ORGANISATIONAL CULTURE AND SUSTAINABLE SUPPLY CHAIN PERFORMANCE: THE ROLE OF SUPPLY CHAIN INTEGRATION

By

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Declaration of Authorship

The research and all the findings reported in this thesis are my own and all other materials or sources have been properly referenced. This study has not been submitted, in whole or in part, for the award of any other academic degree or diploma at any other institution, except where otherwise indicated, this thesis is my own work.

Dedication

In the Name of God, Most Wonderful, Merciful and Gracious

This Thesis is Dedicated to the Memory of My Late Lovely Mother, Miss Theresah Owusu. Her Steadfastness, Sacrifice and Endurance Made Me Who I Am Today.

And

My Cherished Siblings (Augustine Duah Osei, Ophelia Osei Konadu and Michael Y. Osei) and the Younger Ones.

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Abstract

Organisational culture (OC) and supply chain integration (SCI) have long been considered as effective enablers of sustainable supply chain performance (SSCP) of manufacturing firms. Nonetheless, research investigating the role OC and SCI could play on improving SSCP of firms have not been given enough consideration in literature. From the lenses of institutional, relational view and resource-based view theories, this research examines the impact of OC and SCI on SSCP and assesses the mediation role of SCI drawing from a study in the food manufacturing industry in both the UK and Greece. The flexibility-control dichotomy of the competing value framework (CVF) was adopted in operationalising OC into; developmental, group, rational and hierarchical cultures. SCI was classified into internal, customer and supplier integration and SSCP was operationalised using environmental, social and economic performance. The mixed method approach utilising both qualitative and quantitative approaches were employed. Eleven top managers from different food manufacturing firms in the UK were interviewed. A total of 315 usable responses were also obtained from a survey and the data was analysed using PLS-SEM technique.

The findings from the study revealed that, only developmental, group and hierarchical cultures play a key role in the implementation and achievement of higher SSCP (environmental, social and economic performance). SCI was also found to be very significant for increasing the SSCP of the food manufacturing firms, however, internal integration lays the foundation for external integration within the context of sustainability. Furthermore, it was found that all the competing values of OC especially the values in group culture strengthen internal integration which serves as a prerequisite for establishing a formidable external integration for a higher SSCP. The study also confirmed that the dimensions of SCI individually and collectively mediate the relationship between OC and SSCP. OC was also found to positively influence SCI and SCI had a positive relationship with SSCP. The findings in this research introduces a new insight into literature of OC, SCI and SSCP by confirming that; (i) only group, developmental and hierarchical culture are significant for SSCP, (ii) all the dimensions of OC are crucial for SCI and (iii) internal integration is significant for external integration and SSCP. The research also develops a new framework that links OC, SCI and SSCP for future studies.

Based on the findings, managers are encouraged to firstly pursue the values inherent in developmental, group and hierarchical culture to improve and achieve a higher SSCP. Developmental culture instils sustainability learning and creativity. Group culture encourages the pooling of skilled workers together to collate ideas on sustainability improvement whiles

hierarchical culture maintains sustainability discipline and control in firms. Secondly, managers are encouraged to pursue developmental, hierarchical, rational and group culture to establish strong levels of SCI. The values present in these cultures encourage a stronger internal integration which enables organisational members to integrate easily with their supply chain partners. Lastly, after adopting the sustainability-oriented cultures (developmental, group, hierarchical) managers are encouraged to establish strong ties with their suppliers and customers and through this share the relevant knowledge, skill, information and resources to improve the sustainability performance of the supply chain.

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CHAPTER ONE: INTRODUCTION

1.1 Research Background

The continuous rise in negative industrial activities has resulted in the increase in environmental impacts and damage to life resulting in the enactment of sustainability standards and policies for companies to comply with (Gupta, Kusi-Sarpong, and Rezaei 2020). The sustainability standards coupled with the activities of pressure groups have caused firms especially multinational companies to incorporate sustainability into their supply chains (Ioannou and Serafeim 2019; Gupta, Kusi-Sarpong, and Rezaei 2020). Consequently, sustainability has become an integral part of the strategy of firms which has proven effective for overcoming several contemporary challenges in the supply chains (Giannakis and Papadopoulos 2016). Manufacturing firms are also responding to the sustainability demands by instituting and adopting several measures to mitigate negative environmental and societal impacts.

The resultant effect is the significant increase in research on sustainability with the optimism that this would positively impact on business and industry, nonetheless, most manufacturing firms and their supply chains have not been able to attain higher sustainable supply chain performance (SSCP) (Pagell and Wu 2017). This has been blamed on the inability of the supply chains to actively recognise and balance sustainability with the factors affecting it (Ghadge et al. 2020). Several factors such as organisational culture (OC), supply chain integration (SCI), technology, environmental factors, supply and demand have been found to exert a great influence on SSCP (Carter and Easton 2011; Hassini, Surti, and Searcy 2012). Linnenluecke and Griffiths (2010) and McGrady and Cottrell (2018) highlighted that for manufacturing firms and their supply chains to improve their SSCP, adopting a sustainability-oriented culture and intensifying SCI are highly significant. This indicates the relevance of OC in the implementation of supply chain strategies such as sustainability. However, the relationship between OC, SCI and SSCP has not received enough attention in supply chain literature. This study bridges this gap by empirically assessing the impact of OC on SSCP and the role played by SCI in the relationship.

The real importance of OC in the supply chain has been downplayed in extant literature, nevertheless, it is deemed as the most controllable and uncompromising element which affects every supply chain activity including SCI and SSCP (Fawcett, Magnan, and McCarter 2008; Cao, Huo, and Zhao 2015). Importantly, OC plays a crucial role in supply chain management

in establishing the rules for controlling the behaviour of members both in firms and across the supply chain in terms of flow of information, trust, teamwork, risk taking and finally, controlling the general behaviour and skills of internal employees (Beugelsdijk, Koen, and Noorderhaven 2006). The relevance of OC is gradually gaining much prominence in the extant literature of sustainability as the basis for improving SSCP (Wijethilake, Upadhaya, and Lama 2021). For example, Sehnem et al. (2019) recently recognised operational excellence and top management education which are all embedded in OC as factors that could improve SSCP in several manufacturing firms. This suggests that every OC constitutes the heart of the organisation and its operations; therefore, an initiative or strategy without an appropriate cultural support is bound to fail.

Cadden et al. (2020) further reported that the failure of many supply chain strategies in many firms is due to unavailability or absence of a suitable culture in place. Porter (2019) stressed that the success of every supply chain strategy largely depends on the existence of a consistent OC. Impliedly, without an appropriate OC in place, several supply chain strategies including SCI and sustainability may fail. Since sustainability is a new phenomenon, it is only appropriate for firms to adopt a supportive culture for its easy and successful implementation and performance. Furthermore, according to the institutional theory, most manufacturing firms implement sustainability for the purpose of gaining legitimacy and survival in the society (Iarossi et al. 2013; Miska, Szocs, and Schiffinger 2018), therefore, it is argued that manufacturing firms are likely to implement sustainability practices regardless of the type of culture being practiced. Nonetheless, like this research, theoretically driven studies examining the various ways through which OC can ensure successful achievement of higher SSCP are very rare.

In this study, OC is viewed as the way of life or beliefs or elements shared by group members of a particular organisation. Several frameworks have been adopted in operationalising OC in research. For example, Hostede's cultural dimensions developed in 1984; the Global Leadership and Organisational Behaviour Effectiveness (GLOBE) project (House et al. 2001); Gordon and Ditomaso's dimensions (Gordon and Ditomaso 1992) and cultural dimensions developed by Verbeke (Verbeke 2000). The most widely accepted firm-specific framework that is gradually being used by supply chain researchers due to its ability to reveal value orientations (Dubey et al. 2019) and determine the firm-specific culture and values is the flexibility-control dichotomy of the competing value framework (CVF) developed by (Quinn and Rohrbaugh 1983). The CVF categorises every OC into developmental (adhocracy), group (clan), rational (market) and hierarchical culture (Quinn and Rohrbaugh 1983; Cameron and Quinn 2011). Utilising the CVF, most supply chain authors have tried

examining the influence of its dimensions on the implementation of supply chain strategies such as SCI (Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Porters 2019), total quality management (TQM) (Yunus et al. 2016) and six sigma practices (Zu, Robbins, and Fredenhall 2010). Nonetheless, empirical studies linking OC to SSCP and other supply chain strategies such as the SCI are not forthcoming. Recently, Wijethilake, Upadhaya, and Lama (2021) identified how the dimensions of the CVF can be utilised to shift the behaviour of organisational members towards sustainability change. Their study confirmed that all the dimensions of the CVF have a role to play in encouraging organisational members to adopt several sustainability practices, however, their studies did not access the direct linkage between OC and SSCP. So far only Linnenluecke and Griffiths (2010) has theoretically predicted the possible influence of OC on sustainability performance using the CVF. From the lens of institutional theory, this study takes their research further by empirically assessing the relationship between OC (using the CVF) and SSCP.

SCI can be fully functional and active in a supply chain if the culture of an organisation provides a solid foundation for it (Linnenluecke and Griffiths 2010; Cao, Huo, and Zhao 2015). According to the Resource Based View (RBV) theory, firms with inimitable and valuable resources can achieve higher levels of competitive advantage (Wernerfelt 1984; Barney 1991). This presupposes that manufacturing firms with integration-supportive culture are capable of building highly knowledgeable, skilled and resourceful employees internally to collaborate effectively with customers and suppliers to attain higher levels of profitability and supply chain performance. Despite the importance of OC to SCI, only few research (e.g., Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Porters 2019) have tried examining the relationship between OC and SCI from CVF perspective. Even with these studies, there is a lack of consensus in their findings requiring the need for more research in the area. From the lens of RBV theory, this research argues that firms with high levels of developmental, group, rational and hierarchical cultures can form a strong integration with their supply chain partners (customers and suppliers).

Furthermore, a strong internal, customer and supplier integration are highly necessary for the attainment and improvement of the social, economic and environmental performance of several supply chains. In a typical supply chain, partners share relational knowledge, skills and resources necessary for sustainability performance (Weingarten and Longoni 2015; Golgeci et al. 2019). Based on the relational view theory (RVT), the sharing of relevant social capital, tacit knowledge, information, resources and skills between supply chain partners is necessary for achieving higher sustainability performance (Blome, Schoenherr, and Eckstein 2014). However, there is paucity of empirical research examining the holistic impact of the

SCI on sustainability performance. Both Blome, Schoenherr, and Eckstein (2014) and Weingarten and Longoni (2015) ignored the impact of internal integration on sustainability performance. Kang et al. (2018) also downplayed the impact of internal integration in examining the relationship between SCI and SSCP. Due to this, this study further examines the impact of SCI on SSCP. Braunscheidel, Suresh, and Boisnier (2010) proposed that integration may account for the relationship between culture and firm performance. Therefore, in this research, it is argued that with a well-defined and suitable OC in place, firms still require a higher level of integration to achieve higher SSCP, yet literature has been quiet on the mediation effect of SCI in the OC and SSCP relationship.

Against these backdrops, the main purpose of this research is to empirically assess the relationship between OC and SSCP and investigate the mediating role played by SCI. This will be achieved by assessing; (i) the relationship between OC and SSCP (ii) the relationship between OC and SCI (iii) the relationship between the dimensions of SCI and SSCP and finally (iv) the mediating role of SCI on the relationship between OC and SSCP (see Table 1.1). In this study, it was assumed that since sustainability has become a requirement, it is likely to be built into an OC to improve the SSCP, therefore, the institutional theory was used in examining the relationship between OC and SSCP. Additionally, the RBV theory was used in linking the OC and SCI as firms with SCI-supportive structures in place are more susceptible to improving competitive advantage and sustainable performance through a strong SCI. The RVT which strongly encourges the sharing of information and knowledge in a supply chain to improve competitive advantage was used in explaining the relationship between SCI and SSCP. With this, it is argued that the growing exchange of knowledge, information and skills among the partners in a supply chain can help stimulate a higher SSCP.

1.2 Research Justification and Gaps

In this section, the various gaps that exist in extant studies are presented and the justification for this research is explained. Four main gaps with their matching research questions are identified and explained below. The gaps together with their corresponding research questions have been summarised in Table 1.1.

First, few research (e.g., Miska, Szocs, and Schiffinger 2018) have empirically examined the impact of culture on sustainability performance, however, Hofstede's cultural dimensions were used. Unlike Hofstede's dimensions which measures national culture, the CVF directly assesses firm-specific culture. In a recent study by Wijethilake, Upadhaya, and Lama (2021), all the dimensions of the CVF were found to be very effective in shifting the behaviour of organisational members towards the adoption of sustainability practices.

However, their study, though empirical, does not directly assess the direct impact of the dimensions of CVF on sustainability performance (SSCP). So far, only Linnenlueke and Griffiths (2010) used the dimensions of CVF to theoretically conceptualise how the cultural dimensions can possibly influence SSCP. This research takes the study of Linnenluecke and Griffiths (2010) further by empirically examining the impact of OC on SSCP from the lens of institutional theory. The fact that only one research has focused on the area demonstrates the need for more empirical studies assessing the impact of OC on SSCP from the perspective of the CVF. Evidently, the gap in the extant literature has resulted in lack of insight about the type(s) of culture (values) capable of enhancing the achievement of higher SSCP. This has also resulted in the inability of managers and supply chain partners to determine the actual values useful for implementing and achieving higher SSCP. To fill the gap identified, this research seeks to answer the following question:

RQ1: To what extent do the dimensions of OC (based on CVF) influence SSCP?

Second, studies such as (Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Porters 2019) have extensively investigated the relationship between OC and SCI, yet there is lack of consensus in their findings. For example, Braunscheidel, Suresh, and Boisnier (2010) found that group culture has no direct relationship with neither supplier nor customer integration while Cao, Huo, and Zhao (2015) and Porter (2019) found results to the contrary. Additionally, Braunscheidel, Suresh, and Boisnier (2010) and Zu, Robbins, and Fredenhall (2010) have diverging views on the impact of hierarchical culture on supply chain strategies, whereas the former found a negative relationship between hierarchical culture and SCI, the latter found a positive relationship between hierarchical culture and total quality management. In the same vein, extant studies have differing views on the impact of hierarchical and rational culture on SCI, with most of the research confirming a negative relationship between hierarchical and rational cultures and SCI. These portray lack of consensus on the actual relationship between the dimensions of OC and SCI prompting a demand for more studies on the relationship (Cao, Huo, and Zhao 2015). An investigation into their relationship is crucial for revealing the type (s) of competing values which could aid firms in forging a closer relationship with their supply chain partners. This is significant for advising supply chain partners on some of the effective ways of strengthening SCI with OC values. This research examines the relationship between the two concepts in a new research context and from the perspective of the RBV theory. Based on the gap identified, this research seeks to answer the following question:

RQ2: To what extent do the dimensions of OC (based on CVF) influence SCI?

Third, Kang et al. (2018) recognised the need for a strong integration for significant increase in the sustainability performance. However, there is paucity of research holistically examining the dimensions of SCI (internal, customer and supplier integration) on the SSCP of firms. Blome, Schoenherr and Eckstein (2014) and Weingarten and Longoni (2015) both examined the impact of only external integration on sustainability performance while Kang et al. (2018) downplayed the impact of internal integration in their research. Therefore, it has become very necessary for a study solely focusing on examining the impact of all the dimensions of SCI on SSCP. As SCI has become a crucial facet in today's supply chain, more research on its impact on the achievement of higher SSCP is necessary for practitioners and theorists to determine the extent of internal, customer and supplier integration needed to implement and achieve higher SSCP. This study comprehensively examines the impact of the various dimensions of SCI on SSCP from the lens of RVT. To fill the gap, this research seeks to respond to the following question:

RQ3: To what extent do the dimensions of SCI have an impact on SSCP?

Last, SCI has been regarded as very crucial to the implementation of supply chain strategies, however, research examining the mediation role of SCI in the implementation of supply chain strategies are not forthcoming. Despite the growth in research on the critical role of SCI in the implementation of supply chain strategies, studies examining the mediating link SCI could play is still limited. This means the various dimensions of SCI could accelerate the achievement of ultimate supply chain performance after adopting a supply chain strategy. Studies (e.g., Braunscheidel, Suresh, and Boisnier 2010) found SCI as a mediating element in the OC and delivery performance relationship. Jajja, Chatha, and Farooq (2018) also confirmed SCI as a key element in the improvement of supply chain agility in the presence of risk. Kumar et al. (2020) also considered SCI as a crucial element in the improvement of innovation performance from the viewpoint of learning orientation. These demonstrate the need for the mediation role of SCI to be examined further in the implementation of supply chain strategies yet there is paucity of studies examining this phenomenon. Based on the mediating significance of SCI, it is highly essential to also determine the extent of internal, customer and supplier integration needed to achieve the desirable SSCP after adopting sustainability-supportive culture, yet extant literature has been silent on this. Against this backdrop, this study seeks to provide answer to the following question:

RQ4: Does SCI mediate the relationship between OC and SSCP?

1.3 Summary of Research Questions

Based on the gaps identified, this study intends to provide answers to these questions:

1. To what extent do the dimensions of OC influence SSCP?
2. To what extent do the dimensions of OC influence SCI?
3. To what extent do the dimensions of SCI have an impact on SSCP?
4. Does SCI mediate the relationship between OC and SSCP?

1.4 Research Objectives

Based on the gaps presented and available in extant literature, the focus of this research includes:

1. Determining the type (s) of sustainability-supportive culture (s) and values using the dimensions of the CVF.
2. Employing CVF to assess the extent to which OC impacts SSCP from the perspective of the institutional theory.
3. Examining the influence of the dimensions of OC on the dimensions of SCI from the viewpoint of the RBV theory.
4. Analysing the role of the dimensions of SCI in improving SSCP from the RVT perspective.
5. Examining the mediation role of SCI in the relationship between the individual dimensions of OC and SSCP.

Table 1.1. Summary of the Research Gaps, Research Questions and Research Objectives

Research Gaps	Related Research Question	Research Objectives
Empirical research on the impact of OC on SSCP using CVF is rare	To what extent do the dimensions of OC (CVF) influence SSCP?	• Determining the type of sustainability-supportive culture (s) and values using the dimensions of the CVF. • Using the dimensions of the CVF to assess the extent to which OC impacts the SSCP from the perspective of the institutional theory.

Inconsistencies in extant literature regarding the relationship between SCI and OC	To what extent do the dimensions of OC (CVF) influence SCI?	Examining the influence of the dimensions of OC (using the CVF) on the dimensions of SCI from the viewpoint of the RBV theory.
Lack of empirical research on the direct link between SCI and SSCP	To what extent do the dimensions of SCI have an impact on SSCP?	Analysing the impact of the dimensions of SCI on improving the SSCP using the RVT.
Lack of research on the mediation role of SCI within the context of sustainability	Does SCI mediate the relationship between OC and SSCP?	Examining the mediation role of SCI on the relationship between the individual dimensions of OC and SSCP.

