akkerman, R. and van der Vaart, T. (2008), "Opportunities and realities of supply chain integration: the case of food manufacturers", *British Food Journal*, Vol. 110 No.2, pp. 218-235.

Pigni, F., Ravarini, A. and Saglietto, L. (2010), "An explorative analysis of the effects of information and communication technologies and inter-organizational relationships on supply chain management systems", *Supply chain forum: an international journal*, Vol. 11 No. 4, pp. 36-48.

Pingali, P. (2007), "Westernization of Asian diets and the transformation of food systems: implications for research and policy", *Food Policy*, Vol. 32 No. 3, pp. 281-298.

Piramuthu, S., Farahani, P. and Grunow, M. (2013), "RFID-generated traceability for contaminated product recall in perishable food supply networks", *European Journal of Operational Research*, Vol. 225 No. 2, pp. 253-262.

Prado-Prado, J.C. (2009), "Continuous improvement in the supply chain", *Total Quality Management*, Vol. 20 No. 3, pp. 301-309.

Prakash, G. (2018), "Review of the food processing supply chain literature: a UK, India bilateral context", *Journal of Advances in Management Research*, Vol. 15 No. 4, pp. 457-479.

Prasanna, R.I.R. and Shiratake., Y. (2014), "Sustainability of Resources: Dairy Sector Dual Circulation System Under Market Liberalization—A Case Study of the Dairy Sector in the Kurunegala District, Sri Lanka", *Agroecology and Sustainable Food Systems*, Vol. 38 No. 1, pp. 109-133.

Pretty, J., Smith, G., Goulding, K.W.T., Groves, S.J., Henderson, I., Hine, R.E., King, V., Van Oostrum, J., Pendlington, D.J., Vis, J.K. and Walter, C. (2008), "Multi-year assessment of Unilever's progress towards agricultural sustainability II: outcomes for peas (UK), spinach (Germany, Italy), tomatoes (Australia, Brazil, Greece, USA), tea (Kenya, Tanzania, India) and oil palm (Ghana) ", *International Journal of Agricultural Sustainability*, Vol. 6 No. 1, pp. 63-88.

Puligundla, P., Jung, J. and Ko, S. (2012), "Carbon dioxide sensors for intelligent food packaging applications", *Food Control,* Vol. 25 No. 1, pp. 328-333.

Pullman, M.E. and Dillard, J. (2010), "Values based supply chain management and emergent organizational structures", *International Journal of Operations & Production Management,* Vol. 30 No. 7, pp. 744-771.

Qu, X.H., Zhuang, D.F. and Qiu, D.S. (2007), "Studies on GIS based tracing and traceability of safe crop product in China", *Agricultural Sciences in China,* Vol. 6 No. 6, pp. 724-731.

Raab, V., Petersen, B. and Kreyenschmidt, J. (2011), "Temperature monitoring in meat supply chains", *British Food Journal,* Vol. 113 No. 10, pp. 1267-1289.

Rademakers, M.F. and McKnight, P.J. (1998), "Concentration and inter-firm co-operation within the Dutch potato supply chain", *Supply Chain Management: An International Journal,* Vol. 3 No. 4, pp. 203-213.

Rajaguru, R. and Jekanyika Matanda, M. (2009), "Influence of inter-organisational integration on business performance: The mediating role of organisational-level supply chain functions", *Journal of Enterprise Information Management,* Vol. 22 No. 4, pp. 456-467.

Randrup, M., Wu, H. and Jorgensen, B.M. (2012), "On the track of fish batches in three distribution networks", *Food Control,* Vol. 26 No. 2, pp. 439-445.

Raspor, P. and Jevšnik, M. (2008), "Good nutritional practice from producer to consumer", *Critical reviews in food science and nutrition,* Vol. 48 No. 3, pp. 276-292.

Raut, R. and Gardas, B.B. (2018), "Sustainable logistics barriers of fruits and vegetables-an interpretive structural modeling approach", *Benchmarking: An International Journal*, Vol. 25 Iss.: 8, pp. 2589-2610

Raykov, T. and Widaman, K.F. (1995), "Issues in applied structural equation modeling research", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. *2* No. 4, pp. 289-318.

Reardon, T. and Timmer, C.P. (2014), "Five inter-linked transformations in the Asian agrifood economy: food security implications", *Global Food Security*, Vol. 3 No. 2, pp. 108-117.

Regattieri, A., Gamberi, M. and Manzini, R. (2007), "Traceability of food products: General framework and experimental evidence", *Journal of food engineering*, Vol. 81 No. 2, pp. 347-356.

Richter, B. and Bokelmann, W. (2016), "Approaches of the German food industry for addressing the issue of food losses", *Waste management*, Vol. 48, pp. 423-429. https://doi.org/10.1016/j.wasman.2015.11.039

Rimmington, M., Carlton Smith, J. and Hawkins, R. (2006), "Corporate social responsibility and sustainable food procurement", *British Food Journal* Vol. 108 No. 10, pp. 824-837.

Robinson, C. J. and Malhotra, M. K. (2005), "Defining the concept of supply chain quality management and its relevance to academic and industrial practice", *International Journal of Production Economics*, Vol. 96 No. 3, pp. 315-337.

Roggeveen, K. (2014), "Tomato journeys from farm to fruit shop", *Local Environment*, Vol. 19 No. 1, pp. 77-102.

Rong, A., Akkerman, R. and Grunow, M. (2011), "An optimization approach for managing fresh food quality throughout the supply chain" *International Journal of Production Economics*, Vol. 131 No. 1, pp. 421-429.

Ropkins, K. and Beck, A.J. (2003), "Using HACCP to control organic chemical hazards in food wholesale, distribution, storage and retail", *Trends in Food Science & Technology*, Vol. 14 No. 9, pp. 374-389.

Ross, D.F. (1998), Competing Through Supply Chain Management, Chapman & Hall, New York, NY.

Roth, A.V., Tsay, A.A. Pullman, M.E. and Gray, J.V. (2008), "Unraveling the food supply chain: strategic insights from China and the 2007 recalls", *Journal of Supply Chain Management*, Vol. 44 No. 1, pp. 22-39.

Routroy, S. and Behera, A. (2017), "Agriculture supply chain: A systematic review of literature and implications for future research", *Journal of Agribusiness in Developing and Emerging Economies*, Vol. 7 No. 3, pp. 275-302.

Rowley, J. and Slack, F. (2004), "Conducting a literature review", *Management Research News*, Vol. 27 No. 6, pp. 31-39.

Ruel, S., Evrard-Samuel, K., and Vignard, N. (2013), "Collaboration and information sharing in an internal supply chain during an innovation project", *Supply Chain Forum: An International Journal*, Vol. 14 No. 4, pp. 32-41

Rundh, B. (2005), "The multi-faceted dimension of packaging: marketing logistic or marketing tool?", *British food journal*, Vol. 107 No. 9, pp. 670-684.

Rundh, B. (2009), "Packaging design: creating competitive advantage with product packaging", *British Food Journal*, Vol. 111 No. 9, pp. 988-1002.

Rungtusanatham, M., Salvador, F., Forza, C. and Choi, T.Y. (2003), "Supply-chain linkages and operational performance: a resource-based-view perspective", *International Journal of Operations & Production Management*, Vol. 23 No. 9, pp. 1084-1099.

Ruparathna, R. and Hewage, K. (2015), "Sustainable procurement in the Canadian construction industry: current practices, drivers and opportunities", *Journal of Cleaner Production*, Vol. 109, pp.305-314. https://doi.org/10.1016/j.jclepro.2015.07.007

Ryan, C., (2012), Cross-Case Analysis–Introduction. In *Field Guide to Case Study Research in Tourism, Hospitality and Leisure*, Emerald Group Publishing Limited, pp. 497-499.

Sachan, A. and Datta, S. (2005), "Review of supply chain management and logistics research", *International Journal of Physical Distribution & Logistics Management*, Vol. 35 No. 9, pp. 664-705.

Sachan, A., Sahay, B.S. and Sharma, D. (2005), "Developing Indian grain supply chain cost model: a system dynamics approach", *International Journal of Productivity and Performance Management*, Vol. 54 No. 3, pp. 187-205.

Sage, C. (2003), "Social embeddedness and relations of regard:: alternative 'good food' networks in south-west Ireland", *Journal of rural studies,* Vol. 19 No. 1, pp. 47-60.

Sagheer, S., Yadav, S.S. and Deshmukh, S.G. (2009), "Developing a conceptual framework for assessing competitiveness of India's agrifood chain", *International Journal of Emerging Markets,* Vol. 4 No. 2, pp. 137-159.

Sahin, E., ZiedBabai, M., Dallery, Y. and Vaillant, R. (2007), "Ensuring supply chain safety through time temperature integrators", *The International Journal of Logistics Management,* Vol. 18 No. 1, pp. 102-124.

Salampasis, M., Tektonidis, D., and Kalogianni, E.P. (2012), "Trace ALL: a semantic web framework for food traceability systems", *Journal of Systems and Information Technology,* Vol. 14 No. 4, pp. 302-317.

Salin, V. (1998), "Information technology in agri-food supply chains", *The International Food and Agribusiness Management Review,* Vol. 1 No. 3, pp. 329-334.

Salin, V. and Nayga, R.M. Jr (2003), "A cold chain network for food exports to developing countries", *International Journal of Physical Distribution & Logistics Management,* Vol. 33 No. 10, pp. 918-933.

Samuel, D., and Hines, P. (1999), "Designing a supply chain change process: a food distribution case", *International Journal of Retail & Distribution Management,* Vol. 27 No. 10, pp. 409-420.

Sanchez Chiappe, I. and Angel Herrero, V. (1997), "The status of supply chain management in Argentina's food industry", *The International Journal of Logistics Management,* Vol. 8 No. 1, pp. 87-96.

Santa, J., Zamora-Izquierdo, M.A., Jara, A.J. and Gomez-Skarmeta, A.F. (2012), "Telematic platform for integral management of agricultural/perishable goods in terrestrial logistics", *Computers and electronics in agriculture,* Vol. 80, pp. 31-40.
https://doi.org/10.1016/j.compag.2011.10.010

Saraiva, A.B., Pacheco, E.B., Gomes, G.M., Visconte, L.L., Bernardo, C.A., Simões, C.L. and Soares, A.G. (2016), "Comparative lifecycle assessment of mango packaging made from a polyethylene/natural fiber-composite and from cardboard material", *Journal of cleaner production*, Vol. 139, pp.1168-1180. https://doi.org/10.1016/j.jclepro.2016.08.135

Sarkis, J., Gonzalez-Torre, P. and Adenso-Diaz, B. (2010), Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. Journal of Operations Management, Vol. 28 No. 2, pp. 163-176.

Sauer, J., Gorton, M. and White. J. (2012), "Marketing, cooperatives and price heterogeneity: evidence from the CIS dairy sector", *Agricultural Economics*, Vol. 43 No. 2, pp. 165-177.

Saxena, K.B.C. and Sahay, B.S. (2000), "Managing IT for world-class manufacturing: the Indian scenario", *International Journal of Information Management*, Vol. 20 No. 1, pp.29-57.

Schaltegger, S. and Burritt, R. (2014), "Measuring and managing sustainability performance of supply chains: Review and sustainability supply chain management framework", *Supply Chain Management: An International Journal*, Vol. 19 No. 3, pp. 232-241.

Schaltegger, S., and Wagner, M. (2011), "Sustainable entrepreneurship and sustainability innovation: Categories and interactions", *Business Strategy and the Environment,* Vol. 20 No. 4, pp. 222-237.

Schneider, K., and Hoffmann, I. (2011), "Nutrition ecology—a concept for systemic nutrition research and integrative problem solving", *Ecology of food and nutrition,* Vol. 50 No. 1, pp. 1-17.

Schoenherr, T., Narasimhan, R. and Bandyopadhyay, P. (2015), "The assurance of food safety in supply chains via relational networking: A social network perspective", *International Journal of Operations & Production Management,* Vol. 35 No. 12, pp. 1662 - 1687.

Sgarbossa, F. and Russo, I. (2017). "A proactive model in sustainable food supply chain: Insight from a case study", *International Journal of Production Economics*, Vol. 183, Part B, pp. 596-606. https://doi.org/10.1016/j.ijpe.2016.07.022

Shah, R. and Goldstein, S. M. (2006), Use of structural equation modelling in operations management research: Looking back and forward. Journal of Operations Management, Vol. 24 No. 2, pp. 148-169.