1.5 Research Methodology

To achieve the objectives of this study, the mixed method approach utilising both quantitative and qualitative designs are employed. This research relates to the quantitative-dominant and quantitative priority type of research as suggested by (Tashakkori and Teddlie 1998; Cresswell 2008) as the quantitative design dominates the qualitative approach in this study. The main purpose of the qualitative study is to directly obtain the views, perceptions, ideas and opinions of the managers (Miles, Huberman, and Saldana 2014; Silverman 2014) on OC, SCI and SSCP and their relationship and to further enrich the analysis by partly confirming the findings from the quantitative study to enrich the results of the study. Additionally, the results from the qualitative research are also expected to be used in enriching the questionnaire by confirming additional industry-specific constructs for measuring SSCP. Overall, the qualitative study was necessary to increase the rigor of the research, refine the data collection process and further enrich the analysis as both the qualitative and quantitative results were used in discussing the study. The combination of the qualitative and quantitative designs in this research requires the use of both the philosophies of positivists and interpretivists'. However, due to the clear-cut differences between the two paradigms, it is highly complicated to combine the two methodologies in one research (Zachariadis, Scott,

and Barrett 2010). As a solution to this, critical realism has been considered as offering middle ground between positivism and interpretivism as its philosophies accommodate both paradigms (Bhaskar 1998) accounting for its adoption in this study.

The context of this research is the food manufacturing firms and their supply chains in the UK and Greece due to the sustainability issues engulfing the industries in both economies (Caroli et al. 2010; Lawrence and Lorsch 2013; Anastasidas, Apostolidou, and Michailidis 2020). Since the food manufacturing supply chains are complex and have severe impact on the environment and society of several countries, it is relevant for its sustainability performance to be measured. Additionally, Anastasidas, Apostolidou, and Michailidis (2020) and Ghadge et al. (2020) indicated that the capital intensive, energy consuming and the usage of refrigeration in the processing, production and distribution of the food supply chains make them highly susceptible to climate change. The initial focus of the research was to assist the food manufacturing firms in improving their SSCP. The food supply chains in Greece were added due to the issues with data collection in the UK. The Greek food supply chains were selected mainly due to the sustainability issues in the industry, the similarity of their supply chain activities with UK's food supply chains and availability of respondents and data.

It is, therefore, expected that the results from this research would offer exquisite suggestions to the firms on how to effectively implement sustainability practices and achieve higher SSCP. The list of firms from the UK and Greece were obtained from the FAME database and through personal contact respectively. Stratified sampling was used in selecting 1,535 firms and Thirty-five (35) firms were randomly selected for the interview. Only 11 managers agreed to the interview and the interviews were recorded and manually coded based on the suggestions of (Miles, Huberman, and Saldana 2014; Yin 2017). Since most of the constructs of the variables have been rigorously developed, a questionnaire was designed and the results from the interviews were used in updating it. An online survey, through Qualtrics was conducted and Structural equation modelling (SEM) technique was employed in analysing the relationship between the variables and achieving the objectives of the study.

1.6 Expected Theoretical Contributions

The findings in this research are expected to contribute immensely to the literature and practice of OC, SCI and SSCP. This research is expected to use the dimensions of the CVF to empirically establish the relationship between OC and SSCP from the lens of institutional theory. So far, only Linnenluecke and Griffiths (2010) have theoretically investigated the relationship between OC and SSCP using CVF. This research takes their study further by empirically assessing the relationship between the two concepts from the lens of institutional

theory. The results on the relationship are expected to introduce new insight into literature of OC and SSCP by revealing the actual competing values relevant for the achievement of higher SSCP.

Again, this research is expected to enhance SCI and OC literature by determining the extent to which OC influences customer, supplier and internal integration of the food manufacturing firms. So far only Braunscheidel, Suresh, and Boisnier (2010); Cao, Huo, and Zhao (2015) and Porters (2019) have examined the relationship between OC and SCI, nonetheless, there is lack of consensus in their findings demanding the need for more research in the study area. This research strengthens extant literature on OC and SCI by further examining the influence of OC on SCI from the lens of RBV theory and determining the type(s) of competing values relevant for SCI.

Additionally, this research aims at bringing to light, the extent to which internal, customer and supplier integration affect SSCP. Unlike this study, previous studies (e.g., Blome, Schoenherr, and Eckstein 2014; Weingarten and Longoni 2015; Kang et al. 2014) did not comprehensively assess the dimensions of SCI on the SSCP. The impact of internal integration was ignored in their research. This research investigates the relationship between internal, customer and supplier integration and SSCP from the lens of RVT and the findings are expected to determine the extent to which internal integration impacts external integration and how all the dimensions impact SSCP of the food manufacturing firms and their supply chains.

The individual and collective mediation role of the SCI is yet to gain attention in extant literature. In this research, the individual and collective mediation role of SCI on the relationship between OC and SSCP is conducted. This makes the results of this research highly significant to the literature of OC and SSCP as it is expected to reveal the extent of SCI needed in the attainment of higher sustainability performance and secondly, highlight the mediation role of SCI in the OC-SSCP relationship. Moreover, the results are also expected to contribute to the literature on the mediation role SCI can play in the implementation of various supply chain strategies.

Lastly, the framework from the qualitative study is expected to contribute enormously to future research on OC, SCI and SSCP as it would depict how OC, SCI and SSCP are inter-linked in the industrial setting.

1.7 Expected Managerial Contributions

Practically, since sustainability has become a very crucial practice which needs to be enforced by every manufacturing firm, this research intends to advise policymakers and management of food manufacturing firms on the specific kind of competing values to employ to trigger or enable easy ingraining of sustainability practices in both the firm and across the supply chain to enhance SSCP. Secondly, this research is expected to reveal the various channels through which management can integrate internally and with supply chain partners. Lastly, the findings in this research are expected to admonish management of manufacturing firms on the importance of SCI to sustainability performance in the supply chain and the extent of internal, customer and supplier integration needed in enhancing SSCP in the manufacturing firms and their supply chains after instituting sustainability-supportive culture(s) or values.

1.8 Structure of the Thesis

In the next chapter (chapter 2), the theories relating to OC, SCI and SSCP are individually discussed. Subsequently, the theories and the empirical findings on the relationship between the variables (OC, SCI and SSCP) are presented. Three main theories; institutional, RBV and RVT are reviewed, discussed and are used in establishing the hypotheses of the study. Lastly, the main conceptual framework for the research is presented.

Chapter 3 captures the methodological review, where the main philosophical views and paradigms underpinning the research are explained. The various ontological, epistemological and axiological views adopted in this study are discussed. A brief overview of the research context is discussed followed by the various methods used in the qualitative and quantitative designs. The methods and process used for the qualitative studies are first presented followed by the various methods and process for the quantitative methodology. The preliminary results from both the qualitative and quantitative analyses are presented and discussed.

The next chapter (Chapter 4) reveals the analysis and the findings from the interviews conducted (qualitative case study method). In this section, the various findings relating to OC, SCI and SSCP and the respondents' views on the possible relationship between the variables are clearly stipulated. The various findings are buttressed with the direct quotations from the managers. A new framework linking the main variables in the study is then presented.

Chapter 5 divulges the results from the quantitative analysis of the study. The PLS-SEM was used in analysing the relationship between OC, SCI and SSCP. The results from the confirmatory factor and exploratory factor analyses are reported. The structural model of the

study highlighting the results from the hypotheses testing is also presented. Other tests were carried out to assess the model fit and also test the relationship between the dimensions of OC and SCI on the individual dimensions of SSCP (first order constructs).

Chapter 6 discusses the results of the study using the findings from both the qualitative and quantitative methods. The implications of the various findings are reviewed, followed by the theoretical and practical contributions of the findings. The last chapter, chapter 7, presents the conclusions of the study, where a summary of all the chapters, findings and final conclusions are presented. The chapter ends with the limitations of the study and the directions for future research.

CHAPTER TWO: THEORETICAL REVIEW, HYPOTHESES AND THE CONCEPTUAL MODEL

Introduction

This section reviews the literature relating to sustainable supply chain performance (SSCP), supply chain integration (SCI), organisational culture (OC) and the theories adopted in this research. Using empirical studies, the section, further, establishes the plausible relationship between each of the concepts from which four (4) general hypotheses are revealed. Later, the adopted conceptual model of the study revealing the hypotheses is presented.

2.1 Sustainable Supply Chain Management

The consistent occurrence of oil spillages, dumping, pollution, release of carbon footprints and non-environmentally friendly activities of manufacturing activities (Dubey et al. 2017) called for the enactment of the Brundtland Report to enforce sustainability policies. Consequently, governments in various countries have reacted to this by enacting sustainability regulations for various companies and their supply chains. Additionally, various multi-stakeholder groups are also exerting pressure on companies to comply with the sustainability demands (Gupta, Kusi-Sarpong, and Rezaei 2020). Supply chains have responded to the demands from the pressure groups and the government by implementing sustainability measures into their operations (Gupta, Kusi-Sarpong, and Rezaei 2020). ISO 14001 and SA 8000 have emerged to regulate the implementation of the sustainability acts and have encouraged firms to produce environmentally friendly products, introduce processes to address and minimize pollutions, efficiently use resources and perform socially responsible acts to protect the society and save the environment. Due to the relevance of sustainability, it has been considered as a strategy for competitive advantages and often implemented through the adoption of innovative practices and processes (Giannakis and Papadopoulos 2016). As a result, sustainability has received interest in literature and practice yet more studies need to be done on revealing factors affecting the sustainability performance of firms (Pagell and Wu 2017) and especially manufacturing firms with global supply chains such as the food manufacturing firms.

The Brundtland Commission report provided by the World Commission on Environment and Development (WCED) defined sustainability as the "development that meets the needs of the present without compromising the ability of future generations to meet

their own needs" (WCED 1987 p.43). Based on their definition, SSCM could be seen as the process of ensuring the supply chain does not cause harm to the environment and society. Sustainability in the supply chain simply means firms preventing harm to the natural environment and society while at the same time making profit for a specified period (Pagell and Wu 2009). In other words, SSCM does not make a supply chain fully sustainable but takes reasonable steps to reduce any possible present and future negative environmental and social footprints while at the same time keeping tabs on the economic activities of the firm.

SSCM has undergone several developmental changes over the last decade and several terminologies have been used to refer to the concept over these periods. In the last decade, SSCM research were mainly based on managing the environmental aspects in purchasing, logistics, manufacturing and corporate social responsibility (CSR). The term SSCM is considered to have transitioned from Green Supply Chain Management (GrSCM) as Pagell and Wu (2009) emphasized that the lapses in GrSCM led to the development of SSCM. Unlike SSCM, GrSCM only focused on the environmental and economic aspects of the supply chain without giving much consideration to social aspect of the supply chain. This explains why SSCM in lieu of GrSCM is adopted in measuring the sustainability performance of the supply chains in this research.

The growing interest in research in SSCM depicts how important the concept has become to academics, practitioners and the government. The integration of sustainability into the supply chain has boosted the social image and increased the competitive advantage of several supply chains (Qorri, Mujkic, and Kraslawski 2018). In this research, it is argued that adopting sustainability into the supply chains of the food manufacturing firms is critical to its success and attaining optimal competitive advantage. SSCM marks a transition in supply chain management as an area in operations management that essentially and effectively combines environmental, social and economic issues along the supply chain (Seuring and Mueller 2008; Ahi and Searcy 2013). The main aim of SSCM is to ensure firms deliver quality goods and services without harming the environment. Several supply chain researchers have attempted to provide a comprehensive definition. Table 2.1 provides a list of the definitions of SSCM which provide basis for contextualising SSCP in this research. The definitions highlight the most important elements that must be present in every sustainable supply chain. In this research, SSCM is defined as the process by which firms and their supply chains enact and integrate policies to protect the society and environment while at the same time maintaining higher profitability (economic).

The effective implementation of SSCM practices leads to attainment of SSCP. Therefore, SSCP of firms is achieved through the implementation of sustainable practices, however, various concerns have been raised as to which of the practices (environmental, social and economic) make firms and supply chains more sustainable. Food supply chains constitute one of the dynamic industries, it is therefore, highly crucial to instil environmentally friendly practices into their operations (Ghadge et al. 2020). Also, food supply chains are mostly global making it highly important for its environmental and social impact to be measured. Kleindorfer, Singhal, and Van Wassenhove (2005) suggested that social and environmental responsive companies make firms adaptive, responsive, agile and align practices with systems to achieving three objectives of protecting the people (social), planet (environment) and profit (economic). Qorri, Mujkic, and Kraslawski (2018) reported on the complications associated with the measurement of the sustainability performance both in theory and practice, however, in SSCM literature, the triple bottom line (TBL) elements or principles, thus, social, economic and environmental measures are often employed in assessing the sustainability performance of supply chains.

Table 2.1 Examples of definitions of sustainable supply chain management

Author(s)	Definition
Carter and Rogers (2008)	The strategic transparent integration and achievement of an organisation's social, environmental and economic goals in the systematic coordination of key inter-organisational business processes for improving the long-term economic performance of the individual company and its supply chains.
Seuring (2008)	The integration of sustainable development and supply chain management (in which) by merging these two concepts, environmental and social aspects along the supply chain have to be taken into account, thereby avoiding related problems, but also looking at more sustainable products and processes

Pagell and Wu (2009)	The specific managerial actions that are taken to make the supply chain more sustainable with an end goal of creating a truly sustainable chain
Badurdeen et al. (2009)	Involvement of the planning and management of sourcing, procurement, conversion and logistics activities involved during pre-manufacturing, manufacturing, use and post-use stages in the life cycle in closed-loop through multiple life cycles with seamless information sharing about all product life-cycle stages between companies by explicitly considering the social and environmental implications to achieve a shared vision.
Haake and Seuring (2009)	The set of supply chain management policies held, actions taken, and relationships formed in response to concerns related to the natural environment and social issues with regard to the design, acquisition, production, distribution, use, reuse and disposal of the firm's goods and services
Hassini, Surti, and Searcy, (2012)	The management of supply chain operations, resources, information and funds in order to maximise the supply chain profitability while at the same time minimizing the environmental impacts and maximizing the social well-being.
Ahi and Searcy (2013)	It signifies the resiliency of organisations over time where they are closely connected to healthy environmental, economic and social systems so they are better positioned to respond to internal and external shocks.

2.1.1 Sustainable Supply Chain Performance

Measuring SSCP has extensively received much attention in extant literature, however, most of the studies are literature reviews (Qorri, Mujkic, and Kraslawski 2018) and there seem

to be a dissension of the appropriate approach for measuring SSCP regardless of the increased research (Hassini, Surti, and Searcy 2012). According to Qorri, Mujkic, and Kraslawski (2018) several approaches such as Balanced Scorecard, Life Cycle Assessment (LCA), Supply Chain Operations Reference (SCOR), Fuzzy set approaches, Data Environment Analysis (DEA), Analytic Hierarchy/Network Process (AHP/ANP) and conceptual frameworks have been employed in assessing SSCP of firms. The various approaches have been criticised for their inability to measure all aspects of sustainability and additionally, most of the approaches ignore the inputs of supply chain members. Moreover, most of the approaches were developed to measure firm specific instead of sustainability across the whole supply chain. Since food manufacturing chains in the UK and Greece are mostly global (crossing several national borders) and complex, it is highly imperative to adopt an approach which holistically assesses the SSCP of the manufacturing firms.

The drawbacks associated with the approaches have generated debate, leading to the call for several other frameworks and more specifically more practical measurement of SSCP. Due to this, the most widely adopted framework for evaluating the SSCP of most firms and supply chains is the TBL. This is due to the ability of the TBL to assess all the aspects of the sustainability in the supply chain. Specifically, the TBL contains measures that comprehensively evaluates the environmental, economic and social performance of a particular supply chain (Agrawal and Singh 2019). This explains the choice of the TBL in assessing the SSCP of the supply chains in this study.

Adoption of sustainability practices implies that supply chains blend strategies that help to protect the environment and the society while at the same taking reasonable steps to increase profitability. The adoption and continuous implementation and improvement of the triple bottom line dimensions shifts the organisation towards the achievement of higher sustainability performance (Elkington, 1998; Abdul-Rashid et al. 2017). This means, the adoption of environmental, social and economic performance measures leads to sustainability performance. Sustainability performance can only be measured if there is a continuous improvement in the sustainability practices implemented by firms. This suggests that sustainability performance is measured over time, thus, by assessing how firms are improving upon the implemented environmental, social and economic practices. Abdul-Rashid et al. (2017) further stressed that sustainability practices are key to achieving higher sustainability performance. From the TBL perspective, attainment of an improved SSCP implies that supply chains are deeply ingrained in the implementation of environmental and social practices while at the same time attaining higher profitability. Many authors (e.g., Carter and Rogers 2008; Seuring and Mueller 2008; Hassini, Surti, and Searcy 2012; Nouri, Nikabadi, and Olfat 2019)

have researched on and identified several practices leading to the attainment of a better SSCP. Table 2.2 provides a brief overview of sustainability practices and performance measures used in extant literature. It can be deduced from the table that, sustainability practices lead to sustainability performance and sustainability performance measures widely revolves around environmental, social and economic performance measures. Studies conducting survey through the use of questionnaires often use the TBL in measuring sustainability performance (as depicted in Table 2.2). Also, other measures can be adopted depending on the aim of a particular study. In this study, performance measures adopted were like those adapted by Abdul-Rashid et al. (2017) and Cankaya and Sezen (2019). This is due to the usage survey approach in collecting data in both studies.

Currently, achieving corporate sustainability involves companies implementing and building sustainability into the strategy of the companies which is translated or achieved through environmental, social and governance factors (ESG). These factors have been found to enable firms to achieve sustainability performance. In this research, however, sustainability performance is measured using TBL, namely, environmental, social and economic performance. Moreover, one of the contemporary strategies enabling firms to achieve sustainability is the concept of supply chain integrity. Supply chain integrity is the act of engaging in socially and environmentally responsible activities such that these activities are aligned with corporate strategies and enables organisations to pursue economic performance sustainably (Castillo et al. 2018). These aligns organisational activities with sustainability practices thereby achieving sustainability performance. However, the focus of this research is centered on SSCP and how it can be improved in manufacturing firms

Table 2.2. Examples of measures of Sustainable Supply Chain Performance

Authors	Methods Employed	Sustainability Practices	**Sustainability Performance**
Abdul Rashid et al. (2017)	Cross-sectional survey	• Sustainable product design and development • Sustainable manufacturing process • Sustainable supply chain management • Sustainable end-of-life management	**Environmental Performance** Carbon emissions reduction, reduction in water and energy consumption, reduction in solid wastes, decrease in material usage, compliance to environmental standards **Economic Performance** Improved market share, improved company image, improved market growth, increased profitability, decrease in material, purchasing and utility bills cost, improved product quality, improved delivery and flexibility. **Social Performance** Improved relationship with community and stakeholders, improved workplace safety, improved work environment.
Lam (2015)	Analytical Network Process		**Environmental Performance** Energy consumption/efficiency, greenhouse gas emissions, waste control and treatment.
Cankaya and Sezon (2019)	Mixed method	• Green design • Green purchasing • Green production	**Environmental Performance** Reduction in waste, reduction in air emission, decrease in consumption, decrease in frequency for environmental accidents **Social Performance**

		• Green distribution • Green logistics • Green marketing • Reverse logistics	Improvement in customer satisfaction, image, societal projects, relations with community, awareness and protection of the claims and rights of people, training and education, improvement in occupational health and safety and overall stakeholder well-fare **Economic Performance** Decreased materials cost, energy cost and waste discharge fee. Improvement in earnings per share, investment, sales growth and profit growth.

2.1.2 Triple Bottom Line

Elkington (1998) is credited with the introduction of a triple bottom-line approach (TBL) which is also known as the three pillars; profit, planet and people and have eventually become essential elements in a report firms need to provide to stakeholders. Elkington (1998) simply explains TBL as the intersection of social, environmental and economic performance for organisations. TBL is the common terminology which is translated as the performance a firm needs to achieve in the environment, economic and social dimensions (Seuring and Mueller 2008) which are considered as the metrics for measuring and assessing SSCP. The TBL can simply be explained as the gradual management of material, information and funds as well as an integration along the supply chain while pursuing all the goals of the three dimensions of social, economic and environmental performance (Seuring and Mueller 2008). In this study, it is argued that, to achieve a higher SSCP, food manufacturing firms need to implement practices that could lead to higher environmental, economic and social performance across their supply chains. Based on this, higher SSCP can be considered as the implementation of practices to achieve higher environmental, social and economic performance.

Many criticisms have been levelled against the use of TBL in measuring the sustainability of the supply chain. Johnson (1991) criticised TBL as a narrow focus and means through which companies are using to overlook the supply chain as a single system. Even though, these criticisms are only rational, TBL seems to be the available tool for measuring how effective a supply chain is progressing towards achieving the sustainability. This implies that a supply chain which implements most of the elements of the TBL is not actually deemed as sustainable but is moving towards achieving an improved sustainability in the supply chain. Pagell and Wu (2009) also expressed that SSCM is a managerial action taken to ensure that the supply chain is on the right track of becoming truly sustainable. Meaning, a true sustainability (which is very rare), is the end goal of every supply chain implementing the TBL elements (Pagell and Wu 2017) and SSCP assessed with TBL (environmental, economic and social performance) is an approach for assessing how close a firm and its supply chain are to achieving sustainability. Improvement in SSCP denotes an improvement in the economic, social and economic performance of the supply chain. Furthermore, in this study, an improvement in SSCP of the food manufacturing firms suggests that the supply chain has implemented and improving the TBL performance measures. This re-affirms the choice of

TBL as an effective tool for assessing the sustainability performance of supply chains in this study.

2.1.3 Factors Affecting Sustainable Supply Chain Performance

The premise of this research is based on SSCP enhancing factors. As previously indicated, implementation of sustainability practices has become the prerequisite for the survival of the various manufacturing firms and their supply chains (Adesenya et al. 2020). This is depicted in the enactment of various laws and standards governing the implementation of sustainability. These standards have made it compulsory for manufacturing firms to establish measures to meet the sustainability requirements of the law and standards. Consequently, sustainability has become an important facet in the strategy of several firms accounting for the increment in research in the area. Despite this relentless effort, several manufacturing firms and their supply chains are still struggling to attain an improved SSCP. As a result, supply chain researchers have enacted and suggested several theories and solutions that could help induce an improved sustainability performance. For example, Sehnem et al. (2019) found that embracing operational excellence helps in implementing and improving sustainability performance. McGrady and Cottrell (2018) also suggested that focusing on the sustainability enhancing factors is the most important approach for improving the sustainability performance. Their assertion was due to the inability of firms and supply chains to identify the various drivers or factors that can help in achieving higher sustainability performance. Ghadge et al. (2020) further reiterated that the sustainability struggles in the food manufacturing industries make it relevant to examine the influential factors that could enable the achievement of higher SSCP, however, research on such factors is not forthcoming.

Previously, external pressure from parties such as NGOs, customers, the community, environmental regulations, government and other pressure groups (Hassini, Surti, and Searcy 2012) were considered as elements triggering SSCP. Other studies such as (Linnenluecke and Griffiths 2010) identified internal pressures such as labour turnover, employee dissatisfaction, top management support, human resource management, environmental training, employee empowerment, OC, teamwork and reward systems as factors triggering SSCM. Hassini, Surti, and Searcy (2012) further grouped the major factors accounting for the adoption of SSCM into market forces, SCI, policy and regulations, science and technology, supply and demand, environmental factors, governmental laws, product development, process capability, sourcing and operations, transport and logistics, marketing, PR and social issues. Despite the numerous factors and scanty research on the factors, Linnenluecke and Griffiths (2010), Hassini, Surti, and Searcy (2012) and Han and Huo (2020) have emphasized that SCI and OC are the current

most important factors yet ignored by firms in the quest for managing and achieving a better SSCP. Sehnem et al. (2019) also recognised the importance of top management support, training and development, sustainability knowledge and awareness which are all embedded in OC as enablers of SSCP.

Both OC and SCI are regarded as the most flexible albeit crucial factors that play significant role in the implementation of policies and procedures in the supply chain (Linnenlueke and Griffiths 2010; Cao, Huo, and Zhao 2015; Cadden et al. 2020). Nonetheless, studies expounding on this relationship are not forthcoming. Whereas research (e.g., Awudu and Zhang 2012; Mulhall and Bryson 2014; Peters, Romi, and Sanchez 2019) have examined the influence of other factors such as technology and supply and demand factors on SSCP, little is known on how OC and SCI could assist firms in the improvement of SSCP. This suggest that while research on other factors influencing sustainability is increasing, research on the relationship between SSCP, SCI and OC are lacking. With the importance of OC and SCI to the implementation of supply chain strategies (Cadden et al. 2020; Han and Huo 2020), inadequate research on their impact on sustainability performance create a wide disparity in extant literature due to the inability of firms to determine the types of values relevant for implementing and achieving higher SSCP. With the susceptibility of the food supply chains to climate change and low sustainability performance (Ghadge et al. 2020), in this research, it is argued that adopting workable cultural values and striving to integrate supply chain partners across the supply chain are very crucial for enhancing SSCP.

2.1.4 Social Performance

Mani, Gunasekaran, and Delgado (2018) expressed that the increased awareness of sustainability is partly due to social issues and stakeholder awareness. Therefore, it is highly necessary to implement the necessary social sustainability practices. However, little research has been conducted on the extent to which social sustainability practices are implemented (Mani, Gunasekaran, and Delgado 2018) especially in global supply chains. Pagell and Gobeli (2009) discovered that maintaining and improving employees' living conditions is the most important step to consider for a firm to be considered as socially sustainable. Their research found that improvement in the well-being of employees stimulates better performance. Social performance has become very important due to its strong influence on competitive advantage of firms (Das 2017). Social sustainability performance manifest in the form of improvement in the well-being of employees as well as the community.

Mani, Gunasekaran, and Delgado (2018) found that good working conditions reduces workplace accident and performance of supply chain. This suggests that firms need to create an enabling environment for the well-being of the employees while creating same environment for the community. Sustainable social practices can be categorized into employee-centred social performance (ESP) and community-centred social performance (CSP) (Das 2017). ESP is depicted in the prevention of inequity in remuneration, provision of health facilities for employees, improvement in the working and living conditions, developing employees' capabilities, organizing training and development for employees, developing innovative skills and capabilities in employees, health care benefits, safety, leave, fringe benefits and opportunities for growth (Zhu, Liu, and Lai 2016; Abdul-Rashid et al. 2017; Das 2017).

The CSP is also demonstrated in the form of improvement in the level of education, health conditions, providing social amenities or introducing societal developmental projects, providing the necessary support needed to improve the living conditions of the community (Zhu, Liu, and Lai 2016; Das 2017). Pursuing both ESP and CSP can enable firms obtain a higher social sustainability performance as well as increase the corporate image which leads to higher profits, competitive advantage and higher customer satisfaction (economic performance). However, since OC and SCI have been considered as very vital to the sustainability performance of supply chains, little is known of how both factors (OC and SCI) could be used in improving the social performance of supply chains. Since customer and other stakeholder expectations and safety issues are relatively very significant in the food manufacturing supply chains, higher social performance achievement is very crucial. This accounts for the continuous rise in research examining the social performance of manufacturing firms.

2.1.5 Environmental Performance

Acquaye et al. (2018) reported on the challenges associated with adopting measures for assessing the environmental performance of supply chains. Especially, with the food manufacturing firms whose supply chains extend across several national borders, climate change contribution is very prevalent (Ghadge et al. 2017), therefore, measuring the environmental performance of supply chains is significant yet very complex. Also, the food supply chains especially the perishable food manufacturers are energy intensive making it very important to measure the environmental performance of the supply chains. The main challenge stems from the use of different measures by different supply chain authors (Qorri, Mujkic, and Kraslawski 2018). Currently, almost every manufacturing firm have adopted recycling and reverse logistics to reduce bad environmental activities. Firms seeking to achieve

improved environmental performance adopt the necessary environmental management practices (EMPs) (Das 2017). In this research, supply chains with a high focus on implementing several practices to avoid negative environmental impact are considered as having an improved or higher environmental performance. Environmental performance practices are reflected in the reduction in the discharge of solid and liquid waste, gaseous waste, toxic materials, reduction in emission of pollutants, reduction in environmental accidents, substitution of hazardous materials, recyclable and reusable packages, implementation of ISO 14001, cleaner production, green packaging, environmental compliance, collaboration with suppliers and customers for eco-design, investment in environmental R&D, environmental innovation through project implementations, reduction in greenhouse gas emissions (Carbon footprint) and environmental consciousness (Hassini, Surti, and Searcy 2012; Genovese et al. 2017).

Additionally, other researchers also considered environmental management practices as the reduction in the occurrences of accidents on the shop floor, management of energy consumption, waste recycling, greener raw material sourcing and protection of biodiversity (Harms, Hansen, and Schaltegger 2013). Despite the availability of several measures, it is undeniable the implementation of environmental management practices is utterly difficult for several manufacturing firms. Shaw, Grant, and Mangan (2020) also highlighted the underdeveloped nature of environmental performance measures and therefore, calls for more research on the practices and constructs. It is therefore argued in this research that, adopting the supportive cultural values and strengthening SCI across the supply chain are necessary for a successful implementation of environmental performance practices and the achievement environmental performance in the food supply chains.

2.1.6 Economic Performance

Economic performance encapsulates the ability of organisations to maintain its profitability levels after implementing environmental and social practices. Qorri, Mujkic, and Kraslawski (2018) views a better economic performance as improvement in quality, efficiency, reduction in cost and improvement in timeliness. Economic performance is manifested in the improvement in financial and operational performance through decrease in cost, improvement in profit and efficiency across the supply chain (Das 2017). Establishment of advanced operations system provides an avenue for firms to improve lean operational and mass performance (Das 2017). Firms and their supply chains have adopted stringent practices to attain an improvement in economic performance. These metrics imply that the improvement in economic performance can be achieved through; decrease in cost of

purchased materials, decrease in cost of production, increase in market shares, return on assets and return on investment, delivery time, customer satisfaction, order fill capacity, advanced delivery systems, delivery dependability and responsiveness to key customers and the overall profitability levels. Other operations management authors (e.g., Luthra et al. 2016; Abdul-Rashid et al., 2017; Kang et al. 2018) consider decrease in cost factors such as ordering cost, operational cost, environmental accidents cost, manufacturing cost and other operational cost factors in assessing the improvement in economic performance of firms.

In as much as sustainability has become one of the tenets of competitive advantage (Cantele and Zardini 2018), the cost associated with the transitioning of supply chains to include sustainability constitutes one of the challenges of several manufacturing firms. This accounts for the need for increased research examining how better firms can be able to implement environmental and social measures and still improve profit. The economic performance in the food supply chain industries (UK and Greece) (Ghadge et al. 2017) is a delicate one as most of the firms are SMEs. Malak-Rawlikowska et al. (2019) also highlighted that the development of long transportation, complicated distribution systems associated with the food supply chains make them very vulnerable to achieving higher level of economic performance. Therefore, research into economic performance of food manufacturing supply chain and the critical factors crucial for achieving higher economic performance are key.

2.2 Supply Chain Integration

For more than a decade, the trend of supply chain management has shifted from solely internal process towards the integration of key business processes and actors across the supply chain. External organisations can help make firms distinct in developing new products and improving pertinent supply chain issues such as reducing time-to-market and time of introductions of new products (Stank, Keller, and Daugherty 2001; Flynn, Huo, and Zhao 2010). Porter (2019) also stated that with SCI, firms' ability to stockpile both internal and external resources is intensified. The SCI involves the coordinated efforts within an organisation and extending such collaborations to outside partners of the firm for the purpose of achieving utmost performance (Stank, Keller, and Daugherty 2001). The main philosophy of SCI is for firms to move away from arms-length transactions towards longer term, partnership-related arrangements with partners of the supply chain for the purpose of designing and creating highly competitive supply chains (Flynn, Huo, and Zhao 2010).

Many authors have ascribed different definitions to the concept of SCI. It can be simply defined as the relationship between a manufacturer and its suppliers. Others also explained it

as the integration between a manufacturer and its supply chain members, specifically, customers and suppliers (Huo 2012). A more comprehensive definition was provided by Romano (2003) and Flynn, Huo, and Zhao (2010). Both studies conceptualized SCI as the coordination of efforts and resources in the form of business processes that are closely linked both within and outside a company's boundaries. In this research, SCI is simply defined as the collaboration between the focal firms, their local and global suppliers and customers to share relevant information, resources and ideas for the purpose achieving an improved supply chain performance. Furthermore, the strategic combination of resources and information between focal firms and the supply chain partners can enable the smooth implementation of sustainable practices to improve SSCP. However, research on how SCI can help improve SSCP is lacking in extant literature.

Many current research and essentially theories on SCI are based on the findings and suggestions made by Stevens. Stevens (1989) emphasized on the main bases for integrating the supply chain. Firstly, he opined that the issues in supply chain can be mitigated if firms can develop an integrated supply chain driven by the needs of the firms. Secondly, he suggested phases by which firms can successfully integrate their supply chain. In the first phase (Phase 1) called the baseline, Stevens suggested that firms could allocate responsibilities for different activities to almost independent departments and firms. The second phase involves firms integrating the internal functions, followed by firms enacting polices and aspects of the activities that can directly be controlled by the firms (internal integrations). The last stage comprises firms extending their integration to external boundaries to embrace customers and suppliers (external integration). From this analogy, it could be deduced that, internal integration is the prerequisite for external integration and SCI can be categorised into external and internal integration. These categories of integration have been adopted in this study and used throughout the study.

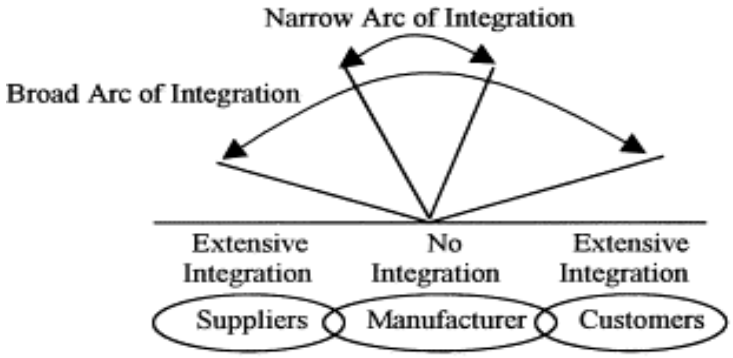

Figure 2.1 Arc of integration

Adapted from Frohlich, MT and Westbrook, R. (2001)

Several authors predicted that SCI would be the new version of supply chain management in the future and indeed, SCI has currently become the buzzword in supply chain research. According to Jayaram and Tan (2010), SCI can be fully operationalised through the implementation of the arc of integration. The arc of integration (see Fig. 2.1) was originally developed by (Frohlich and Westbrook 2001). The arc of integration explains the integration preferences of several manufacturing companies. The decision of integration by firms depends on the extent of upstream and downstream integration to which firms are willing to incorporate. Some firms decide to engage or integrate relatively little with upstream suppliers and downstream customers and therefore, have narrow arc of integration while others actually have a broader integration with upstream suppliers and downstream customers. Frohlich and Westbrook (2001) opines that the direction of the arc indicates the degree of the integration of a firm. Firms in the middle category are often regarded as integration intolerant, meaning, the company's culture does not encourage integration. In the same vein, firms who fall at the extremely right segment (see Fig. 2.1) are considered as practising extensive customer integration whereas firms who fall at the extremely left segment are considered as practicing an extensive supplier integration. Firms with no degree of integration risk finding difficulties in balancing supply and demand and meeting customer needs timely. Within the context of sustainability, Kang et al. (2018) expressed the need for firms to integrate more with suppliers. However, given the bargaining power of customers of the food manufacturers, integration with customers should also be prioritised. Therefore, it is argued that a strong degree of integration between suppliers and customers should be encouraged to achieve a higher SSCP.

Other concepts such as supply chain orientation has emerged to assess the relational exchange mostly between internal and external supply chain activities. Supply chain orientation coordinates the resources in the supply chain to improve overall performance (Jadhav, Orr, and Malik 2019). Supply chain orientation is mostly measured using customer, competitor, suppliers, logistics operations and supply chain-oriented variables (Jadhav, Orr, and Malik 2019). In this research, the main aim is to assess supply chain integration and how it impacts SSCP and influences the OC-SSCP relationship. In this study, supply chain integration is operationalised to include supply chain coordination.

2.2.1 Dimensions of Supply Chain Integration

Following the arcs of integration, some researchers have considered SCI as a single construct while others consider it as having individual dimensions, that is, internal and external integration (Stank, Keller, and Daugherty 2001; Flynn, Huo, and Zhao 2010). Some authors have also considered SCI as a unidimensional construct (Narasimhan and Kim 2002; Droge, Jayaram, and Vickery 2004; Gimenez and Ventura 2005). Currently, in the SCI literature, few research consider SCI as a unidimensional construct comprising either customer or supplier integration while most studies operationalise SCI as a multidimensional construct consisting of internal and external (customer and supplier) integration. Prajogo and Olhager (2012) highlighted that SCI essentially involves logistics integration, information technology, establishing long-term relationship with supply chain partners and sharing of information, more frequent interaction with partners, contacting customers for performance feedbacks and creating supplier development programme.

Spralls et al. (2011) also assessed SCI as an activity involving trust, information exchange, communication quality, performance evaluation and relationship building. The different approaches to defining and operationalising SCI make it easier for the concept to be understood from different dimensions. However, the different approaches signify complexity in adopting a particular dimension (s) in assessing SCI in a research (Flynn, Huo, and Zhao 2010). In this research, based on the suggestion of Flynn, Huo, and Zhao (2010), it is argued that SCI can be collapsed into three main dimensions: internal, customer and supplier integration.

2.2.2 Internal Integration

Internal integration focuses on the collaboration of the internal activities of a firm. Flynn, Huo, and Zhao (2010) defined internal integration as the extent to which a firm can restructure its internal practices, procedures, behaviours and operations into a collaborative, synchronized and manageable processes for the purpose achieving company's objectives. Huo (2012) also views internal integration as the synchronisation and integration of the functions, procedures and activities in a focal firm. This suggests that internal integration involves establishing a unified process that ensure constant collaboration between people, operations and process in an organisation. Based on the definition, internal integration can be perceived as a collaboration between people. Internal integration is simply the extent to which the logistics activities in a firm are synchronized into the functional activities of the various departments within an organisation.