Sharif, A.M. and Irani, Z. (2016), "People, process and policy perspectives on food security: An exploration using systems archetypes", *Transforming Government: People, Process and Policy*, Vol. 10 No. 3, pp.359-367.

Shaw, S., Grant, D.B. and Mangan J. (2010), "Developing environmental supply chain performance measures", *Benchmarking: An International Journal,* Vol. 17 No. 3 pp. 320-339.

Shaw, S.A. and Gibbs, J. (1995), "Retailer-supplier relationships and the evolution of marketing: two food industry case studies", *International Journal of Retail & Distribution Management*, Vol. 23 No. 7, pp. 7-16.

Shaw, S.A. and Gibbs, J. (1999), "Procurement strategies of small retailers faced with uncertainty: an analysis of channel choice and behavior", *The International Review of Retail, Distribution and Consumer Research,* Vol. 9 No. 1, pp. 93-109.

Shen, D., Lai, K.K., Leung, S.C. and Liang, L. (2011), "Modelling and analysis of inventory replenishment for perishable agricultural products with buyer–seller collaboration", *International Journal of Systems Science,* Vol. 42 No. 7, pp. 1207-1217.

Shin, H., Collier, D.A. and Wilson, D.D. (2000), "Supply management orientation and supplier/buyer performance", *Journal of Operations Management*, Vol. 18 No. 3, pp. 317-333.

Shokri, A., Nabhani, F., and Hodgson, S. (2010), "Supplier development practice: Arising the problems of upstream delivery for a food distribution SME in the UK", *Robotics and Computer-Integrated Manufacturing,* Vol. 26 No. 6, pp. 639-646.

Shu, G., Ren, T.Z. and Wang, M.H. (2007), "Technology and infrastructure considerations for e-commerce in Chinese agriculture", *Agricultural Sciences in China,* Vol. 6 No. 1, pp. 1-10.

Shukla, M. and Jharkharia, S. (2013), "Agri-fresh produce supply chain management: a state-of-the-art literature review", *International Journal of Operations & Production Management*, Vol. 33 No. 2, pp.114-158.

Siddh, M.M., Soni, G. and Jain, R. (2015), "Perishable food supply chain quality (PFSCQ) a structured review and implications for future research", *Journal of Advances in Management Research*, Vol. 12 No. 3, pp. 292-313.

Siddh, M.M., Soni, G. Gadekar, G. and Jain, R. (2014), "Integrating lean six sigma and supply chain approach for quality and business performance", *Business and Information Management (ICBIM), 2014 2nd International Conference on* (pp. 53-57). IEEE.

Siddh, M.M., Soni, G., Jain, R., Sharma, M.K. and Yadav, V. (2017), "Agri-fresh food supply chain quality (AFSCQ): a literature review", *Industrial Management & Data Systems*, Vol. 117 No. 9, pp. 2015-2044.

Sigala, M. (2007), "RFID applications for integrating and informationalizing the supply chain of foodservice operators: perspectives from Greek operators", *Journal of Foodservice Business Research*, Vol. 10 No. 1, pp. 7-29.

Sila, I., Ebrahimpour, M. and Birkholz. C. (2006), "Quality in supply chains: an empirical analysis", *Supply Chain Management: An International Journal*, Vol. 11 No. 6, pp. 491-502.

Singh, P.J. (2008), "Empirical assessment of ISO 9000 related management practices and performance relationships", *International Journal of Production Economics*, Vol. 113 No. 1, pp. 40-59.

Sitkin, S.M., Sutcliffe, K.M. and Schroeder, R.G. (1994), "Distinguishing control from learning in total quality management: a contingency perspective", *Academy of Management Review*, Vol. 19 No. 3, pp. 537-564.

Sivakumar, D. and Wall, M.M. (2013), "Papaya fruit quality management during the postharvest supply chain", *Food Reviews International*, Vol. 29 No. 1, pp. 24-48.

Smith, T.D. and McMillan, B.F. (2001), A Primer of Model Fit Indices in Structural Equation Modeling.

Sohal, A.S. and Perry, M. (2006), "Major business-environment influences on the cereal products industry supply chain: an Australian study", *International Journal of Physical Distribution & Logistics Management*, Vol. 36 No. 1, pp. 36-50.

Soler, C., Bergstrom, K. and Shanahan, H. (2010), "Green supply chains and the missing link between environmental information and practice", *Business Strategy and the Environment*, Vol. 19 No. 1, pp. 14-25.

Soni, G. and Kodali, R. (2011), "A critical analysis of supply chain management content in empirical research", *Business Process Management Journal*, Vol. 17 No. 2, pp. 238-266.

Soni, G. and Kodali, R. (2012), "A critical review of empirical research methodology in supply chain management", *Journal of Manufacturing Technology Management*, Vol. 23 No. 6, pp. 753-779.

Sonneveld, K. (2000), "What drives (food) packaging innovation?", *Packaging Technology and Science*, Vol. 13 No. 1, pp. 29-35.

Soto-Silva, W.E., Nadal-Roig, E., González-Araya, M.C. and Pla-Aragones, L.M. (2016), "Operational research models applied to the fresh fruit supply chain", *European Journal of Operational Research*, Vol. 251 No. 2, pp. 345-355.

Soucie, W.G. (1997), "Efficient consumer response meets the industrialization of agriculture", *Agribusiness (1986-1998)*, Vol. 13 No. 3, pp. 349-355.

Soussana, J. F. (2014), "Research priorities for sustainable agri-food systems and life cycle assessment", *Journal of Cleaner Production,* Vol. 73, pp. 19-23. https://doi.org/10.1016/j.jclepro.2014.02.061

Spence, L., and Bourlakis, M. (2009), "The evolution from corporate social responsibility to supply chain responsibility: the case of Waitrose" *Supply Chain Management: An International Journal*, Vol. 14 No. 4, pp. 291-302.

Sporleder, T.L. and Goldsmith, P.D. (2001), "Alternative firm strategies for signaling quality in the food system", *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, Vol. 49 No. 4, pp. 591-604.

Srimanee, Y. and Routray, J.K. (2012), "The fruit and vegetable marketing chains in Thailand: policy impacts and implications", *International Journal of Retail & Distribution Management*, Vol. 40 No. 9, pp. 656-675.