The internal integration process is highly volitional and very effective when there is constant sharing of information, resources, ideas, visions and goals among departments in an organisation (Stank, Keller, and Daugherty 2001). Firms with intensive internal integration encourage; data integration and sharing among internal departments, common knowledge of functional activities, joint establishment of firm's objectives, effective sharing of operational and information between departments, integrative inventory management, real-time searching of logistics-related operated data and the use of cross-functional teams in new process and product development (Stank, Keller, and Daugherty 2001; Gimenez and Ventura 2002; Narasimhan and Kim 2002; Flynn, Huo, and Zhao 2010). On the other hand, firms with high internal integration ensure the usage of inter-departmental teams in the creation and introduction of new products and the integration of real-time data from the raw materials extraction along the supply chain to the last stage in production.

Even though, most researchers have undermined the importance of internal integration (Cao, Huo, and Zhao 2015; Kang et al. 2018), this research views it as the most crucial element necessary for a strong external integration and SSCP. Since the introduction of sustainability is a gradual process, the eventual training and sensitisation of employees and supply chain members about sustainability is crucial for enhancing sustainability performance (Linnenluecke and Griffiths 2010). Evidently, this can be achieved through the formation of teamwork and rigid use of cross-functional teams to implement the necessary sustainability practices into the organisation. This makes internal integration highly relevant for sustainability performance while at the same time ensuring the establishment of the sustainability teams to work with customers and/or suppliers for the swift implementation of the sustainability practices.

2.2.3 External Integration

In addition to internal integration, Flynn, Huo, and Zhao (2010) defined external integration as the extent to which a firm can form a strong partnership with its key supply chain members for the purpose of structuring inter-organisational strategies and activities, establishing a unified practice, procedures, operations and behaviours to satisfy customer requirements. The main motive for establishing an external integration is to create a strong alliance and rapport with customers and suppliers, develop strong partnerships, share pertinent information to overcome existing and potential supply chain impediments and develop good strategies to achieve high supply chain performance (Stank, Keller, and Daugherty 2001). Wong, Boon-Itt, and Wong (2011) views external integration as the close collaboration and information dissemination between a focal firm, customer and suppliers

that provide the firm with necessary strategic insights into market expectations and opportunities that ensure firms become more efficient and effective in responding to customer needs and wants. External integration can further be categorised into supplier and customer integration (Flynn, Huo, and Zhao 2010).

2.2.4 Supplier Integration

Ragatz et al. (2002) explains supplier integration as the collaboration between a focal firm and its suppliers in managing inter-firm business processes such as information sharing, strategic partnership, collaborative planning, joint product development, collaborative product designs and establishment of effective supply chain strategies. It is expected that a strong collaboration between firms and suppliers provides a unique opportunity for eliminating the errors with demand and supply and with product (food) design, improving production planning time and mitigating inventory obsolescence (e.g., food spoilages), thereby, helping manufacturers to be more responsive towards the needs of customers. Collaborative process with suppliers is likely to help manufacturers reduce costs, create value, quickly respond to demand variations and maximise customer satisfaction (Wong, Boon-Itt, and Wong 2011). In an effort to develop a working relationship with suppliers, firms establish joint programs, plan activities and make collaborated decisions with suppliers (Narasimhan and Kim 2002). Since suppliers of the food supply chains are many and originate from different countries, involving them in making decisions regarding quality, sustainability, new product development, benchmarking activities, process and product designs are very crucial to the implementation and achievement of SSCP.

Kang et al. (2018) found supplier integration as a crucial element to both intra-and-inter organisational sustainable management practices (SMPs). Currently, it is required for supplying firms to be sustainable, achieving that requires a close working relationship with the focal firms. Focal firms, on the other hand, also rely on the constant supply of sustainable raw materials and implementation of other strategies to improve the sustainability performance of the supply chain. Most of the food manufacturing firms have supply chains extending across nations, therefore, higher coordination with suppliers is needed to achieve sustainability along the supply chain (Kang et al. 2018). This provides evidence that a strong integration with suppliers is vital for the improvement of SSCP. However, there is paucity of research on the direct impact of supplier integration on SSCP.

2.2.5 Customer Integration

Customer integration means the sharing of strategic information with customers for the purpose of improving visibility and enabling joint planning. Customer integration enables firms to acquire a deeper and clearer understanding of market expectations and opportunities which enable firms to accurately and quickly respond to customers' need and preferences. It bridges the gap between supply and demand (Wong, Boon-Itt, and Wong 2011). Manufacturing firms including the food manufacturers integrate with customers through joint development of new products with customers, following-up with customers, and sharing of pertinent information with customers (Koufeteros et al. 2005; Flynn, Huo, and Zhao 2010; Wong, Boon-Itt, and Wong 2011). In the food supply chains, customers (who are the renowned retailers), represent the strong force in the supply chain, especially within the context of sustainability. Therefore, a strong customer integration plays a crucial role in the improvement of SSCP. Research focusing on revealing several factors that could instil a strong collaboration with customers in the supply chain is very crucial yet there is paucity of research on how customer integration can directly help in improving the SSCP of the various manufacturing firms and their supply chains.

2.3 Organisational Culture (Corporate Culture)

The concept of OC was actually borrowed from Anthropology and social theorists as it was regarded as the only concept to overcome the inequalities and socio-cultural issues that existed in several organisations (Meek 1988). Moreover, Hofstede (1983) further indicated that the growing defence of identity and the need to protect and effectively manage people from different culture resulted in the need for firms to develop a set of values and policies necessarily to ensure uniformity in the organisation. The OC of every firm is regarded as something that can be created by management which eventually becomes the output of the shared meanings and symbols that particularly emerges from social interaction. Meaning, culture is regarded as a concept that is deeply rooted into the social life of an organisation and cannot be treated in isolation of the organisation. This further suggests that the OC eventually becomes an inevitable part of an organisation and a study into an organisation means a study into the culture of that organisation.

OC has received numerous considerations in academia and has been widely studied by several authors both in strategic management and widely across the field of business management (Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015). Though, the concept has been widely studied, different definitions have been ascribed to it (see Table

2.3). Table 2.3 reveals the working definitions of OC in extant literature. All the definitions outline similar elements that every culture in an organisation should possess. Every culture is shared, contains beliefs and values and is acceptable by members in the organisation. Meaning, OC is considered as the backbone of every initiative undertaken by an organisation. Promotions, social responsibilities, supply chain strategies including green activities and most importantly sustainability practices performed by an organisation can be successful, depending on the kind of cultural values practiced in the focal organisation and also across the supply chain. Cadden et al. (2020) indicated that failure of many firms and supply chains to achieve high supply chain performance is due to the inability to adopt a suitable culture. Though, culture has been widely studied and regarded as very crucial, the various dimensions of culture and how these dimensions affect the supply chain strategies such as SCI and SSCP have not received much attention in extant literature. OC plays a keen role in aligning objectives and designing strategies for the various departments in the organisation. This implies that a supply chain could be successful at implementing sustainability practices if there is a sustainability-supportive culture (s), however, research linking OC to SSCP is not forthcoming.

Table 2.3 Examples of Widely Accepted Definitions of Organisational culture

Authors	Definitions
Kluckhohn (1949, p.17)	"the total way of life of a people"
Schwartz and Davis (1981, p.33)	"a pattern of beliefs and expectations shared by the organisation's members' that create 'norms that powerfully shape the behaviour of individuals and groups in the organisation"
Lorsch (1985, p.84)	"the beliefs top managers in a company share about how they should manage themselves and other employees"
Allen (1985)	"The norms encompassing all behaviour of that is expected, accepted, or supported by the group, whether that behaviour is stated or unstated. The norm is the sanctioned behaviour and people are rewarded and encouraged when they follow the

	norms, and chastised, confronted and ostracized when they violate them"

The most widely accepted definition of OC adopted by supply chain researchers was provided by (Schein 1990). He defined OC as the "a pattern of basic assumptions; invented, discovered, or developed by a given group; as it learns to cope with its problems of external adaptation and internal integration; that has worked well enough to be considered valid and therefore, is to be taught to new members as the correct way to perceive, think and feel in relation to those problems". This comprehensive definition incorporates all the essential elements identified in the previous definitions and further suggests that, the strength of integration and adoption of a particular strategy is dependent on several factors such as the stability of the group, the number of years of the existence of the group, the various mechanisms such as positive reinforcement or avoidance of conditioning and the depth of the assumptions held by the management of the group. The definition suits the aim of this research as it addresses the issue of why external and internal integration is important and it further illustrates how significant values and beliefs are very crucial to the success of supply chain strategies and survival of the firm. This definition moves beyond the normal assumption that OC is the mere belief and practices that are carried across an organisation.

The OC of every firm is regarded as the most powerful and ubiquitous tool that ensure each underlying objective of the firm is achieved. Currently, OC has been considered as an important element underpinning the success of every supply chain phenomena (Cao, Huo, and Zhao 2015; Porter 2019) including sustainability. Therefore, in this research, it is argued that supply chains with values, beliefs or cultural elements that do not support relevant supply chain activities such as SCI and sustainability may struggle to attain higher sustainability performance and effective SCI.

2.3.1 Conceptualization of Organisational Culture

Even though, the definitions of OC from the different authors are closely related to each other, OC theorists, have not really arrived at a common definition yet which makes the conceptualization of the concept very cumbersome. Many authors (e.g., Schein 1990; Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015) hold the assertion that, operationalising OC is more complex than what is being done in literature. The definition provided by Schein (1990) provides a general benchmark (tenets) for assessing the strength of framework or cultural practices of firms. This suggests that every OC should comprise

elements of external and developmental orientation, authority structure, external and internal integration and human resource development. Currently, since sustainability has gradually become a requirement for implementation in every manufacturing firm, it is expected that sustainability practices is inculcated into the culture of the firms. In OC literature, many authors have designed and adopted different measures or constructs in assessing OC (see Table 2.4).

Table 2.4 presents the different types of frameworks and their effectiveness. The table was adapted from the studies of Van den Berg and Wilderom (2004) and updated with new elements to suit the aims of this study. As presented in table 2.4, many authors have adopted and used the measures developed by (Quinn and Rohrbaugh 1983; O'Reilly III, Chatman, and Caldwell 1991; Gordon and DiTomaso 1992; Van Muije and Koopman 1994; Denison and Mishra 1995; House et al. 2004 etc.). Even though, these measures have been used extensively in assessing OC, most of them do not meet the main tenets (external and developmental orientation, authority structure, external and internal integration and human resource development) of OC. Table 2.4 outlines the various dimensions or frameworks that have been used in operationalising OC. In the table, one of the frameworks that is effective, contains all the tenets of OC and can potentially be used in studying sustainability related issues is the CVF. Since the CVF contains dimensions that comprehensively cover all the tenets of OC (see Table 2.4), in this research, it is argued as a suitable framework for assessing OC within the context of sustainability. The dimensions of the CVF are also regarded as effective in determining the specific type of culture and its associated values that could help in stimulating an improved SCI and SSCP. Due to this, the CVF was selected in assessing the OC of firms in this research.

It is worth mentioning that Hofstede (1983) proposed several dimensions which have been used by several authors in conducting studies related to OC. Hofstede's cultural dimensions like the GLOBE factors are suitable for assessing national culture and also OC within national culture context but does not accurately determine and measure the specific values accepted and practiced within a particular organisation. Due to this, the CVF seem to be the only ideal measure in assessing OC within the context of operations management as it enables easier comparison of value orientations (Dubey et al. 2019). A recent study by Miska, Szocs, and Schiffinger (2018) adopted GLOBE approach developed by (House et al. 2004) in assessing culture. The approach considered four dimensions; future orientation, gender egalitarianism, uncertainty avoidance, power distance and performance orientation (See Table 2.4). The GLOBE model is not far-fetched from the cultural dimensions of Hofstede and is

also valid for evaluating national culture. Unlike the GLOBE factors, the CVF exposes the firm-specific cultural values suitable for implementing various supply chain strategies in a focal firm.

Table 2.4 presents the various cultural frameworks used in extant literature in operationalising both OC and national culture. Out of the frameworks, the CVF seems to contain dimensions suitable for assessing the sustainability or supply chain strategies of firms. However, based on the objectives of a particular research, other frameworks could be adopted to examine the impact of OC and supply chain strategies. For example, Cadden et al. (2020) used Verbeke's framework and dimensions (see Table 2.4) to examine the impact of OC on lean practices implementation.

Table 2.4 The Main Tenets of Every Organisational Culture

Cultural Frameworks	Corresponding Dimensions	Tenets of Organisational Culture						
		Developmental orientation	External Orientation	Authority Structure	Interdepartmental Collaborations	Reward system	Human Resource Development	Sustainability
Competing Value Framework Quinn and Rohrbaugh (1983) Denison and Spreitzer (1991) Cameron and Quinn (2011)	Development culture	+++	++					++
	Rational Culture			++		+++		
	Hierarchical Culture		+	+++				
	Group Culture				+++		++	++
Van Muijen et al. (1999)	Goal Orientation	+	++					
	Support Orientation						++	
	Rules Orientation							
	Innovation Orientation	++				++		

Gordon & DiTomaso (1992)	Action oriented	++	++				++	
	Rewards					++		
	Integration				+			
	Development/promotion						++	
	Accountability			++				
	Systematic decision-making			++				
	Innovation/risk taking	++						
	Clarity of strategy/shared goals	++						
Denison & Mishra (1995)	Involvement						++	
	Consistency				++			
	Adaptability	++	++					+
	Mission		++					
O'Reilly, Chatman and Caldwell (1991)	Results oriented	++						
	People oriented						++	
	Team oriented				++			
	Aggressive vs easy going			+++				
	Detail Oriented			++				

	Stability Innovation oriented	+++ +++						
House et al. (2004) **GLOBE**	Globe Factors: Future orientation Gender egalitarianism Uncertainty avoidance Power distance Performance orientation	 ++ ++ +++		 ++			 ++	
Verbeke (2003)	Results vs Process Employee vs Job Open vs Closed Loose vs Tight Normative vs Pragmatic Market vs Internal	++	 ++	 ++	 ++		 +++ +	 +

+=*minimal impact* ++=*medium impact* +++=*high level impact*

2.3.2 Competing Value Framework (CVF)

As indicated earlier, the CVF has been used in studying OC over a wide range of disciplines; particularly in the area of business and management (Porters 2019). Quinn and Rohrbaugh (1983) developed the CVF by rigorously analysing the organisational effectiveness criteria. In an attempt to develop a framework to operationalise OC, the CVF was designed to elucidate the various aspects of culture that leads to organisational effectiveness. The CVF developed by Quinn and Rohrbaugh (1983) has been used by several authors (e.g., Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Dubey et al. 2019) for examining the impact of OC on supply chain strategies. This model has been used in studying issues relating to organisational leadership, organisational development, organisational change and the implementation of strategies in operations and supply chain management (Dubey et al. 2019; Cadden et al. 2020). Due to its usefulness, it has been used in operationalising OC in this study. As indicated earlier, the CVF uses the *flexibility-control dichotomy* (see Fig 2.2) for studying operations management research due to the ability of its dimensions (see Table 3.2 and Fig 2.2) to reveal value orientations and also determine the set of competing values capable of influencing supply chain-related strategies (Dubey et al. 2019; Wijethilake, Upadhaya, and Lama 2021). The CVF categorises OC into four distinct types, namely, group (clan), developmental (adhocracy), rational (market) and hierarchical culture (see Fig 2.2) (Denison and Spreitzer 1991; Cameron and Quinn 2011).

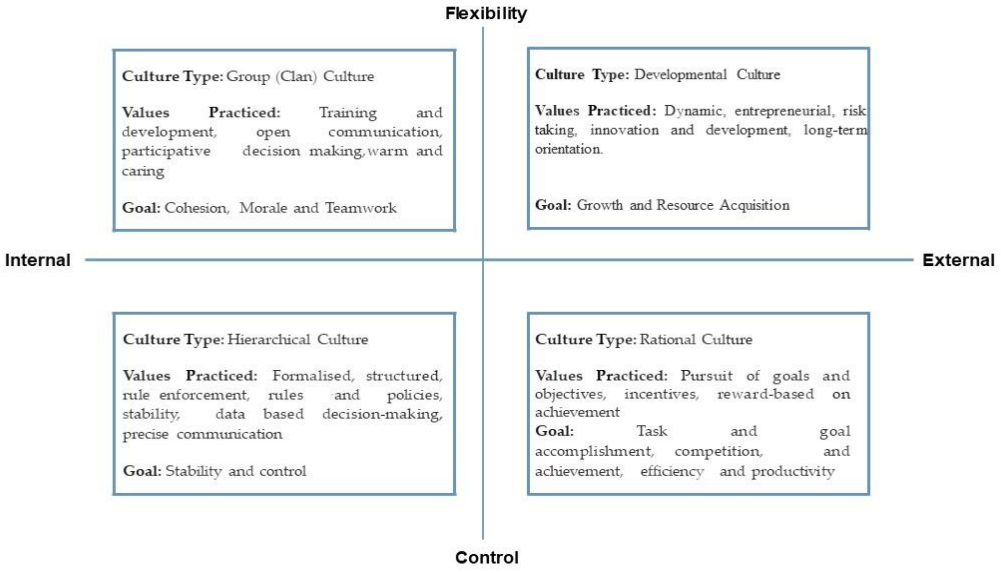

Figure 2.2 Competing Values Framework**.** Cameron and Quinn (2011)

2.3.2.1 Group Culture

Group culture represents the human relations model in the top left quadrant in Fig 2.2. Group culture emphasizes flexibility and stresses on organisations shifting more focus on internal control. It relates to clan culture due to internal structures and family-like atmosphere in group culture dependent organisations (Braunscheidel, Suresh, and Boisnier 2010). The core values in such organisations are often belongingness, trust and participation. Such organisations use attachment, cohesiveness, membership, open communication and participatory decision making as motivational tools (Denison and Spreitzer 1991, Cao, Huo, and Zhao 2015; Porter 2019). Managers and supervisors in such culture encourage cross-functional team building and place much emphasis on teamwork and supervisor-employee relationship. The goal in such organisations is to develop the human potential and stimulate high levels of employee commitment for the purpose of building cohesion and intensifying employees' morale. Moreover, there is frequent exchange of opinions and ideas, frequent holding of group meetings for discussion among employees, usage of teams to solve problems and empowering teams to attain firm objectives. The cohesive nature and teamwork of such culture increases the bond which represents an increased internal integration among cross functions. The teamwork and cross-functional collaboration encouraged is likely to help sensitise, educate and train employees on sustainability practices. It is argued that group culture can be integral to building a strong relationship among supply chain partners. However, much research is needed to examine the real impact of group culture on SSCP and SCI.

Due to the core values of such organisations, researchers often develop constructs around participation, teamwork, people focus, communication, morale and commitment (Cao, Huo, and Zhao 2015; Porter 2019).

2.3.2.2 Developmental Culture

This type of culture represents the open systems model in the top right quadrant in Fig. 2.2. Developmental culture is also considered in other studies as adhocracy or entrepreneurial culture (Braunscheidel, Suresh, and Boisnier 2010). Developmental culture is characterised by flexibility and change while maintaining high levels external control (Quinn and Rohrbaugh 1983; Cao, Huo, and Zhao 2015; Porter 2019). Organisations with high levels of developmental culture have growth, resource acquisition, innovation, creativity, adaptation, change and responsiveness as its ultimate goal (Quinn and Rohrbaugh 1983; Cameron and Quinn 2011). Leaders in such organisations encourage employees to adopt

creative approach in solving issues (entrepreneurial), take risks, develop visions, take initiatives, become idealistic and develop behaviourally (Braunscheidel, Suresh, and Boisnier 2010). With developmental culture, the emphasis is largely dependent on the individuals in the organisation, risk taking and future orientations. Developmental culture encourages flexibility and the creativity aspect of the culture is highly relevant for sustainability management and collaborating effectively with customers and suppliers. In this research, it is argued that, adopting developmental culture across the supply chain is effective for strengthening a strong collaboration among members across a supply chain.

Previous researchers have developed developmental culture constructs around creativity, growth, flexibility, innovation, building of new resources, innovative skills of the firm (Braunscheidel, Suresh, and Boisnier 2010; Linnenluecke and Griffiths 2010; Cao, Huo, and Zhao 2015).

2.3.2.3 Rational Culture

Rational culture also termed as market culture represents the lower right quadrant, thus, the rational goal model in Fig 2.2. This type of culture is characterised by low levels of flexibility but higher levels of control. The taxonomy of rational culture accentuates on productivity, maximum performance, goal achievement and fulfilment (Denison and Spreitzer 1991). The focus of this culture is to increase competitive advantage (Cao, Huo, and Zhao 2015). Cameron and Quinn (2011) stated that organisations with high rational culture maintain core values which include competitiveness, productivity and profitability. Rational culture urges firms to focus on their external partners such as customers, suppliers and other partners of the firm with the aim of maintaining its competitive position in the industry. Cao, Huo, and Zhao (2015) defined rational culture as the shared beliefs of using incentives to motivate employees to fulfil the objectives of the firm. In relation to the other types of culture, subsequent researchers have measured rational culture based on the values identified above. Since rational culture deals with the usage of incentives in stimulating employees' behaviour, it is asserted that such culture can help in the implementation and achievement of a better SSCP. However, the usage of incentive signifies that, firms which are not keen on incentives are not likely to use such culture in the improvement of SSCP.

Constructs of rational culture focuses on efficiency, task focus, rewards, goal orientation, competition, market share (Braunscheidel, Suresh and Boisnier 2010; Cao, Huo and Zhao 2015; Porter 2019).

2.3.2.4 Hierarchical Culture

The lower left quadrant in Fig 2.2, the internal process model, is represented by hierarchical culture. Hierarchical culture places much emphasis on internal focus and maintaining high levels of control (Quinn and Rohrbaugh 1983; Liu et al. 2010). The ultimate goal of such culture is the attainment of internal stability and control. Management and leaders of the organisation encourage rigorous centralized information management, precise communication, and databased system of keeping decisions (Denison and Spreitzer 1991). Organisations keen on hierarchical culture maintains a decentralized system of decision making and a formal structure of executing actions in the organisations. Managers and leaders in the organisation establish formal structure of control and authority in the organisation. Zu, Robbins, and Fredenhall (2010) asserted that firms with strong hierarchical culture have clearly specified procedures, routines and decision-making structures are more formalized. In such firms, decisions have to be approved by top management before its execution. Cao, Huo, and Zhao (2015) highlighted that hierarchical culture is characterised by a 'top-down control and coordination' in the firm.

The strict nature of such type of culture definitely mars creativity and teamwork which hinders integration and sustainability performance. This type of culture is often linked to the bureaucratic elements including strict training and rules, rigid specialization and meritocracy. Most of the researchers of organisational culture focuses the constructs on centralization, order, regulation, control, timeliness, smooth function and excessive bureaucratic characteristics of firms.

2.4 Organisational Culture and Sustainable Supply Chain Performance

According to Carter and Rogers (2008), OC constitutes one of the fundamental facilitators of SSCM as it is strongly rooted in the organisation and encompasses the organisational citizenship. Implementing sustainability practices in an organisation requires gradual redesign and restructuring of processes, structure and practices which are deeply rooted in the OC. Meaning, the existence of a suitable cultural value can trigger an improved SSCP. Crum et al. (2011) stressed that building a sustainability-supportive OC is considered as one of the approaches which can enable firms to develop respect and protect the society and the natural environment. Cadden et al. (2020) also indicated that OC provides a foundation for a successful implementation of supply chain strategies. This makes it highly imperative to determine the crucial role OC could play on the improvement and achievement of higher SSCP and also reveal the type of cultural values which can trigger and enable the

achievement of higher SSCP. Cao, Huo, and Zhao (2015) argued that the first approach to improving any supply chain strategy is the development of a supportive culture. Likewise, developing a supportive OC could be one of the safest and cost-effective approaches to improving SSCP of manufacturing firms. Linnenluecke and Griffiths (2010) also suggested that OC is one of the crucial mechanisms which can help firms in designing a resilient supply chain to respond to the environmental and social challenges. It is argued that, adopting suitable and workable cultural values along the supply chains is an ideal approach food supply chains could use to achieve higher levels of SSCP.

This can be achieved using CVF due to the effectiveness of its dimensions in directly assessing the OC of every firm. The CVF has been applied across many areas in the discipline of business and management especially in studying operations management related issues. For example, Jabeen et al. (2018) applied clan (group), adhocracy (developmental), hierarchy and market (rational culture) cultures to determine the positive impact of OC on employee issues. Other research (e.g., Zu, Robbins, and Fredenhall 2010) also applied the same dimensions in understanding the overall performance of supply chains and the organisations. The dimensions of CVF have been identified to positively influence supply chain strategies such as total quality management (TQM)/six sigma, quality and services, lean processes, SCI and supply chain effectiveness (Braunscheidel, Suresh, and Boisnier 2010; Liu et al. 2010; Zu, Robbins, and Fredenhall 2010; Cao, Huo and Zhao 2015; Porter 2019; Cadden et al. 2020). Similarly, CVF has been used in extrinsically studying the human relation aspect of operations management. The application of CVF in analysing the relationship between OC and the various aspects of operations management justifies its suitability in empirically analysing the relationship between OC and SSCP as it can reveal the specific cultural values capable of influencing SSCP. However, research on how OC can influence sustainability adoption and SSCP even along the supply chain are not forthcoming.

Since the application of CVF in studying supply chain related issues is an emerging area, almost no research has been conducted on the role on OC in achieving utmost SSCP. So far, only Linnenluecke and Griffiths (2010) conceptualised into the relationship between OC and SSCP using the CVF. Unlike this research which attempts to empirically test the influence of the dimensions of the CVF on SSCP, Linnenluecke and Griffiths (2010) only used extant literature in predicting the plausible relationship between the two dimensions. Their research only conceptualised a positive relationship between OC and SSCP. This study extends their research further by empirically examining the influence of OC on SSCP using CVF. Even though, there are limited studies on the impact of OC on SSCP using CVF, a current study by

Wijethilake, Upadhaya, and Lama (2021) have used the CVF to determine how each dimension could shift organisations towards a change for sustainability. Their study assesses how each of the four dimensions can help organisational members and their supply chain to adopt sustainability practices. Additionally, their study assesses how each of these dimensions could shift the focus of the organisational members in adopting sustainability practices. Their study also matched the sustainability practices to the type of culture which could trigger implementation of these practices. Their study found that all the dimensions of OC can help in the adoption of sustainability practices such as sustainability auditing, environmental assessment etc. This current research differs from Wijethilake, Upadhaya and Lama's research in terms of focus as this study examines how each dimension can have a direct impact on the SSCP of manufacturing firms.

2.4.1 Developmental Culture and Sustainable Supply Chain Performance

Developmental culture is often characterized by rigorous training and development of employees, open communication, flexibility and participatory decision making, social interaction, interpersonal relations, employee development and creation of a humane work environment (Cameron and Quinn 2011). This type of culture stimulates group affiliation, alignment of conflicting goals, pursuance of multiple interests, motivation and recognition of informal structures and arrangements (Scott 2003). These suggest that firms dominated by developmental culture place much emphasis on developing employees and expanding the learning and capacity building in the firm (Linnenluecke and Griffiths 2010). Additionally, manufacturing firms with high developmental culture focus on introducing polices that promotes development of productive skills, equal opportunity, work-place balance, internal staff development, environmental and societal welfare and safety, societal wellbeing, work satisfaction, employee commitment and achievement of equity in the firm. These practices increase the social performance of the firms which can be extended to the supply chain (Linnenluecke and Griffiths 2010).

Consequently, these actions are much likely to stimulate economic performance as employees are motivated to improve their productivity thereby leading to the maximization of profits. Berger, Cunningham, and Drumwright (2007) suggested that developmental culture promotes social entrepreneurship in the firm through which the promotion of sustainability practices would be advocated and highly practiced in the organisation. Though, Linnenluecke and Griffiths (2010) argued that the promotion of corporate sustainability diverts attention from profit maximization, the flexibility, encouragement of employees to improve their skills and the continuous training and development would enable easy introduction of sustainability

practices into such culture. Moreover, since developmental culture promotes the expansion of resources through coordination with global external partners along the supply chains, the food manufacturing firms and their supply chains are compelled to protect the environment as a reciprocate gesture, leading to an improvement in the environmental performance. Therefore, in this research, it is argued that food manufacturing firms with intense developmental culture are likely to achieve higher environmental, economic and social performance (SSCP) across their supply chains.

2.4.2 Group Culture and Sustainable Supply Chain Performance

Group culture implies that firms pursue a vision of maintaining high standards for goal setting, adaptability and change, visionary communication and flexible decision-making (Cameron and Quinn 2011). The main aim of this culture is to stimulate growth of the members and achieve higher levels of teamwork in the firm. Additionally, firms with higher group culture maintains a sense of moral authority, integration, quality, flexibility and increment of employee satisfaction towards the achievement of organisational objectives (Linnenluecke and Griffiths 2010). Group culture focuses on the inter-departmental and cross-functional coordination within the internal boundaries of the organisation. Manufacturing firms with high levels of this type of culture are able to easily introduce new strategies due to promotion of supervisor-employee relationship and usage of expertise from different parts of the firm to achieve the stated objectives. Additionally, such firms can design effective supply chain strategies, successfully educate employees on the various sustainability practices and firmly introduce sustainability practices into their supply chains. Employees obtain direct knowledge on how to produce environmentally friendly products, perform activities that sustain the society and acquire knowledge on how to measure environmental performance of products. Based on this, it could be argued that the values in group culture are ideal for achieving higher levels of SSCP as the members from different departments and functions in the food manufacturing firms can easily coordinate and share the needed resources and information for sustainability management and improvement.

Due to this, food manufacturing firms promoting high levels of group cultural values are likely to achieve higher levels of SSCP. Group culture develops internal employees and policies that extend firms' actions beyond only pollution (Linnenlueke and Grifiths 2010) to the supply chain regardless of its global nature and helps in performing responsible acts towards saving the environment and society while at the same time maintaining higher profitability levels. In this research, it is argued that food manufacturing firms with high levels of group culture are able to achieve higher levels of SSCP across their supply chains.

2.4.3 Rational Culture and Sustainability Supply Chain Performance

Rational culture is characterised by goal setting and planning, instructional communication, usage of incentives and rewards, with its focus on achieving organisational objectives through motivation and incentives. Rational culture is externally focused and characterised by high levels of controls. It encompasses planning, forecasting, controlling, and effective design of a reward system that incorporates responsiveness to the external environment and achievement of the stated objectives (Linnenluecke and Griffiths 2010; Cao, Huo, and Zhao 2015; Porter 2019). This type of culture involves the use of adequate remuneration and reward system, resources, goal setting and efficient planning systems to generate higher performance (Cameron and Quinn 2011). Rational culture creates corporate sustainability consciousness due to efficient use of resources by firms. Managers can introduce sustainability practices into the supply chain as part of the goals of the organisation and through efficient rewards, planning system and incentives channel employees' behaviour towards the attainment of sustainability goals. The efficient use of resources means firms aim at reducing cost, increasing profit, reinvesting profits in the firms and the protection of the environment. As the food supply chains extend across boundaries, firms can easily ingrain sustainability along the global supply chain and encourage employees and partners to focus on achieving high levels of SSCP when incentives are utilised.

Pagell and Wu (2009) suggested that since sustainability in the supply chain requires an enormous organisational commitment, firms can be successful at fully implementing sustainability in the supply chain when incentives and rewards are used as motivational tools. Based on this, it is argued that food manufacturing firms utilising rational culture is expected to easily introduce sustainability practices to attain a higher SSCP.

2.4.4 Hierarchical Culture and Sustainable Supply Chain Performance

Hierarchical culture is characterised by centralization where lower-level managers are restricted from making independent decisions. The centralization system present in the firm limits the motivation of employees and constrain employees' choices and actions in the firm. Cameron and Quinn (2011) suggested that the high conformity to rules and regulations in such firms are relatively effective given a stable environmental condition and allows for maximisation of production of goods and services. This shows that the lack of flexibility in such firms enables the full achievement of the profitability goal of the firm. In this environment, only economic performance of sustainability is likely to be pursued and achieved (Linnenluecke and Griffiths 2010).

Aragon-Correa and Sharma (2003) argued that the pursuance of only economic performance is not sufficient for firms to be highly sustainable. Since hierarchical culture restrains innovation and creativity which are crucial elements for sustainability, an introduction of sustainability would conflict the existing culture which leads to initial problems in the supply chain. According to Berger et al. (2007) hierarchical culture-oriented firms are likely to pursue sustainability if it leads to the maximisation of profits (economic performance) and attainment of competitive advantage. Moreover, since sustainability has gradually become a legal requirement and customers of food supply chains are continuously exerting pressure on them to comply with sustainability policies, the food manufacturing firms with hierarchical culture would pursue and easily introduce sustainability in the firm and across the supply chain, thereby, increasing SSCP. Like Linnenluecke and Griffiths (2010), this research argues that food supply chains with high levels of hierarchical culture are likely to achieve a higher economic, environmental and social performance (SSCP).

2.5 Supply Chain Integration and Sustainable Supply Chain Performance

Currently, the essence of SCI has received traction in supply chain literature as an enabler of several supply chain strategies. Elkington (1998) suggested that an effective long-term relationship in the supply chain is a prerequisite to achieving sustainable performance in a firm. Currently, the effective implementation of sustainable acts in firms require the close working relationship with supply chain partners as well as the strong alliance with external stakeholders such as NGOs and governmental organisations. Pagell and Wu (2009) also suggested that forming a strong collaborative relationship with customers and suppliers are prerequisites for establishing an environmentally and socially sustainable supply chains. For example, environmentally sustainable issues can be solved through partnership with environmental NGOs while customers could also provide valuable suggestions such as green packaging (Yu et al. 2014). Additionally, food manufacturing supply chains with extended and active collaboration with customers and suppliers are better suited and prepared to implement and perform sustainable acts to eventually attain better competitive advantage (Amoako et al. 2020). Since most of the food supply chains are mostly global, effective measurement and achievement of sustainability performance requires collaborative effort and sharing of resources among the global supply chain partners. Seuring and Mueller (2008) acknowledged the need for firms to integrate before the implementation of sustainable activities. Effective collaboration with suppliers also acts as a tool for addressing social issues through certifications (Pagell and Wu 2009).

Hassini, Surti, and Searcy (2012) further considered SSCM as constituting six fragments; sourcing, transformation, delivery, value proposition, customers and recycling and each of the elements are interdependent. The interlinkage between each of the fragments requires the specialized relationship and the continuous sharing of information. In the same vein, correcting the waste that results from the supply chain require the interrelationship and combination of resources between the partners of the supply chain. Currently, close loop supply chains have reverted to include reverse logistics, recycling, remanufacturing and reclamations which are all components of SSCM. The closed-loop activities of the supply chain may direct the relationship between firms, customers and suppliers and further strengthen the relationship between the supply chain partners (Guide and Van Wassenhove 2003).

The relevance of SCI to operations management provides enough rationale for linking it to SSCP. This is due to the importance of inter-firm relationship to the implementation of the SSCM practices. As indicated earlier, the cooperation between firms, suppliers and customers is very vital for the successful implementation of SSCM. Therefore, the performance of sustainable practices requires the close collaboration between the resources of the supply chain partners. Customers create the awareness through the identification of environmental and societal issues and suppliers need the implementation ISO certifications and standards. Additionally, further coordination of resources and data for measurement of environmental impacts of products across the supply chain (Wijethilake, Upadhaya, and Lama 2021) is needed for SSCP. In this research, it is argued that manufacturing firms alone do not thrive during the implementation of sustainable practices. In the food manufacturing supply chains, where most of the customers of firms are major retailers in the country, the customers are likely to play a key role in the enforcement of sustainability management practices, provision of information on the type of green packaging and environmentally friendly processes to adopt (Yu et al. 2014). Failure of firms to comply with the demands of the customers results in the boycott of their products. Suppliers, on the other hand, are needed to adopt environmentally friendly ways of extracting and transporting raw materials. However, there is paucity of research examining the impact of both internal and external integration on SSCP.

Kang et al. (2018) empirically conducted a research on how SCI help in the implementation of sustainability practices in manufacturing firms. The research adopted the three dimensions of SCI and researched their relationship on inter-organisational and intra-organisational sustainability management practices (SMPs). The research used the IMSS-VI

survey data collected between the 2013 and 2014 from 22 countries over America, Asia and Europe. Using structural equation modelling (SEM) technique, their research placed much emphasis on external integration, specifically, supplier integration and found a positive and significant relationship between customer and supplier integration and SMPs and eventually, found a positive relationship between SMPs and SSCP. However, the positive relationship between the elements does not strictly imply a direct relationship between SCI and SSCP. Unlike their research, this current study reveals the current SMPs and establishes a direct relationship between all the dimensions of SCI and SSCP.

Moreover, Weingarten, and Longoni (2014) also researched on the impact of SCI on operational and sustainability performance improvement. The main aim of the study was to analyse how coordinative and collaborative SCI could improve operational, environmental and social sustainability performance. However, their study only employed external integration dimensions. After a survey with Indian firms and analysis with SEM technique, their study found a positive relationship between external integration and sustainability and operational performance. Unlike this research, their study also failed to consider the influence of internal integration and the possible interaction/mediation effect of other factors on the relationship.

Blome, Schoenherr, and Eckstein (2014) also conducted a study on the effect of supply chain collaboration and sustainability performance through profile deviation analysis. The main purpose of the study was to analyse the deviation from an optimal profile of supply chain collaboration and its detrimental effect on sustainability of 259 European manufacturing firms. After analysing the survey with SEM technique, the study found that alignment between supply chain initiatives does have a positive impact on sustainability and the effects of alignment on performance measures are mediated by internal sustainable production. However, their study also employed only external integration dimensions and only assumed the positive effect of internal integration, unlike this study which considers the effect of internal integration and further tests the mediation role of external integration, on the internal integration-sustainability performance relationship.

Han and Huo (2020) assessed the impact of SCI on green supply chain performance. Their research found that SCI is highly relevant for green supply chain performance and further confirmed that, within the context of green supply chain performance, internal integration is relevant for external integration. That is, the strength of SCI on green supply chain performance depends on the strength of internal integration. Their study only focused on environmental aspect of the TBL whereas this study assesses the impact of SCI on the

social, environmental and economic performance. The scope of sustainability measurement used in this study is wider than the measures adopted by Han and Huo.