Stanton, J.V. and Burkink, T.J. (2008), "Improving small farmer participation in export marketing channels: perceptions of US fresh produce importers," *Supply Chain Management: An International Journal,* Vol. 13 No. 3, pp. 199-210.

Stiller, S., and Gold, S. (2014), "Socially Sustainable Supply Chain Management Practices in the Indian Seed Sector: A Case Study", *Supply Chain Forum: An International Journal,* Vol. 15 No. 1 pp. 52-67.

Storoy, J., Thakur, M. and Olsen, P. (2013), "The TraceFood Framework–Principles and guidelines for implementing traceability in food value chains," *Journal of food engineering,* Vol. 115 No. 1, pp. 41-48.

Stringer, M.F. and Hall, M.N. (2007), "A generic model of the integrated food supply chain to aid the investigation of food safety breakdowns", *Food Control,* Vol. 18 No. 7, pp. 755-765.

Stringer, R., Sang, N. and Croppenstedt, A. (2009), "Producers, processors, and procurement decisions: the case of vegetable supply chains in China", *World Development,* Vol. 37 No. 11, pp. 1773-1780.

Sun, F., Yun, D.A.I. and Yu, X. (2017), "Air pollution, food production and food security: A review from the perspective of food system", *Journal of integrative agriculture*, Vol. 16 No. 12, pp. 2945-2962.

Suryaningrat, I.B. (2016), "Raw Material Procurement on Agroindustrial Supply Chain Management: A Case Survey of Fruit Processing Industries in Indonesia", *Agriculture and Agricultural Science Procedia,* Vol. 9, pp. 253-257. https://doi.org/10.1016/j.aaspro.2016.02.143

Tajbakhsh, A. and Hassini, E. (2015), "Performance measurement of sustainable supply chains: a review and research questions", *International Journal of Productivity and Performance Management,* Vol. 64 No. 6, pp. 744-783.

Tang, N.K., Yasa, P.R. and Forrester, P.L. (2004), "An application of the Delta Model and BPR in transforming electronic business–the case of a food ingredients company in UK", *Information Systems Journal,* Vol. 14 No. 2, pp. 111-130.

Tanik, M. (2010), "Improving 'order handling' process by using QFD and FMEA methodologies: a case study", *International Journal of Quality & Reliability Management,* Vol. 27 No. 4, pp. 404-423.

Tassabehji, R., Taylor,W.A., Beach, R. and Wood. A. (2006), "Reverse e-auctions and supplier buyer relationships: an exploratory study", *International Journal of Operations & Production Management,* Vol. 26 No. 2, pp. 166-184.

Taylor, A.W., Coveney, J., Ward, P.R., Dal Grande, E., Mamerow, L., Henderson, J. and Meyer S.B. (2012), "The Australian Food and Trust Survey: Demographic indicators associated with food safety and quality concerns", *Food Control,* Vol. 25 No. 2, pp. 476-483.

Taylor, D.H. (1994), "Problems of food supply logistics in Russia and the CIS", *International Journal of Physical Distribution & Logistics Management,* Vol. 24 No. 2, pp. 15-22.

Taylor, D.H. (2006), "Demand management in agri-food supply chains: an analysis of the characteristics and problems and a framework for improvement", *The International Journal of Logistics Management,* Vol. 17 No. 2, pp. 163-186.

Thakur, M. and Donnelly, K.A.M. (2010), "Modeling traceability information in soybean value chains", *Journal of Food Engineering,* Vol. 99 No. 1, pp. 98-105.

Thakur, M., Martens, B.J. and Hurburgh, C.R. (2011a), "Data modeling to facilitate internal traceability at a grain elevator", *Computers and Electronics in Agriculture,* Vol. 75 No. 2, pp. 327-336.

Thakur, M., Sorensen, C.F., Bjornson, F.O., Foras, E. and Hurburgh, C.R. (2011), "Managing food traceability information using EPCIS framework", *Journal of Food Engineering,* Vol. 103 No. 4, pp. 417-433.

Thomas-Francois, K., Von Massow, M. and Joppe, M. (2017), "Strengthening farmers–hotel supply chain relationships: A service management approach", *Tourism Planning & Development*, Vol. 14 No. 2, pp. 198-219.

Thomopoulos, R., Croitoru, M. and Tamani, N. (2015), "Decision support for agri-food chains: a reverse engineering argumentation-based approach", *Ecological Informatics,* Vol. 26, Part 2, pp. 182-191.

Thron, T., Nagy, G. and Wassan, N. (2006), "The impact of various levels of collaborative engagement on global and individual supply chain performance", *International Journal of Physical Distribution & Logistics Management,* Vol. 36, No. 8, pp. 596-620.

Toften, K., and Hammervoll, T. (2010), "Niche importers and the role of commitment in supply chains: An exploratory study", *Supply Chain Forum: An International Journal*, Vol. 11 No. 2, pp. 18-29.

Trienekens, J., van Uffelen, R., Debaire, J. and Omta, O. (2008), "Assessment of innovation and performance in the fruit chain: the innovation-performance matrix", *British Food Journal*, Vol. 110 No. 1, pp. 98-127.

Trienekens, J.H., Wognum, P.M., Beulens, A.J. and van der Vorst, J.G. (2012), "Transparency in complex dynamic food supply chains", *Advanced Engineering Informatics* Vol. 26 No. 1, pp. 55-65.

Tsolakis, N.K., Keramydas, C.A., Toka, A.K., Aidonis, D.A. and Iakovou, E.T. (2014), "Agrifood supply chain management: a comprehensive hierarchical decision-making framework and a critical taxonomy", *Biosystems Engineering,* Vol. 120, pp. 47-64. https://doi.org/10.1016/j.biosystemseng.2013.10.014

Tuominen, T., Kitaygorodskaya, N. and Helo, P. (2009), "Benchmarking Russian and Finnish food industry supply chains", *Benchmarking: An International Journal,* Vol. 16 No. 3, pp. 415-431.

Uddin, N. (2017), "Inter-organizational relational mechanism on firm performance: The case of Australian agri-food industry supply chain", *Industrial Management & Data Systems*, Vol. *117* No. 9, pp. 1934-1953.