2.5.1 Internal Integration and Sustainable Supply Chain Performance

The essence of internal integration to a strong formation of external integration has been highlighted in extant literature (Stank, Keller, and Daugherty 2001; Flynn, Huo, and Zhao 2010). This explains the important role internal integration plays in a traditional supply chain. Within the context of sustainability, a stronger internal arrangements and support need to be put in place before forging a closer relationship with supply chain partners and implementing sustainability practices into the supply chain. Kang et al. (2018) and Sehnem et al. (2019) asserted that top management support, environmental commitment policies and proper performance systems are crucial prerequisites to sustainability performance. This implies that, developing a strong sustainability practices and environment such as recycling policies, carbon footprint tracking, water and energy reduction, improvement of employee welfare in a global supply chain can be triggered by top management support and commitment. Maintaining employees' well-being and safety can be greatly achieved through a strong internal management support and training of employees. Improving SSCP in the firm and the supply chain would require sensitization programs, training of employees, cross-functional teamwork and education. Food manufacturing firms with strong sustainability teams and policies are able forge a close working relationship with customers and suppliers (Linnenluecke and Griffiths 2010). This portray that a strong internal integration is a pre-requisite to external integration and through this, SSCP can be enhanced. This means internal integration provides all the basis through which customers and suppliers can be easily integrated into the supply chain. Based on this, this research argues that food manufacturing firms and their supply chains are able to achieve higher SSCP when there is an effective internal integration.

2.5.2 Customer Integration and Sustainable Supply Chain Performance

Kang et al. (2018) highlighted that firms able to implement and adequately respond to the needs and demands of customers experience a higher operational and financial performance. Furthermore, within the context of sustainability, customer pressure constitutes one of the significant factors influencing the implementation of sustainability practices. In the food supply chains where customers are expecting food safety not to be compromised (Ghadge et al. 2020), there is a consistent pressure from customers on firms to implement sustainability practices. Customer integration is also necessary to obtain the necessary

information to tailor the products to customers' sustainability demand (Gelhard and von Deft 2016). In the food supply chains, customers, who are the retailers, encompass a strong party across the chain so the food manufacturing firms are obliged to form a strong working collaboration with them. The retailers also possess first-hand information about the sustainability demands of lower-tier customers. This means sustainable products can be produced when customers are strongly involved. Yu et al. (2014) and Wijethilake, Upadhaya, and Lama (2021) confirmed that customers are very significant for providing ideas of the type of sustainable packaging and materials to adopt and determination of the environmental performance of products.

Every food supply chain requires resources such as information, knowledge and skills for sustainable materials sourcing, improving sustainable production (Blome, Schoenherr and Eckstein 2014) from the customers to improve the design and production of environmental-friendly products. Producing according to the sustainable demands of the customers increase profitability of the firms and their supply chain. Due to this, it is argued that food manufacturing firms with a strong integration with customers can strengthen the acquisition of resources, knowledge and information pertinent to achieving higher levels of SSCP.

2.5.3 Supplier Integration and Sustainable Supply Chain Performance

Pagell and Wu (2009) indicated the significance of collaborating strongly with suppliers for the purpose of improving SSCP while Seuring and Muller (2008) also reiterated the need for firms to build a strong collaboration with their suppliers in the chain. Most manufacturing firms are closely working with their suppliers purposely for achieving a better sustainability performance through certifications (Pagell and Wu 2009; Kang et al. 2018). In the implementation of SMPs, Kang et al. (2018) found that suppliers play a crucial role. Through an effective integration, manufacturing firms are able to obtain the necessary sustainable raw materials and further provide ultimate assistance to firms in designing sustainable products (Adesenya et al. 2020). By implication, food manufacturing firms and their supply chains practicing supplier integration manifesting through joint environmental goal setting, environmental planning, collaborative pollution reduction and mitigating negative environmental practices are capable of achieving a better sustainability performance. Additionally, the continuous pressure from the customers in the food manufacturing industry can be handled through a strong collaboration with suppliers. Through supplier integration, relational resources such as knowledge, joint product design, skills (Blome, Schoenherr and Eckstein 2014) to maintain a sustainable supply chain can be exchanged between suppliers

and focal food manufacturing firms. Based on this, this study argues that supplier integration is highly crucial for improving SSCP.

2.6 Organisational Culture and Supply Chain Integration

Among the antecedents of SCI, OC seems to be the most plausible and controllable factor yet there is paucity of research on their relationship (see Table 2.5). Existing research on OC and SCI are summarised in Table 2.5. Like every supply chain phenomenon which requires the support of OC, SCI must also be built into the culture of every firm. Research (e.g., Porter 2019) often consider OC as the most proximate determiner and antecedent of SCI due to the crucial role it plays in supply chain management (Cao, Huo, and Zhao 2015). Most importantly, due to its role in defining and regulating the behaviour of employees, operations management strategies and the internal relationship within and outside firms. OC determines the skills, relationship and help to place a level of measure on the extent to which firms can enter into the relationship with supply chain partners. According to Cao, Huo, and Zhao (2015), Japanese firms have failed with their supply chain relationships due to lack of rigorous OC. This depicts the important role OC plays in SCI. The findings in the previous research as presented in Table 2.5 depicts the strong connection between OC (CVF) and SCI of firms. This makes it highly necessary to determine the types of values capable of instilling easy integration with supply chain partners (customers and suppliers) and sensitize employees towards forming a strong integration with the supply chain partners. So far, only few empirical studies have been conducted on the impact of OC on SCI. The findings of extant studies present divergent views requiring more research on the relationship between OC and SCI

Table 2 .5 Previous research on Organisational Culture and Supply Chain Integration

Author (Year)	Dimensions of OC	Dimensions of SCI	Theoretical Lens	Findings	Inconsistencies/Gaps
Singh, D., Sharma, R.R.K. (2016)	Clan culture (CC), Adhocracy culture (AC), Market culture (MC) and Hierarchy culture (HC)	Customer (CI), Supplier (SI) and Internal Integration (II)	N/A	Theoretical Review, organisational culture is not widely studied.	1. More studies are needed to examine the relationship between the CVF dimensions and SCI 2. Whereas Yunus and Tadisina (2016) found a positive relationship between OC (CVF) and SCI Cao, Huo and Zhao (2015) found a positive relationship between flexible culture (GC and DC) and SCI but mixed results between control culture (RC and HC) and SCI (e.g -ve relationship between HC and SCI). 3. Like Cao, Huo and Zhao (2015), Braunscheidel, Suresh and Boisnier (2010) also found a positive relationship between flexible culture and SCI but mixed results between control culture and SCI. 4. Porter (2019) found a positive relationship between flexible culture and only external integration (CI and SI) but no relationship between flexible culture and II. The
Yunus and Tadisina (2016)	Clan culture, Adhocracy culture, Market culture and Hierarchy culture	SCI (unidimensional construct)	N/A	+ve relationship between SCI and firm performance +ve relationship between OC, customer orientation and SCI	
Cao, Huo and Zhao (2015)	Hierarchical culture (HC), rational culture (RC), group culture (GC) and developmental culture (DC)	Internal, customer and supplier integration	Contingency and configuration theories	+ve relationship between DC and GC and SCI. +ve relationship between RC and II. -ve relationship between HC, II and CI.	

Braunscheidel, Suresh and Boisnier (2010)	Adhocracy, market, clan and hierarchical cultures	Internal, customer and supplier integration	N/A	+ve relationship between OC with CI and SI. -ve relationship between HC and II, CI and SI	study also found no relationship between control culture and SCI.
Porter (2019)	Hierarchical (HC), rational (RC), group (GC) and developmental culture (DC)	Internal, customer and supplier integration	Relational View Theory	+ve relationship between GC and CI and SI +ve relationship between DC and CI and SI	

**+ve-positive *-ve-negative *N/A-Not Available *HC-Hierarchical Culture *GC-Group Culture *RC-Rational Culture *DC-Developmental Culture*

Porter (2019) researched into the relationship between OC and SCI using the dimensions of CVF. The main purpose of the study was to analyse the correlation between OC, SCI and firm performance using RVT. After conducting Likert-type scale survey, with 201 supply chain and procurement specialists working in various companies in the US, the study found only flexible culture (group and developmental) as influencing the SCI and firm performance. Singh and Sharma (2016) developed a theoretical framework relating SCI with culture. In measuring SCI, the research adopted customer, supplier and internal integration while clan, adhocracy, market and hierarchy dimensions were adopted to measure OC. The study rigorously reviewed the strategies through which firms can match OC with SCI, however, the extent to which OC impacts SCI was not quantitatively determined. Moreover, the study reviewed just a few research papers, and this is due to the limited research on the issue of OC and SCI. The study also confirmed the inadequacy of research on the relationship between the variables and therefore, suggested for more research on OC and SCI.

Yunus and Tadisina (2016) also used survey to empirically research into the role of OC as a driver of SCI. Similarly, the research adopted the CVF approach in assessing the OC of firms and used customer, supplier and internal integration as the dimensions of SCI. However, SCI was considered as a unidimensional variable. Measuring SCI as a unidimensional variable do not reveal the actual impact of the individul dimensions of SCI. The study, however, did not reveal the actual relationship between the variables and failed to determine how the dimensions of each of the variables impact on each other. The study also confirmed that much research is still needed to strengthen the relationship between OC and SCI. Their study suggested that longitudinal studies on SCI and firm performance should be conducted and future researchers should adopt different methods in testing the relationship between SCI, drivers and firm performance.

Cao, Huo, and Zhao (2015) comprehensively investigated the impact of OC on SCI by employing contingency and configuration approach. In measuring OC and SCI, their research adopted internal and external integration and the dimensions of the CVF, thus, hierarchical, rational, group and developmental culture respectively. After quantitatively analysing their relationship with SEM, the study confirmed; the inconsistency in extant literature regarding the findings of OC and SCI, inadequate research on smaller firms and lack of research on either the suppliers or customers of a focal firm. Their research requested for more empirical studies on the influence of OC on SCI.

Braunscheidel, Suresh, and Boisnier (2010) researched into the impact of OC on SCI using the CVF and similarly, adopted internal and external integration and adhocracy, clan, market and hierarchical culture in operationalising SCI and OC respectively. Their research adopted no underlying theories for measuring both OC and SCI. Their study conducted a survey using questionnaire with 218 firms from different industries and performed SEM analyses. The study found a relationship between some of the dimensions of OC and SCI. The study also found SCI as mediating the relationship between OC and delivery performance. The study sought to establish a link between OC and SCI and subtly looked at the mediating role of SCI between OC and delivery performance. This current research tries to empirically examine the link between OC and SSCP and evaluates the mediating role of SCI in the relationship.

Naor et al. (2008) empirically studied the role of OC on quality management, performance infrastructure and core quality. The study quantitatively analysed the relationship by adopting rational, hierarchical, group and developmental culture in conceptualising OC of firms. However, the study could not identify major theories underpinning CVF and quality. Similarly, the study confirmed that research on culture and performance in operations management is limited. Their study further suggested that, multiple models should be used in testing the relationship between OC, performance and SCI.

2.6.1 Developmental Culture and Supply Chain Integration

Developmental culture can be explained as an organisational atmosphere which makes members of a firm pursue a common goal (Braunscheidel, Suresh and Boisnier 2010; Cao, Huo, and Zhao 2015). Meaning, developmental culture brings members in the supply chain together to develop and pursue common goals. The presence of developmental culture enables employees to pursue only activities that are related to the long-term developmental goals of the organisation. Due to the complexity of implementing strategies in the food manufacturing firms and supply chains, a strong internal integration is deemed to be highly beneficial. Therefore, strong internal collaboration, can be greatly enhanced by the presence of a strong developmental culture in an organisation as members work collaboratively towards ensuring the long-term goals of the firm are achieved. In other words, developmental culture achieves collaboration through the constant sharing of information and technology. This enhances the possibility of internal members and supply chain partners conducting a unified R&D, collaboratively identifying opportunities, forecasting future demands and supply, taking risk and short-term losses (Cao, Huo, and Zhao 2015).

Thus, a strong development culture helps supply chain partners collaborate effectively in pursuing the objectives of the supply chain. The flexible nature of such a culture encourages the employees in the focal manufacturing firms to integrate easily with the supply chain partners. In the food manufacturing industry, through joint product designs and collaboration of resources and information between the focal manufacturing firms, customers and suppliers, the focal firms are able to produce the desirable and innovative products. Due to this, this research proposes that food supply chains with a strong developmental culture have the capability of remitting such integration to their partner firms thereby strengthening SCI.

2.6.2 Group Culture and Supply Chain Integration

The organisational environment where there exist common set of values of shared team cooperation and this cooperation practised by the members in the organisation is referred to as group culture (Cao, Huo and Zhao 2015). The existence of a group culture in a firm means members share a common reason, respect a common element of their connection, share collective knowledge and practise them together. The team cooperation speeds up the collaborative capability of the firm thereby triggering the ease of sharing information and collaborative working spirit. Team cooperation is highly essential for SCI as it enables the integration of suppliers, firm and customers to achieve a common goal and jointly solve problems (Flynn, Huo, and Zhao 2010).

In today's global supply chain typically in the food manufacturing industry, firms that form a strong team with their supply chain partners are able to quickly withstand competitions and mostly outcompete competitors. The teamwork spirit present in this type of culture makes it ideal for integration activities. Additionally, the firms can easily obtain the relational knowledge, resources, skills and information needed from their supply chain partners (Blome, Schoenherr, and Eckstein 2014; Weingarten et al. 2015). Therefore, a firm with a strong group culture enables team cooperation to be transferred from within the firm to their supply chain partners to withstand turbulent situations. Furthermore, the presence of group culture improves mutual understanding and greatly encourages trust which are all catalyst for integration. In this research, it is argued that firms with high levels of group culture are likely to achieve strong levels of SCI.

2.6.3 Rational Culture and Supply Chain Integration

Cao, Huo and Zhao (2015) explained rational culture as all the commonly shared beliefs, practices and incentive systems necessary to motivate members in the firms to pursue the stated objectives. The challenges faced by organisations from their internal and external

environment can be partly mitigated through the institution of adequate incentive measures to stimulate and sustain organisational performance. Currently, firms are instituting financial and moral incentives to drive employees towards the attainment of organisational objectives. Manufacturing firms with adequate rational culture tends to have employees working together to attain the stated objectives of the organisation (Denison and Spreitzer 1991). This meams, food manufacturing firms which place much emphasis on rational culture encourage their employees to gear all efforts and resources towards integrating internally and extending such efforts to their supply chain partners. Well-instituted incentive systems help employees to work collaboratively as a step towards achieving internal integration and extending such effort to their supply chain partners (Braunscheidel, Suresh, and Boisnier 2010; Linnenluecke and Griffiths 2010). Therefore, in the food manufacturing industry, firms which rely heavily on the use of rational culture are likely to attain strong internal integration in lieu of customer and supplier integration. However, since employees are likely to pursue all stipulated goals of the firm to obtain achieve high levels of incentives, they are likely to pursue the stipulated external integration target or objectives of the firms. Based on this, it is argued that rational culture is likely to positively influence the SCI of the firms.

2.6.4 Hierarchical Culture and Supply Chain Integration

Cao, Huo, and Zhao (2015) defined hierarchical culture as the values of an organisation that elaborates the control and coordination structure of the firm. Organisations with a strong hierarchical culture place much emphasis on rules, polices, procedures, chain of command and mostly centralised decision-making. Such organisations are often characterised by formalisation (Zu, Robbins, and Fredenhall 2010) and operate based on laid-down rules, structure and regulations. Many researchers assert that hierarchical culture hinders internal and external integration due to its authority and strict nature (Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Porter2019). Braunscheidel, Suresh, and Boisnier (2010) suggested that employees in a hierarchical culture-dense manufacturing firms are more likely to develop a mentality of functional silos, meaning, cross-functional information sharing, and decision-making become cumbersome, hence, internal and external integration may be difficult. Hierarchical culture impedes collective decision making and therefore, SCI becomes difficult to practice (Wong, Boon-Itt, and Wong, 2011). Contrarily, it could be argued that since hierarchical culture is defined by stability, control and internal focus, supply chains with a strong hierarchical culture are able to maintain discipline and focus, hence, integration becomes easy to practice. It could be inferred that as food supply chains have global supply chain partners, it may be difficult to maintain an OC that lacks flexibility.

Braunscheidel, Suresh, and Boisnier (2010) and Cao, Huo, and Zhao (2015) all found a negative relationship between hierarchical culture and SCI. However, due to the quest to increase profit, food supply chains with a strict authority structure will still encourage integration if it leads to higher profitability of the supply chain. This research maintains that hierarchical culture of the food manufacturing supply chains, if well-practiced and managed would have a positive impact on the internal, customer and supplier integration since stability, focus, and strict control enables suppliers relate in a stable and focused manner.

2.7 Gaps Derived from Extant Literature

This section presents the gaps obtained from the extensive review of the literature on OC, SCI and SSCP. These inform the purpose and the significance of the study to extant literature.

OC has seemingly been ignored in operations management research notwithstanding the outstanding contribution it makes to supply chain and sustainability. Little is known about the real contribution OC makes to sustainability performance and other supply chain activities of firms (Miska, Szocs, and Schiffinger 2018). In as much as OC has been considered as a backbone of the organisation in implementing policies and practices, little research has been conducted on what constitutes sustainable-oriented OC and this argument is also confirmed by Linnenluecke and Griffiths (2010). Extant literature is replete on examining the relationship between OC and sustainability, however, only Hofstede's dimensions of measuring culture has been used. Hofstede's dimensions of measuring culture as earlier depicted; are more suitable for assessing OC within a country's cultural context or for measuring how national culture influences the culture of a focal organisation. Additionally, extant literature has focused more on examining the environmental performance other than social and economic performance of firms.

Since the CVF contains the dimensions which investigate the specific OC practices, it is worthwhile CVF is used in examining the relationship between OC and SSCP. Research on how firms, through the dimensions of the CVF, can infuse cultural values and change to become sustainability-oriented is not forthcoming. Extant theories and models on the impact of OC have not been rigorous in essentially explaining how cultural change can be initiated and turned into a subject of managerial intervention (Linnenluecke and Griffiths 2010). Since the dimensions of CVF reveals the practical cultural values practiced in firms, lack of research on the type of culture leads to the inability of firms to clearly pinpoint the exact type of values which could improve SSCP.

The significant role of OC in the implementation of various strategies including SCI has been stressed in extant literature, however, only a handful of research have focused on examining the relationship between the concepts. Braunscheidel, Suresh, and Boisnier (2010), Cao, Huo, and Zhao (2015) and Porter (2019) empirically researched into the possible relationship between the dimensions of OC and SCI, however, there is lack of consensus in their findings. For example, Braunscheidel, Suresh, and Boisnier (2010) revealed that only developmental culture and rational culture have a positive relationship with customer and supplier integration but not internal integration. Porter (2019) also revealed a positive relationship between only group and developmental culture and external integration. On the other hand, Cao, Huo, and Zhao (2015) found a positive relationship between rational culture and internal integration. All the research found a negative relationship between hierarchical culture and SCI. Only three of the research have been conducted on the relationship between concepts so far (see Table 2.5) leaving a wide gap for more research into the relationship between the concepts to be studied further.

Currently, there is an interchange of sustainability ideas between firms and their suppliers (Kang et al. 2018). Since sustainability is currently measured along the supply chain, it is expected that both firms and their major suppliers become highly sustainable. Kang et al. (2018) researched and confirmed the importance of supplier integration in achieving higher sustainability performance or meeting the principles outlined in ISO 14001. Blome, Schoenherr, and Eckstein (2014), Weingarten and Longoni (2015) and Kang et al. (2018) have all revealed that both supplier and customer integration are relevant for achieving a higher sustainability performance. The role of internal integration in the implementation of sustainability practices have completely been ignored in extant literature. Additionally, the direct impact of SCI and sustainability performance across the supply chain have also been ignored in extant literature. It is highly essential for firms to understand the type of integration (customer, internal and supplier) firms need to place much emphasis on to attain and strengthen SSCP.