Ulwick, A.W. (2005), "*What customers want: Using outcome-driven innovation to create breakthrough products and services*," McGraw-Hill Companies.

V. Kher, S., J. Frewer, L., De Jonge, J., Wentholt, M., Howell Davies, O., B. Lucas Luijckx, N. and J. Cnossen. H. (2010), "Experts' perspectives on the implementation of traceability in Europe", *British Food Journal,* Vol. 112, No. 3, pp. 261-274.

Vakoufaris, H. (2010), "The impact of LadotyriMytilinis PDO cheese on the rural development of Lesvos island, Greece", *Local Environment,* Vol. 15 No. 1, pp. 27-41.

Van Asselt, E.D., Van Bussel, L.G.J., Van der Voet, H., Van der Heijden, G.W.A.M., Tromp, S.O., Rijgersberg, H., Van Evert, F., Van Wagenberg, C.P.A. and Van der Fels-Klerx, H.J. (2014), "A protocol for evaluating the sustainability of agri-food production systems—A case study on potato production in peri-urban agriculture in The Netherlands", *Ecological Indicators* Vol. 43, pp. 315-321. https://doi.org/10.1016/j.ecolind.2014.02.027

Van Boxstael, S., Habib, I., Jacxsens, L., De Vocht, M., Baert, L., Van de Perre, E., Rajkovic, A., Lopez-Galvez, F., Sampers, I., Spanoghe, P. and De Meulenaer, B. (2013), "Food safety issues in fresh produce: bacterial pathogens, viruses and pesticide residues indicated as major concerns by stakeholders in the fresh produce chain", *Food Control,* Vol. 32 No. 1, pp. 190-197.

van der Ploeg, J.D. and Frouws, J. (1999), "On power and weakness, capacity and impotence:rigidity and flexibility in food chains", *International planning studies,* Vol. 4 No. 3, pp. 333-347.

Van Der Vorst, J.G. and Beulens, A.J. (1999), "A research model for the redesign of food supply chains", *International Journal of Logistics: Research and Applications,* Vol. 2 No. 2, pp. 161-174.

Van der Vorst, J.G., and Beulens, A.J. (2002), "Identifying sources of uncertainty to generate supply chain redesign strategies", *International Journal of Physical Distribution & Logistics Management,* Vol. 32 No. 6, pp. 409-430.

van der Vorst, J.G., Beulens, A.J., De Wit, W. and van Beek, P. (1998), "Supply chain management in food chains: Improving performance by reducing uncertainty". *International Transactions in Operational Research,* Vol. 5 No. 6, pp. 487-499.

Van Der Vorst, J.G., Tromp, S.O. and Zee, D.J.V.D. (2009), "Simulation modelling for food supply chain redesign; integrated decision making on product quality, sustainability and logistics." *International Journal of Production Research* Vol. 47 No. 23, pp. 6611-6631.

Van der Vorst, J.G., van Dijk, S.J. and Beulens, A.J. (2001), "Supply chain design in the food industry" *The International Journal of Logistics Management,* Vol. 12 No. 2, pp. 73-86.

Van der Vorst, J.G., Van Dongen, S., Nouguier, S. and Hilhorst, R. (2002), "E-business initiatives in food supply chains; definition and typology of electronic business models", *International Journal of Logistics,* Vol. 5 No. 2, pp. 119-138.

Van Hoek, R. (1997), "Postponed manufacturing: a case study in the food supply chain", *Supply Chain Management: An International Journal,* Vol. 2 No. 2, pp. 63-75.

Van Hoi, P., Mol, A.P. and Oosterveer, P.J. (2009), "Market governance for safe food in developing countries: the case of low-pesticide vegetables in Vietnam", *Journal of Environmental Management,* Vol. 91 No. 2, pp. 380-388.

vanVeen-Dirks, P.M., and Verdaasdonk P.J. (2009), "The dynamic relation between management control and governance structure in a supply chain context", *Supply Chain Management: An International Journal,* Vol. 14 No. 6, pp. 466-478.

Vasileiou, K. and Morris, J. (2006), "The sustainability of the supply chain for fresh potatoes in Britain", *Supply Chain Management: An International Journal*, Vol. 1 No. 4, pp. 317-327.

Vega, H. 2008. "Air cargo, trade and transportation costs of perishables and exotics from South America", *Journal of Air Transport Management,* Vol. 14 No. 6, pp. 324-328.

Velicer, W.F. and Fava, J.L. (1998), "Affects of variable and subject sampling on factor pattern recovery", *Psychological methods,* Vol. 3, No. 2, pp. 231-251.

Venkatraman, N. (1989), "The concept of fit in strategy research: Toward verbal and statistical correspondence", *Academy of management review*, Vol. 14 No. 3, pp.423-444.

Vermeulen, H., Kirsten, J. and Sartorius, K. (2008), "Contracting arrangements in agribusiness procurement practices in South Africa", *Agrekon,* Vol. 47 No. 2, pp. 198-221.

Virtanen, Y., Kurppa, S., Saarinen, M., Katajajuuri, J.M., Usva, K., Mäenpää, I., Mäkelä, J., Grönroos, J. and Nissinen, A. (2011), "Carbon footprint of food–approaches from national input–output statistics and a LCA of a food portion." *Journal of Cleaner Production* Vol. 19 No. 16, pp. 1849-1856.

Vivaldini, M. and Pires, S.R. (2013), "Applying a business cell approach to fourth-party logistics freight management in the food service industry", *International Journal of Logistics Research and Applications,* Vol. 16 No. 4, pp. 296-310.

Vlachos, I.P. 2004. "Adoption of electronic data interchange by agribusiness organizations", *Journal of International Food & Agribusiness Marketing,* Vol. 16 No. 1, pp. 19-42.

Vlachos, I.P. and Bourlakis, M. (2006), "Supply chain collaboration between retailers and manufacturers: do they trust each other?.", *Supply Chain Forum: An International Journal,* Vol. *7* No. 1, pp. 70-80.

Voldrich, S., Wieser, P. and Zufferey, N. (2017), "Competitive and timely food supply combined with operational risk", *Supply Chain Forum: An International Journal,* Vol. 18 No. 1, pp. 2-6.

Vorst, J.G.A.J., Beulens, A.J., Wit, W.D. and Beek, P.V. (1998), "Supply chain management in food chains: improving performance by reducing uncertainty", *International Transactions in Operational Research*, Vol. 5 No. 6, pp. 487-499.

Voss, C., Tsikriktsis, N., & Frohlich, M. (2002), Case research in operations management. International journal of operations & production management, Vol. 22 No. 2, pp. 195-219.

Wales, C., Harvey, M. and Warde, A. (2006), "Recuperating from BSE: The shifting UK institutional basis for trust in food", *Appetite* Vol. 47 No. 2, pp. 187-195.

Wang, C.L. and Ahmed, P.K. (2004). "The development and validation of the organizational innovativeness construct using confirmatory factor analysis", *European journal of innovation management*, Vol. *7* No. 4, pp. 303-313.

Wang, S., Liu, X., Yang, M., Zhang, Y., Xiang, K. and Tang, R. (2015), "Review of time temperature indicators as quality monitors in food packaging", *Packaging Technology and Science*, Vol. 28 No. 10, pp. 839-867.

Wang, X. and Li, D. (2012), "A dynamic product quality evaluation based pricing model for perishable food supply chains", *Omega*, Vol. 40 No. 6, pp. 906-917.

Wang, X., Li, D. and O'brien, C. (2009), "Optimisation of traceability and operations planning: an integrated model for perishable food production", *International Journal of Production Research*, Vol. 47 No. 11, pp. 2865-2886.

Whipple, J.M., Voss, M.D. and Closs, D.J. (2009), "Supply chain security practices in the food industry: Do firms operating globally and domestically differ?", *International Journal of Physical Distribution & Logistics Management*, Vol. 39 No. 7, pp. 574-594.

White III, C.C. and Cheong, T. (2012), "In-transit perishable product inspection", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 48 No. 1, pp. 310-330.

Wiese, A. and Toporowski, W. (2013), "CSR failures in food supply chains-an agency perspective", *British Food Journal*, Vol. 115 No. 1, pp. 92-107.

Wilkinson, J. (2015), "Food security and the global agrifood system: Ethical issues in historical and sociological perspective", *Global Food Security,* Vol. 7, pp. 9-14. https://doi.org/10.1016/j.gfs.2015.12.001

Wilson, N. (1996), "Supply chain management: a case study of a dedicated supply chain for bananas in the UK grocery market", *Supply Chain Management: An International Journal*, Vol. 1 No. 2, pp. 28-35.

Wilson, N. (1996), "The supply chains of perishable products in northern Europe", *British Food Journal*, Vol. 98 No. 6 pp. 9-15.

Wilson, T.P. and Clarke, W.R. (1998), "Food safety and traceability in the agricultural supply chain: using the Internet to deliver traceability", *Supply Chain Management: An International Journal* 3 (3): 127-133.

Winter, M. and Knemeyer, A.M. (2013), "Exploring the integration of sustainability and supply chain management: Current state and opportunities for future inquiry", *International Journal of Physical Distribution & Logistics Management*, Vol. *43* No. 1, pp.18-38.

Wiskerke, J.S. (2009), "On places lost and places regained: Reflections on the alternative food geography and sustainable regional development", *International planning studies,* Vol. 14 No. 4, pp. 369-387.

Wognum, P.N., Bremmers, H., Trienekens, J.H., van der Vorst, J.G. and Bloemhof, J.M. (2011), "Systems for sustainability and transparency of food supply chains–Current status and challenges", *Advanced Engineering Informatics,* Vol. 25 No. 1, pp. 65-76.

Wu, X., Wu, H., Xia, L., Ji, K., Liu, Z., Chen, J., Hu, D., Gao, C. and Wu, Y. (2010), "Socio-technical innovations for total food chain safety during the 2008 Beijing Olympics and Paralympics and beyond", *Trends in food science & technology*, Vol. 21 No. 1, pp. 44-51.

Yadav, V. and Sharma, M.K. (2015a), "An application of hybrid data envelopment analytical hierarchy process approach for supplier selection", *Journal of Enterprise Information Management*, Vol. 28 No. 2, pp. 218-242.

Yadav, V. and Sharma, M.K. (2015b), "Application of alternative multi-criteria decision making approaches to supplier selection process", in Kahraman, C. and Çevik Onar, S. (Eds), Intelligent Techniques in Engineering Management, Theory and Application, Intelligent Systems Reference Library, Vol. 87, Springer, Cham, available at: https://doi.org/10.1007/978-3-319-17906-3_27

Yakovleva, N. (2007), "Measuring the sustainability of the food supply chain: a case study of the UK", *Journal of Environmental Policy & Planning*, Vol. 9 No. 1, pp. 75-100.

Yakovleva, N., and Flynn, A. (2004), "Innovation and sustainability in the food system: A case of chicken production and consumption in the UK", *Journal of Environmental Policy & Planning*, Vol. 6 No. (3-4), pp. 227-250.

Yakovleva, N., Sarkis, J. and Sloan, T. (2012), "Sustainable benchmarking of supply chains: the case of the food industry", *International Journal of Production Research*, Vol. 50 No. 5, pp. 1297-1317.

Yan, B., Wu, J. and Wang, F. (2018), "CVaR-based risk assessment and control of the agricultural supply chain", *Management Decision*. https://doi.org/10.1108/MD-11-2016-0808

Yanes-Estévez, V., Ramón Oreja-Rodríguez, J. and García-Pérez, A.M., (2010), "Perceived environmental uncertainty in the agrifood supply chain." *British Food Journal*, 112 No. 7, 688-709.

Yee, W.M., Yeung, R.M. and Morris, J. (2005), "Food safety: building consumer trust in livestock farmers for potential purchase behavior", *British Food Journal*, Vol. 107 No. 11, pp. 841-854.

Yin, R. K. (2003). Case study research: design and method, 3 rd ed., sage publication, London.

Yu, M., and Nagurney, A. (2013), "Competitive food supply chain networks with application to fresh produce", *European Journal of Operational Research*, Vol. 224 No. 2, pp. 273-282.

Yu, W., Chavez, R., Feng, M. and Wiengarten, F. (2014), "Integrated green supply chain management and operational performance." *Supply Chain Management: An International Journal*, Vol. 19 No. (5/6), pp. 683-696.