While firms are taking keen interest in the implementation of SCI and sustainability, the essence of SCI on the supply chain needs to be studied further. SCI can serve as a mediating factor on the implementation of many supply chain strategies including SSCP. However, research on the mediating role of SCI is not forthcoming. Braunscheidel, Suresh, and Boisnier (2010) researched into culture, SCI and delivery performance and suggested that the individual dimensions of SCI have partial and negative mediation relationship between OC and delivery performance. This research, however, holds that, SCI has become an integral element in the

supply chain and a requisite strategy which can aid in the implementation of several supply chain management practices including sustainability. Therefore, it is expected that within the context of sustainability performance, SCI can serve as a mediator between OC and SSCP.

2.8 Underlying Theories and Hypothesis Development

In this section, the various theories employed in assessing the relationship between OC, SCI and SSCP are discussed. The reasons for adopting the various theories are also extensively discussed.

2.8.1 Resource-Based View Theory (RBV)

RBV theory was propounded by Wernerfelt (1984) and it can be explained as the competitive advantage firms obtain from possessing heterogeneous resources. According to the theory, firms that possess rare, inimitable, non-substitutable resources in the industry can obtain a high competitive advantage than other firms (Barney 1991). Such resources can be in various forms; assets, technology, knowledge, human resources and other capabilities presented in the firm (Wade and Hulland 2004). In this research, it is argued that an OC which trains employees and increases their productivity, skills and knowledge shapes the employees into becoming a valuable asset to the firm. Suppliers and customers have gradually become a source of constant competitive advantage to many supply chains. Customers provide relevant information about the supply chain and how the products could be improved, while suppliers collaborate with firms for product design, reduction in lead time and overall improvement in quality. This implies that supply chains adopting an OC which creates avenue for constant sharing of information, resources and assets between members along supply chains are likely to experience and achieve highly competitive advantage and stimulate higher levels of firm and supply chain performance. Based on this, this research argues that, the theory can be useful in examining the relationship between OC and SCI. In as much as the RBV theory has been used extensively in supply chain literature it has not necessarily been applied in examining the relationship between OC and SCI.

2.8.2 Institutional Theory

Institutional theory assumes that social structures within and outside an organisation facilitate or restrain organisational performance and adoption of strategies. Miska, Szocs, and Schiffinger (2018) states that institutional influences in the form of rules, laws and shared conceptions of social reality may impact on the behaviour of firms. Iarossi et al. (2013) highlighted that these institutional pressures enable the adoption of certain activities and strategies by the firm. According to the theory, firms respond to these pressures for the

purpose of gaining or seeking legitimacy and mostly for survival or thriving (Scott 2008; Iarossi et al. 2013; Miska, Szocs, and Schiffinger 2018). Several supply chain authors have used institutional theory to explain why firms adopt sustainability practices. For example, Husted and Allen (2006) asserted that the institutional pressures were responsible for the adoption of sustainability by several multinational companies while Miska, Szocs, and Schiffinger (2018) also explained that firms adopt sustainability practices for the purpose of gaining legitimacy in the environment. Iarrosi et al. (2013) claims that both internal and external pressures of a firm influence the adoption of sustainability practices. Scott (2008) also revealed that managers and CEOs are internal actors capable of instilling sustainability practices in a firm.

Customers of the food supply chains are continuously exerting pressure on the firms to adopt sustainable practices (Ghadge et al. 2020). Due to this, sustainability has become a legal requirement, which means supply chains are likely to instil sustainability practices purposely to gain legitimacy and profitability. Meaning, firms are susceptible to introducing sustainability into the organisation regardless of the type of OC (developmental, group, rational and hierarchical) practiced or used, mainly to gain legitimacy. This further suggests that regardless of the OC practiced, firms would take reasonable measures to ensure the sustainability practices are successfully ingrained into the supply chain and also strive to attain a higher SSCP. Based on this, it is argued that the various dimensions of OC are likely to have a positive relationship with SSCP.

2.8.3 Relational View Theory (RVT)

According to the RVT, the fundamental practice of every partnership rests on trust, consistent information sharing, coordination of efforts and joint decision-making (Porter 2019). In order to build and strengthen the competitive advantage of firms through several strategies Dyer and Singh (1998) proposed the RVT. The theory advocates that firms can obtain high level of competitive advantage through a network or dyads of processes, firms or routines working together as a unit. This explanation demonstrates the need for firms to integrate information, assets, efforts, skills and resources in their supply chain. Dyer et al. (2018) further stressed that firms' performance or value could be enhanced through a strong establishment and sharing of information, trust, resources, knowledge, skills and investment with other external partners. The RVT provides a strong foundation for explaining the improvement of SSCP from the perspective of SCI. Based on this, it can be projected that forming a strong relationship with supply chain partners where there is constant sharing of information, resources, skills and knowledge across the supply chains could help in attaining a better SSCP. It is therefore, argued that since customers in the food supply chains exerts a

great influence and provides significant sustainability suggestions, forming a strong alliance with the customers and extension of such integration to suppliers amid consistent exchange of vital information, skills, resources and knowledge can be a precursor to attaining an improved SSCP. Since the food supply chains are global, coordination of data, information and knowledge between the supply chain partners can help in the computation of life cycle assessments (LCA) and social impacts across the supply chain (Wijethilake, Upadhaya, and Lama 2021). This research like extant studies such as Blome, Schoenherr, and Eckstein (2014) contributes to literature by examining SCI and SSCP from the perspective of the RVT.

2.9 Hypothesis Development

In this section, the hypotheses for the study are developed using the theories identified. Four main hypotheses each with sub-hypotheses are presented. Afterwards, the conceptual framework of the study is developed. The hypotheses are derived from the review into the relationship between the various variables examined earlier.

2.9.1 The relationship Between Organisational Culture and Sustainable Supply Chain Performance (SSCP)

A firm with sustainability implanted in the culture is likely to promote environmental practices such as reuse, recycle and remanufacturing and generally environmentally friendly practices (Sarkis, Gonzalez-Torre, and Adenso-Diaz 2010) and also promote employees' health and well-being (Pagell and Gobeli 2009). Porter (2019) argued that every successful supply chain strategy is supported by a consistent culture in a firm. This suggests that several cultural values should be established within the internal boundaries and even across the supply chain to ensure the success of sustainability implementation. This means the cultural values should be ingrained within the structures of the firm and the supply chain before SSCP can be enhanced. Therefore, supply chains can only achieve a higher SSCP when the internal elements and supply chain members of the organisation are made sensitive of sustainability issues. As indicated, flexible and control cultures could create an enabling environment for instituting and implementing sustainability practices along the supply chains of various global supply chains of which the food supply chains are of no exemption.

So far only Linnenlueke and Griffith (2010) has conceptualized that all the dimensions of CVF would have a positive relationship with sustainability performance of firms. Their research opined that since hierarchical culture is characterised by strict authority structure, it distorts the introduction of sustainability of manufacturing firms. Wijethilake, Upadhaya, and Lama (2021) have also argued that the dimensions of CVF are useful in shifting organisational

members' behaviour towards the implementation of sustainability practices. Nonetheless, Berger et al. (2007) confirmed that hierarchical culture-oriented firms are likely to pursue sustainability if it leads to the maximization of profits (economic performance) and the attainment of competitive advantage both in the firm and across the supply chain. According to institutional theory, and in this contemporaneous era of sustainability enforcement, regardless of the type of OC, food manufacturing firms and their supply chains are likely to pursue sustainability if it leads to legitimacy, survival and profitability. This means irrespective of the culture practiced, food manufacturing firms would strive to achieve a fit between the OC practiced and sustainability practices. Therefore, this research argues that all the dimensions of OC would have a positive influence on SSCP of a typical food manufacturing firm. That is, in the food manufacturing firms both flexible (group and developmental cultures) and control cultural values (rational and hierarchical cultures), can enhance sustainability performance which can be extended across their supply chains. This research, therefore, proposes that;

***H1**: Organisational culture has a positive influence on SSCP*

H1a: Developmental culture is expected to have a positive influence on SSCP

H1b: Rational culture is expected to have a positive influence on SSCP

H1c: Group culture is expected to have a positive influence on SSCP

H1d: Hierarchical culture is expected to have a positive influence on SSCP

2.9.2 The Relationship between Organisational Culture and Supply Chain Integration

OC determines the skills, relationship and places a level of measure on the extent to which firms can enter the relationship with supply chain partners. According to Cao, Huo, and Zhao (2015), Japanese firms have failed with their supply chain due to lack of rigorous OC. This depicts the important role OC plays in every supply chain. Group culture which is characterised by teamwork and cohesion is expected to help employees in the focal manufacturing firms integrate internally and assist in successfully integrating with the supply chain partners. In the same vein, developmental culture which embraces flexibility is characterised long-term orientation, high levels of organisational learning, training and development (Cameron and Quinn 2011; Wijethilake, Upadhaya, and Lama 2021) which all integrate internal employees (internal integration). The culture is also characterised by resource extraction which can be achieved by a strong integration with supply chain partners (Linnenluecke and Griffiths 2010). As customers and suppliers of the food manufacturing

firms are mainly across the globe, it is important partners work closely in a team for the smooth implementation, measurement and attainment of SSCP.

As sustainability has gradually become a legal requirement and compulsory for the food supply chains, firms with high levels of rational and hierarchical culture are likely to pursue integration if it leads to high levels of efficiency. Explained from RBV theory and RVT, a culture which trains employees and enhances their productivity, skills and knowledge shapes them into becoming a valuable asset to the firm and the eventual sharing of knowledge, skills and resources between partners in the supply chain is likely to help in strengthening the SCI across the supply chain. Since sustainability is measured across supply chains, firms are likely to pursue integration for the collaboration of skills, knowledge, information and resources. Yunus and Tadisina (2016) found OC as a predictor and moderator of SCI. Braunscheidel, Suresh, and Boisnier (2010) and Cao, Huo, and Zhao (2015) found that all dimensions of OC except hierarchical culture have a positive impact on SCI of manufacturing firms. In contrast, Zu, Robbins, and Fredenhall (2010) confirmed the positive relationship between hierarchical culture and SCI of firms. In this study, we argue that since most of the supply chains of food manufacturing firms extend across borders, the implementation of strategies and optimal supply chain performance can be easily obtained when supply chain partners actively work together. Based on the assertion of RBV theory and RVT, it is argued that developmental, group, rational and hierarchical are highly necessary in building SCI, therefore, this current study proposes that, in the food manufacturing firms and their supply chains:

***H2**: Organisational culture has a positive influence on supply chain integration.*

H2a: Developmental culture is expected to have a positive influence on SCI

H2b: Rational culture is expected to have a positive influence on SCI

H2c: Group culture is expected to have a positive influence on SCI

H2d: Hierarchical culture is expected to have a positive influence on with SCI

2.9.3 Supply Chain Integration (SCI) and Sustainable Supply Chain Performance (SSCP)

The SSCM has taken a new trend to include all the members in the supply chain and this connotes the importance of SCI in attaining higher SSCP. Every manufacturing firm seeks to be sustainable, however, maximum sustainability is achieved when all parties in the supply chain are actively involved in the implementation of the sustainability practices (Nouri,

Nikabadi, and Olfat 2019). It has, therefore, become relevant for the impact of SCI on sustainability performance to be researched further. Elkington (1998) suggested that an effective long-term relationship in the supply chain is a prerequisite to achieving sustainable performance. Additionally, manufacturing firms with extended and active collaboration in the supply chain are better suited and prepared to implement and perform sustainable acts and eventually attain better competitive advantage. Seuring and Mueller (2008) acknowledged the need for firms to integrate before the implementation of sustainable activities. The RVT suggests the need for firms to collaborate for the accumulation of knowledge, resources, skills, information, and management for incremental changes, competitive advantage and performance (Blome, Schoenherr, and Eckstein 2014). This suggests the need for food manufacturing firms and their supply chains to integrate strongly with their supply chain partners for the acquisition and enhancement of resources.

The continuous extraction and enhancement of resources stimulates the need to adopt sustainable practices to protect the environment. As indicated earlier, the global nature of the supply chains of the food manufacturing firms makes it highly susceptible to compromising the safety of the environment and the society. Ghadge et al. (2020) also highlighted the danger food supply chains poses to the environment in terms of carbon emissions resulting in climate changes. Due to this, measuring the environmental and societal impact of the supply chains can be achieved when there is a collaborated and coordinated information and data between the partners. The manufacturing firms need inputs from the suppliers for LCA and insights about green packaging from customers. This presupposes that achieving sustainability across the supply chain requires a stronger relationship between the global supply chain partners. The RVT also provides evidence of how the combination of resources, knowledge, skills and information along the supply chain could enhance the sustainability performance of the supply chain (Blome, Schoenherr, and Eckstein 2014; Weingarten and Longoni 2015). Studies (e.g., Blome, Schoenherr, and Eckstein, 2014; Weingarten and Longoni, 2015; Kang et al., 2018) ignored internal integration and found a positive relationship between external integration and sustainability performance. However, a successful external integration depends on the strength of internal integration (Han and Huo 2020).

Han and Huo (2020) further claimed that a successful integration for green supply chain performance requires a successful internal integration. A strong internal integration is necessary for training employees on sustainability issues and synchronisation of skills leading to the establishment a strong sustainability force within the firm to integrate successfully with

supply chain partners to attain a higher SSCP. Similarly, focal manufacturing firms alone do not thrive during the implementation of sustainable practices, they require the knowledge, skills, resources and collaboration of partners in the supply chain to achieve higher SSCP. In this research, it is argued that strong internal integration is necessary for external integration and both play significant role in achieving higher SSCP. Therefore, this study hypothesises that, in food manufacturing firms and their supply chains:

***H3**: Supply chain integration has a positive relationship with sustainable supply chain performance.*

H3a: Internal integration is expected to have a positive relationship with SSCP

H3b: Customer integration is expected to have a positive relationship with SSCP

H3c: Supplier integration is expected to have a positive relationship with SSCP

2.9.4 Supply Chain Integration as a Mediating Variable between Organisational Culture and Sustainable Supply Chain Performance

In order to improve supply chain performance, it has become very significant for global firms and their supply chains to achieve a strong fit or collaboration both within and across the supply chain. As a result, firms can achieve optimum sustainability performance when there is a strong integration both within (internal integration) and outside the firms (external integration). Firms successful in the implementation of sustainable practices often have well-balanced OC and a strong alliance with customer and suppliers (Linnenluecke and Griffiths 2010). That means, implementing a sustainability-supportive OC alone cannot guarantee an improved SSCP until a strong integration with customers and suppliers is considered. Firms alone are not successful in the implementation of SMPs unless there is a strong collaboration between the upstream suppliers and the downstream customers. Additionally, sustainability is measured along the supply chain so the unsustainable act of a partner is detrimental to the SSCP as a result the supply chain partners must coordinate in order to improve sustainability performance (Kang et al. 2018).

Braunscheidel, Suresh, and Boisnier (2010) argued that the impact of culture on firm performance is partly influenced by certain factors such as integration practices, therefore, cultural values are likely to trigger both internal and external integration which in turn helps in the improvement of SSCP. This implies that, the availability of a good and stable culture in the focal manufacturing firms and supply chains only serve as a bedrock which stimulates supply chain learning and through this, enable firms to learn from their supply chain partners (Cao, Huo, and Zhao 2015; Porter 2019). In this research, it is argued that, with suitable

cultural values, food supply chains are able to successfully implement sustainability practice to increase sustainability performance only when there exists a strong bond between the global supply chain partners. Again, the availability of a suitable OC in the supply chain inculcates trust and willingness which are relevant for the integration in the supply chain. Since customers and suppliers have become indispensable parties for implementation of sustainability practices across the supply chain, a higher SSCP can be attained when there the OC simultaneously encourages sustainability and integration.

Moreover, since sustainability performance is measured across the supply chain and the supply chain partners must coordinate information, resources, ideas and skills (RVT) for assessing the SSCP, the firms are likely to pursue integration in order to attain higher SSCP. This means after adopting a suitable OC, food manufacturing firms need to pursue integration practices to achieve high levels of SSCP. However, research expounding on this is not forthcoming. Therefore, in this research, it is argued that the OC strongly impacts on SCI which may account for the positive relationship between OC and SSCP. Based on this, this study hypothesises that, in the food manufacturing firms and their supply chains:

H4: *Supply chain integration mediates the relationship between organisational culture and sustainable supply chain performance.*

H4a: Supply chain integration mediates the relationship between developmental culture and SSCP.

H4b: Supply chain integration mediates the relationship between group culture and SSCP.

H4c: Supply chain integration mediates the relationship between rational culture and SSCP.

H4d: Supply chain integration mediates the relationship between hierarchical culture and SSCP.

2.9.5 Conceptual Framework

The framework summarises the hypothesis and the connections between the various variables of the study. In the framework, H1a-H1d depict the hypotheses between OC and SSCP, while H2a-H2d depict the hypothesised relationship between OC and SCI. Hypotheses H3a-H3C represent the relationship between SCI and SSCP and lastly, H4 shows the mediation relationship of SCI on the OC and SSCP relationship. Fig. further reveals the dimensions of OC, SCI and SSCP of the study.