Yu, Y., Wang, X., Zhong, R.Y. and Huang, G.Q. (2016), "E-commerce logistics in supply chain management: practice perspective", *Procedia CIRP*, Vol. 52, pp. 179-185.

Zach, L., Doyle, M.E., Bier, V. and Czuprynski, C. (2012), "Systems and governance in food import safety: A US perspective." *Food Control, Vol.* 27 No. 1, pp. 153-162.

Zanoni, S. and Zavanella, L. (2012), "Chilled or frozen? Decision strategies for sustainable food supply chains", *International Journal of Production Economics*, Vol. 140 No. 2, pp. 731-736.

Zeng, J., Phan, C.A. and Matsui, Y. (2013), "Supply chain quality management practices and performance: An empirical study", Operations management research, Vol. 6 No. 1-2, pp. 19-31.

Zhang, B., Lin, J. and Liu, R. (2016), "Factors affecting the food firm's intention to control quality safety in China: The moderating effect of government regulation", Chinese Management Studies, Vol. 10 No. 2, pp. 256-271.

Zhang, K., Chai, Y., Yang, S.X. and Weng, D. (2011), "Pre-warning analysis and application in traceability systems for food production supply chains" , *Expert Systems with Applications*, Vol. 38 No. 3, pp. 2500-2507.

Zhang, L., Wang, S., Li, F., Wang, H., Wang, L. and Tan, W. (2011), "A few measures for ensuring supply chain quality", *International Journal of Production Research*, Vol. 49 No. 1, pp. 87-97.

Zhang, M. and Li, P. (2012), "RFID application strategy in agri-food supply chain based on safety and benefit analysis", *Physics Procedia*, Vol. 25, pp. 636-642. https://doi.org/10.1016/j.phpro.2012.03.137

Zhang, Q.F. and Pan, Z. (2013), "The transformation of urban vegetable retail in China: wet markets, supermarkets and informal markets in Shanghai", *Journal of Contemporary Asia*, Vol. 43 No. 3, pp. 497-518.

Zhang, X. and Aramyan, L.H. (2009), "A conceptual framework for supply chain governance: An application to agri-food chains in China", *China Agricultural Economic Review*, Vol. 1 No. 2, pp. 136-154.

Zhao, X., Li, Y. and Flynn, B.B. (2013), "The financial impact of product recall announcements in China", *International Journal of Production Economics*, Vol. 142 No. 1, pp. 115-123.

Zhong, B., Yang, F. and Chen, Y.L., (2015), "Information empowers vegetable supply chain: A study of information needs and sharing strategies among farmers and vendors", *Computers and Electronics in Agriculture*, Vol. 117, pp. 81-90. https://doi.org/10.1016/j.compag.2015.07.009

Zhong, R., Xu, X. and Wang, L. (2017), "Food supply chain management: systems, implementations, and future research", *Industrial Management & Data Systems*, Vol. 117 No. 9, pp. 2085-2114.

Zhong, R.Y., Li, Z., Pang, L.Y., Pan, Y., Qu, T. and Huang, G.Q. (2013), "RFID-enabled real-time advanced planning and scheduling shell for production decision making", *International Journal of Computer Integrated Manufacturing*, Vol. 26 No. 7, pp. 649-662.

Zhong, R.Y., Newman, S.T., Huang, G.Q. and Lan, S. (2016), "Big data for supply chain management in the service and manufacturing sectors: challenges, opportunities, and future perspectives", *Computers & Industrial Engineering*, Vol. 101, pp. 572-591.

Zhou, J.H., Kai, L.I. and Liang, Q. (2015), "Food safety controls in different governance structures in China's vegetable and fruit industry", *Journal of Integrative Agriculture*, Vol. 14 No. 11, pp. 2189-2202.

Zhou, L., Zhou, G., Qi, F. and Li, H. (2018), "Research on coordination mechanism for fresh agri-food supply chain with option contracts", *Kybernetes*. https://doi.org/10.1108/K-08-2017-0291

Ziggers, G.W., and Trienekens, J. (1999), "Quality assurance in food and agribusiness supply chains: Developing successful partnerships", *International Journal of Production Economics*, Vol. 60, pp. 271-279. https://doi.org/10.1016/S0925-5273(98)00138-8

Annexure – I: Survey questionnaire

Malaviya National Institute of Technology, Jaipur
(An Institute of National Importance under MHRD, Govt. of India)
J.L.N. Marg Jaipur (India) -302017

Dear Sir,

Wish You Warm Season's Greetings

Academic researchers / consultants / organizations have proposed various practices for managing Agri-fresh Food Supply Chain Quality (AFSCQ), which are available in literature. Agri-fresh Food Supply Chain Quality (AFSCQ) is defined as a set of quality practices among supply chain partners establish to achieve Organizational Sustainability (OS). The practices for the same were identified from extant literature.

We at Malaviya National Institute of Technology, Jaipur, are conducting a survey on Agri-fresh Food Supply Chain Quality (AFSCQ). The objective of this survey is to find out importance of various AFSCQ practices such as supplier management, customer focus, internal management and supporting practices also to achieve organizational sustainability.

We have developed a survey questionnaire based on extant literature, feedback from leading practitioners and academicians. We are requesting you to fill-in the enclosed questionnaire. The responses would be kept confidential and used only for academic purpose. It is requested that the questions be filled at your earliest convenience and send back to the undersigned. We will be happy to send you the findings of this survey.

We are aware that you have a busy schedule of work but hope that you would be able to spare some time to help us in the fulfillment of this task. Kindly spare your valuable time despite of your busy schedule.

Thanking you in advance

With regards

Sincerely Yours

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Survey on Agri-fresh Food Supply Chain Quality (AFSCQ)
Department of Mechanical Engineering, MNIT Jaipur

Survey on Agri-fresh Food Supply Chain Quality (AFSCQ), Department of Mechanical Engineering, MNIT Jaipur

Part A (General information)

1. Name (Optional): .....

2. Email-id (optional): .....

3. Organization: .....

4. Designation (Optional): .....

5. Region of India (Please tick mark): East ……West…….North……..South……

6. Please indicate your total work experience (in years):

   i. <five years……..

   ii. 5-10 years……..

   iii. > ten years……

7. Please indicate what types of product are hundled in your esteemed organization:

   i. Manufactured (processed) ……..

   ii. Conserved (frozen)…….

   iii. Local (fresh)……..

8. Please indicate the number of employees at your organization (Permanent + temporary)

   i. 100 or less……

   ii. 101 to 500……

   iii. 501 to 1000….....

   iv. 1001 to 3000……

   v. More than3000…….

9. Please indicate the approximate trend of profits during the past 3-years:

i. Increase up to 10% per year ……

ii. Increase more than 10% per year……

iii. Almost constant…….

iv. Decrease up to 10 % per year……

v. Can't say…….

10. Please indicate your area of work in the organization –

.....

11. Does your organization put emphasis on Agri-fresh Food Supply Chain Quality (AFSCQ) practices and organizational sustainability?

i. Yes …… ii. No. ……..

12. Does Agri-fresh Food Supply Chain Quality (AFSCQ) practices contribute toward organizational sustainability? (In your outlook)

i. Yes …….. ii. No……..

Part B

Please indicate the level of importance of AFSCQ practices and dimensions of organizational sustainability.

The level of importance is based on:

1: Unimportant 2: Ordinary importance 3: Important

4: Especially important 5: Absolutely essential

Top management leadership and commitment to AFSCQ

Kindly response the following variable	1	2	3	4	5
Commitment to customer satisfaction					
Commitment to supplier relationship					
Effective adoption and execution of innovations, with new programs, technologies, and activities for improvement of processing and logistics conditions					
Human resource management					
Any other (please mention & rate importance)					

Internal management (Process management and Logistics management)

Kindly response the following variable	1	2	3	4	5
Continuous process improvement for internal process control or improving processing quality and emphasis on research and development related to food processing quality					
Quality standards to make sure assured quality of food product					
Standard conditions for food product storage and transportation					
Inventory management					
Any other (please mention & rate importance)					

Supplier management

Kindly response the following variable	1	2	3	4	5
Quality of supplier's raw food					
Set up long-term relationships with suppliers					
Actively suppliers' engagement in organizational supply chain quality development courses					
Collaboration and coordination along with suppliers for attaining eco-friendly goals					
Any other (please mention & rate importance)					

Customer focus

Kindly response the following variable	1	2	3	4	5
Brand awareness toward quality of food product					
Emphasis on product variety or diversity					
Frequently communication with customers, like consistent or routine survey of customer's view					
Improve customer's convenience by providing significant information on the packaging of food product					
Any other (please mention & rate importance)					

Supply chain integration management using IT

Kindly response the following variable	1	2	3	4	5
Technological integration among the entire supply chain activities and processes					
Unbiased profit distributing among entire supply chain stakeholders to keep lifelong relationship					
E-commerce (Exchange of data among supply chain stakeholders)					
Traceability and Tracking of the entire supply chain					
Any other (please mention & rate importance)					

Economic sustainability

Kindly response the following variable	1	2	3	4	5
To reduce food processing and logistics cost					
Reduce transaction cost					
Increase market-share					
Emphasis on revenues or returns from “green” products and reduce cost of the waste management.					
Any other (please mention & rate importance)					

Social sustainability

Kindly response the following variable	1	2	3	4	5
Food product quality like safe, healthy					
Build up the social welfare schemes. Food product contributions to more population or community					
Specified working environment					
Flora and fauna centering framework					
Diversity or Miscellany of employees					
Any other (please mention & rate importance)					

Environmental sustainability

Kindly response the following variable	1	2	3	4	5
To reduce air emission and effluent discharge					
Safe and sound dumping of packaging substances					
To reduce utilization of harmful materials like toxic / antibiotics etc.					
Save ecosystem					
Any other (please mention & rate importance)					

Annexure -II: List of publications

Journal Publications (Published/Accepted)

- Siddh, M.M., Soni, G. and Jain, R. (2015) "Perishable food supply chain quality (PFSCQ) A structured review and implications for future research", Journal of Advances in Management Research, 12 (3), pp.292-313. (Emerald publication)

- Siddh, M.M., Soni, G., Jain, R., Sharma, M.K. and Yadav, V. (2017) "Agri-fresh food supply chain quality (AFSCQ): a literature review", Industrial Management & Data Systems, 117 (9), pp. 2015-2044. (SCI)

- Siddh, M.M., Soni, G. and Jain, R. (2018) "Assessment of top management leadership and commitment to improve perishable food supply chain quality", International Journal of Intelligent Enterprise, 5 (1/2), pp.97-107. Scopus

- Siddh, M.M., Soni, G., Jain, R., Sharma, M.K. "Structural Model of Perishable Food Supply Chain Quality (PFSCQ) to Improve Sustainable Organizational performance", Benchmarking: an International Journal, (Accepted) Scopus

Journal Publications (Communicated)

- Siddh, M.M., Soni, G., Jain, R., Sharma, M.K. and Yadav, V. "Agri-fresh food supply chain quality (AFSCQ) and organizational sustainability: A conceptual model proposal" Production Planning & Control, Taylor & Francis **(Communicated)**

Conference Publications

- Siddh, M.M., Soni, G., and Jain R., (2017) " Sustainability in Agri-food Supply Chain", Proceedings of the 4th International Conference on Industrial Engineering 2017 (ICIE-2017), Dec. 21-23, SVNIT, Surat, India.

- Siddh, M.M., Soni, G., and Jain R., (2015) " Quality Management Issues in Agri-fresh Food Supply Chain Environment: A Review", Proceedings of the 3rd International Conference on Industrial Engineering 2015 (ICIE-2015), Nov. 26-28, SVNIT, Surat, India.

- Siddh, M.M., Gadekar G., Shukla O.J., Soni, G. and Jain R., (2014) " Assessment of Retailer's quality in Dairy Supply Chain Using AHP Technique ", Proceedings of the International Conference on Industrial Engineering Science and Applications (IESA 2014), April 2-4, NIT, Durgapur, India.

Annexure -III: Biographical profile of the researcher

Man Mohan Siddh is born in Harsana (Alwar), Rajasthan (India). He did his B.E. in Mechanical Engineering from University of Rajasthan, Jaipur (India) and M.Tech.in Production Engineering from Rajasthan Technical University, Kota (India). He is presently pursuing P.hD. from Malaviya National Institute of Technology Jaipur (India). His area of research Interest are supply chain management, supply chain quality, sustainability, lean six sigma.