CONCEPTUAL FRAMEWORK

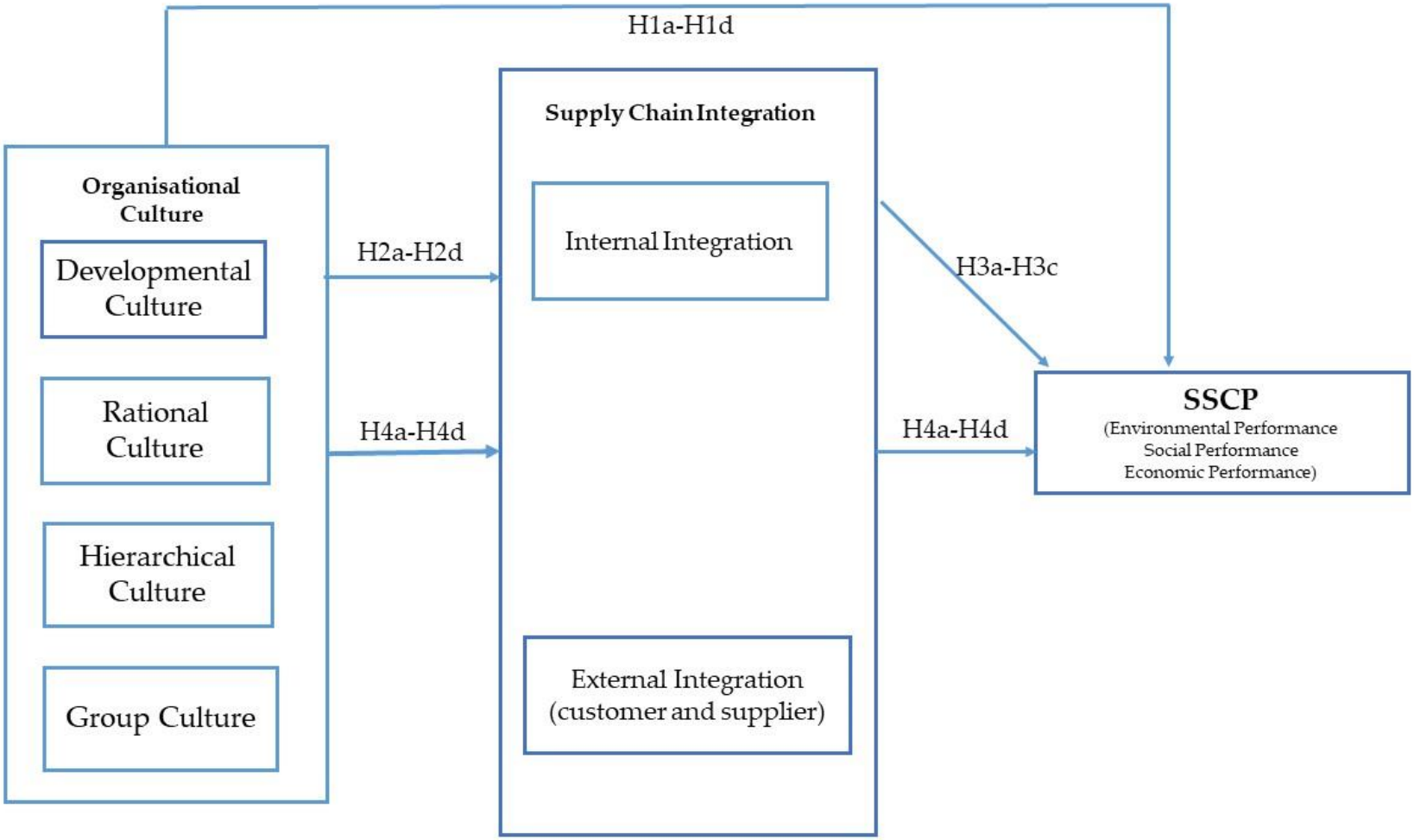

Figure 2.3 Proposed Conceptual Framework

Summary of the Chapter

The chapter outlined the theoretical review on OC, SCI and SSCP and through this, the various dimensions of each of the variables were revealed. Similar research focusing and envisaging the potential relationship between the variables were also reviewed enabling the extraction of the gaps in extant literature while at the same time highlighting the potential contributions of this research. Three main theories, namely; institutional, RBV and RVT theories were adopted in projecting the possible relationship between variables. Four (4) main hypotheses as depicted Fig 2.3 were identified, and the conceptual framework was developed. In the next chapter, the research paradigms, the methodology and the methods used in the research are presented.

CHAPTER THREE: THE METHODOLOGICAL APPROACH

Introduction

This chapter presents the methodology and the various methods adopted in conducting this study. The mixed method approach is adopted in conducting the study and the first sections reveals the philosophical assumptions and paradigm adopted in this research. This encapsulates the ontological, epistemological, axiological and methodological assumptions of the mixed method approach. In the next section, the various methods, including the qualitative case study interviews and survey under both the qualitative and quantitative approaches are discussed in detail.

3.1 Critical Realism and the Mixed Method Design

This study adopts the positivist/functionalist and interpretivist paradigms or philosophies as a guide in conducting the study. From the positivists' perspective, this research holds the assertion that; people and reality are separate, and reality exists beyond the human mind; every organisation has a different and unobserved qualities that exist independently of the firm; data is useful in measuring reality and statistics is the best method for analysing the data and reality (Weber 2004; Burrell and Morgan 2017). The positivists approach research from the realism perspective and obtain information and truth about social entities through observation and measurement of facts from which conclusions and eventually generalisations could be made about the social entities (Saunders and Lewis 2009). Linking this to the study, it is held that the impact of OC can be understood through surveying, measuring and quantifying its influence on SCI and SSCP. From the interpretivists' perspective, it is assumed that people and reality are not different, therefore, understanding of the reality means understanding the people that exist in it (Weber 2004). Furthermore, the interpretivists' assert that knowledge is obtained based on the interpretation of a person's experience (Weber 2004). Adapting this to the study, the culture and the supply chain practices of the firms can be comprehensively understood, if the people that exist in it are involved and interviewed.

Pluralists opposed to the unificationists hold the assertion that the diversified research in business and management makes a unique contribution to business and management knowledge and develop different ontological assumptions about organisational realities (Saunders and Lewis 2009). The usage of mixed methods is now gradually emerging in a wide

range of academic disciplines especially in social sciences (including business management) (Tashakkori and Teddlie 2010). The mixed methods approach addresses the setbacks linked to quantitative (deductive) and qualitative (inductive) approach by extracting observation or interviews from reality and experience and then testing it with hypothesis to ascertain truth and reality. The mixed method approach has been considered as highly effective for making reasonable inferences and theories about a phenomenon and simultaneously testing it to prove or disprove a particulr theory (Mitchell 2018). Sustainability practices, SCI and OC differ among firms; therefore, interviews are needed to reveal the exact practices while positivist (quantitative) is needed to statistically examine the relationship between the practices.

However, it is seemingly impossible to combine both paradigms in one research due to the different worldviews and methodologies (Zachariadis et al. 2010). With the criticisms levelled against the ontology and epistemology of the positivism paradigm, several other paradigms such as critical realism have evolved. The critical realism appears to provide a middle ground for both positivism and interpretivism (Zachariadis et al. 2010). Critical realism asserts that the world exists independently from our knowledge and further argues for the ability of researchers to distinguish between transitive and intransitive objects in order to establish the models, theories and facts about a research (Bashkar 1998; Zachariadis et al. 2010). Critical realism proposes that the existence of one real world which is consist of different parts or objects can be observed and these objects and the interactions between the objects provide an insight into the existence of unobservable objects (Bashkar 1998). Critical realism does not employ one paradigm or designs in a research as it employs both the views of interpretivists and the positivists in conducting research in a social system. As a result, critical realism is suitable for this research as it makes room for the ontology and epistemology of both interpretivism and positivism to be used in one research. Even though, the paradigm provides a unified ontology as explained above, this research still maintains the general ontology and epistemology of both interpretivism, and positivism as summarised in Table 3.1.

According to Tashakkori and Teddlie (1998) and Cresswell (2008) mixed method research could fall under one of the following: equivalent or dominant/less dominant designs, sequential or parallel/simultaneous designs, sequential or non-sequential, qualitative priority or quantitative priority, explicit or implicit perspective. Though, both qualitative and quantitative designs are employed in this research, the quantitative dominates the qualitative designs. In this research, both designs are employed sequentially as the interviews are conducted in the first phase followed by the survey and quantitative analyses. The main objective is to obtain the direct opinions, views and perspectives about the relationship

between the variables (Miles, Huberman and Saldana 2014) and update the constructs for the survey with the results from the interviews. The survey and the quantitative phase then follow, indicating the importance of quantitative methodology in this research (quantitative priority) and both results are used in the discussion of the main findings of the studies.

Table 3.1 Summary of the Philosophical Assumptions Used in this Research

Ontology	Epistemology	Axiology	Methodology
1. OC moderates supply chain activities in a firm. **2.** OC exists independently from the organisation and controls every activity, element or policies (including sustainability and supply chain integration) in a firm. **3.** Since OC exists independently from the people and controls every phenomenon in a firm, more research should be conducted on it. **4.** Since people in an organisation experience the culture, culture can be greatly understood if the	**1.** Deductive and inductive approaches are eligible for studying OC, SCI and SSCP and establishing the relationship between the concepts. **2.** Theories are used in explaining and establishing the relationship between the concepts. **3.** Interviews and survey are the most appropriate methods in conducting the research. **4.** Interviews would be used in confirming the scales and confirming the results of the survey.	**1.** Objectivity is key in employing the designs and reporting the findings. **2.** Rigorous ethical procedures are followed in the design of the questionnaire. **3.** Anonymity and respondents right to withdrawal will be stipulated on the survey and interview instruments and read to the respondents before the interviews. **4.** The research strives to maintain a value-free approach in presenting the results.	**1.** Sequential mixed method approach is employed. The qualitative precedes the quantitative approach. **2.** Qualitative case study approach is adopted. Interviews and reports are used for triangulation. **3.** Survey with questionnaires is adopted for the quantitative data. **4.** Structural Equation Modelling is employed in analysing the relationship. **5.** Both quantitative and qualitative approach are used

people are asked about their experiences. **5.** OC, SCI and SSCP are observable but their interplay can be understood by measuring their relationship quantitatively.	**5.** Quantitative approach is used in examining the causal relationship between the variables. **6.** Statistical analyses are appropriate and used in establishing the relationship between the concepts, thereby, validating or falsifying the theories.		in arriving at the conclusions of the study.

3.1.1 Ontology

For decades, several supply chain researchers, who are mostly positivists, have approached the concept of OC from a common ontological assumption that culture moderates every system or phenomena including supply chain activities or strategies (Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015). This research also holds that even though OC is created for the people in a particular organisation, it exists independently from the organisation and the people, thereby, controlling the elements (SCI and SSCP) and every activity in the organisation. Since it is independent from the organisation, this research views it as separates from the people in the organisation though it regulates the behaviour of the people in the organisation. Therefore, more research should be conducted on it to ascertain how OC functions and controls every phenomenon including SSCP in an organisation.

This suggests that, within the context of this research, it is believed that even though OC is developed for the purpose of controlling the people and activities in every firm, it is created and managed by people, therefore, it is not independent of the firm and the people in it. At the same time, OC exists as an independent body or law, which is consulted by organisations in dealing with every issues and activities of the firm, therefore, every OC should be perceived as totally different from the organisation and the people. Blaikie (2000 p.53) defined ontology as 'claims about what exists, what it looks like, what units make it up, and how these units interact each other'. The definition reveals the importance of combining both the interpretivists and positivists' stance in explaining a particular phenomenon.

Impliedly, an OC typically exist independently from the members in the firms, however, the practices and values outlined in an OC is experienced by the people, controls and determines the behaviour of the people in a particular firm. Therefore, determining the impact of OC on supply chain strategies such as SCI and SSCP means interviewing the people who understand and experience the culture. Additionally, SCI and SSCP can only work if they are ardently supported by the culture of an organisations. Hence, it is always important to measure the impact of OC on new strategies and examine how the new strategy (SCI and sustainability practices) can be infused into the culture. Based on the mixed method approach, this research views culture as independent from the organisation and therefore, the realistic perspective on the impact of culture on SCI and SSCP can only be understood if the people in a firm,

especially managers and CEOs are interviewed to obtain their views and also obtain data through a questionnaire to measure the cause and effect of OC.

3.1.2 Epistemology

While there is lack of clear understanding of the philosophical underpinnings of a mixed method research (Baskarada and Koronious 2018), researchers have applied pragmatism to explaining the mixed method research as it allows the adoption of multiple research methods (Yvonne Feilzer 2010). Also, there is dissension on whether the two approach should be used concurrently or sequentially. In this research, the two methods are being used sequentially, that is, the qualitative design will be used refining the studies, confirming constructs and obtaining the direct opinion and views of respondents. The quantitative approach will be used in statistically establishing the cause and effect between the variables. The positivists' epistemology maintains that there is a clear distinction between the research and the object and further believe there is a single objective reality in every study irrespective of the researchers' beliefs and assertions (Weber 2004). The interpretivists also argue that people are part of the organisation and since OC is designed for the people, it is relevant to include the ideas of the people in measuring or determining the culture of a particular organisation. Furthermore, OC and other supply chain activities differ from one organisation to another. This suggest that the impact of OC on supply chain strategies including integration and sustainability is expected to differ from one firm to another. Since OC is fixed and very important in every organisation and sometimes very cumbersome to be changed or replaced, it is very difficult for a researcher to influence the OC information of any firm.

To identify and assess the OC of the firms, it is highly essential to interview all the top managers as they possess full knowledge of the culture. Moreover, since the stated culture might be different from the actual culture being practiced, the people may provide the real picture of the type (s) of culture or values practiced. The interview could also reveal other hidden sub-cultures which may be crucial to the study. The positivists consistently use rational, logical methods, statistical and mathematical techniques to unravel a single and objective reality (Burrell and Morgan 2017). This study intends to use the information obtained from the interviews to design or update an appropriate data collection instrument for a survey which would help to quantitatively measure the impact of OC. In the same vein, interview is likely to reveal the practicality of SCI and sustainability practices. This makes development of the constructs for a survey relatively easier.

From the interpretivists' viewpoint, since OC and the supply chain activities are managed and overseen by people, it is better to ascertain the relationship between the variables through the interpretations and ideas of the managers of the supply chain or sustainability. Moreover, in terms of sustainability and supply chain activities, firms can determine the actual practices and progress based on the numbers derived from the statistical analyses and quantifying the activities provide managers an idea on the actual supply chain practice to prioritize (Gunasekaran, Patel, and Tirtiroglu 2001). Crucial to the epistemological stance of the research is the use of scientific method specifically the deductive approach in validating theories or developing new knowledge.

This research strongly holds the assertion that the validation and falsification of theories approach conforms to reality. The usage of the theories to explain the impact of OC on supply chain phenomena illustrates the benefits of exploring theories to the usefulness of the society as suggested by the critical realists (Fleetwood and Ackroyd 2004). The usage of mixed method approach in this research is based on the premise that since all theories have been established and are being adopted in extant literature, mixed method approach is the practical way through which the theories can be validated or falsified using interviews and statistics or mathematical techniques.

3.1.3 Axiology

Lekka-Kowaik (2010) strongly argued that accepting funds for conducting research, gathering and elaborating data to prove hypotheses constitute value-laden acts (value-full/value-laden). With regards to axiology, the positivists maintain the beneficence perspective which states that researchers should strive to establish good outcomes of the research for humanity, protect the participants, minimise risk, harm and wrongs (Kivunja and Kuyini 2017). The positivists' belief that there is a physical world independent of researchers always makes it imperative for every positivism researcher to be objective. It is also believed that since the interpretivist researcher is highly involved in the interpretation of the data, personal values and beliefs are likely to influence the judgement or the outcome of the research.

This research intends to be objective and present value-free findings. This would be achieved by presenting the findings of the research in its original state without influencing the results of the research. Interview data on OC, SCI and SSCP are straight forward and provide specific information from different manufacturing firms. This provides little room for the data to be tampered or influenced. Since this research intends to use many firms, any outcome of

the statistical analysis would be accepted and presented and further compared with the results from the interview. Additionally, this research postulated a positive relationship between the OC and the dimensions of SCI and SSCP of firms. Despite the positive postulations, a negative relationship between the variables would be an interesting finding for both managers and theory. Meaning, either positive or negative results from the research would have an enormous impact on literature. This would ensure the research is free from the researcher's values and the issue of falsification would be completely abhorred.

In the design of the questionnaire, practical ethical approaches such as anonymity and confidentiality statements were rigorously stated. The first part of the questionnaire contains questions essentially soliciting information about the firm. Respondents were asked not to disclose either their identity or even state the name (s) of the firm. The non-disclosure of their identity or name (s) of their company will make the analyses and findings anonymous thereby, protecting the identity of the firms or respondents. The study does not necessarily utilise face-to-face interviews or other approach that require face-to-face interaction with the respondents, this protects the privacy of the respondents. The research intends to save the data on the Kent's data repository and other inaccessible locations. Since the research involve no face-to-face interactions with the respondents and non-disclosure of the firms' and respondents' names, the participants are protected. On the questionnaire, the main aim of the research and a statement to the effect that this research is part of a PhD study is clearly stated.

In order to protect the right of the respondents, statement to the effect that respondents can withdraw from the study at any point in time would be stipulated. During the presentation of the findings or the results, the actual names of the firms and identity of the actual respondents used in the research are not presented. The respondents will be answering the questionnaire via a link and since they are not required to disclose their identity and the names of the firm in the questionnaire, the findings will be completely anonymised. A statement to the effect that the research is not funded by any agency or company is stated on the questionnaire, this makes the research devoid of any external influence. The main intention is to generalise the findings to the firms in the food manufacturing industry. The findings of the research will be made available to all the respondents upon request and the results will not be suppressed or compromised to suit a specific request or need of a particular firm. All the purpose and objectives of the research are clearly stated, and the study will ensure the results are in line with the stated purpose and objectives. There is no intention of criticising or revealing any confidential information about a firm and how bad a culture of a particular

organisation is. Instead, the study will make recommendation on the best OC and supply chain practices for a better SSCP.

3.2 Methodology

Previous research on SCI, OC (using CVF) and SSCP adopted quantitative approach in deriving the results for the study (see Table 3.4). Moreover, due to the nature of the research questions, the availability and the rigorous development of the constructs for measuring the variables, quantitative approach was ideal for this research. However, due to the underdeveloped nature of research on the relationship between OC, SCI and SSCP, it was worthwhile a mixed method approach utilising both case study interviews (qualitative) and survey with SEM analysis (quantitative) are adopted in the research. The main purpose of the mixed method was to statistically test the relationship between the variables and obtain the opinion, views, perceptions and ideas of managers (Silverman 2006; Miles, Huberman, and Saldana 2014) on OC, SCI and SSCP and their possible relationship for the purpose of partially confirming the statistical analyses and strengthening and/or enriching the results of the study. Also, due to the increased call for the development of industry-specific constructs for measuring SSCP (Shaw, Grant, and Mangan 2020), the results from the interviews were expected to reveal and enhance the construct development for measuring SSCP in a food manufacturing industry.

It should be noted that SSCP in this research was measured at firm level. Because sustainability is currently measured at the supply chain level (Kang et al. 2018), it was assumed that a measure of sustainability in one firm implies measuring the sustainability of the supply chain. This is true as all parties in a particular supply chain are jointly implementing same sustainability practices. Due to this, it was assumed the practices in the focal firms are similar to the sustainability practices in the individual firms of customers and suppliers. Moreover, in answering the questionnaire, the respondents were asked to rate their sustainability performance with regards to their supply chain not the firm level. This was to ensure a clear picture of SSCP is captured in the study. However, measuring sustainability at the firm level does not represent a comprehensive assessment of the sustainability performance of the supply chain. The sustainability performance of both the suppliers and customers needs to be captured to holistically assess SSCP. Even though, mixed method approach was employed, the quantitative dominated the qualitative methods. Johnson and Onwuegbuzie (2004) defined mixed method research as the combination of both qualitative and quantitative research techniques in a single study.

As previously indicated, the research design in this study adopts the sequential mixed method approach as the qualitative methodology preceded the quantitative methodology. The research began with the qualitative methodology, thus, conducted interviews which was subsequently followed by the quantitative methodology. Fig. 3.1 illustrates the procedure adopted in conducting the research and combining both methodologies. The research started with the interview followed by the design of the questionnaire. However, a draft question with existing measures was developed and presented to the respondents after the interviews for pre-testing through cognitive interview. The main aim was to obtain respondents' idea on the questionnaire and capture other constructs used in measuring especially SSCP in their supply chains. The questionnaire was updated based on the results from the interview. Since new constructs were generated, the questionnaire was subjected to further pre-testing through expert opinion which was then followed by pilot testing. The validity and reliabilities of the constructs were tested after the piloting stage. After, an online survey on Qualtrics was developed and the link was sent to the respondents. The data was then analysed using SEM. The results from the interview and the quantitative analyses were used in discussing (triangulation) the findings.

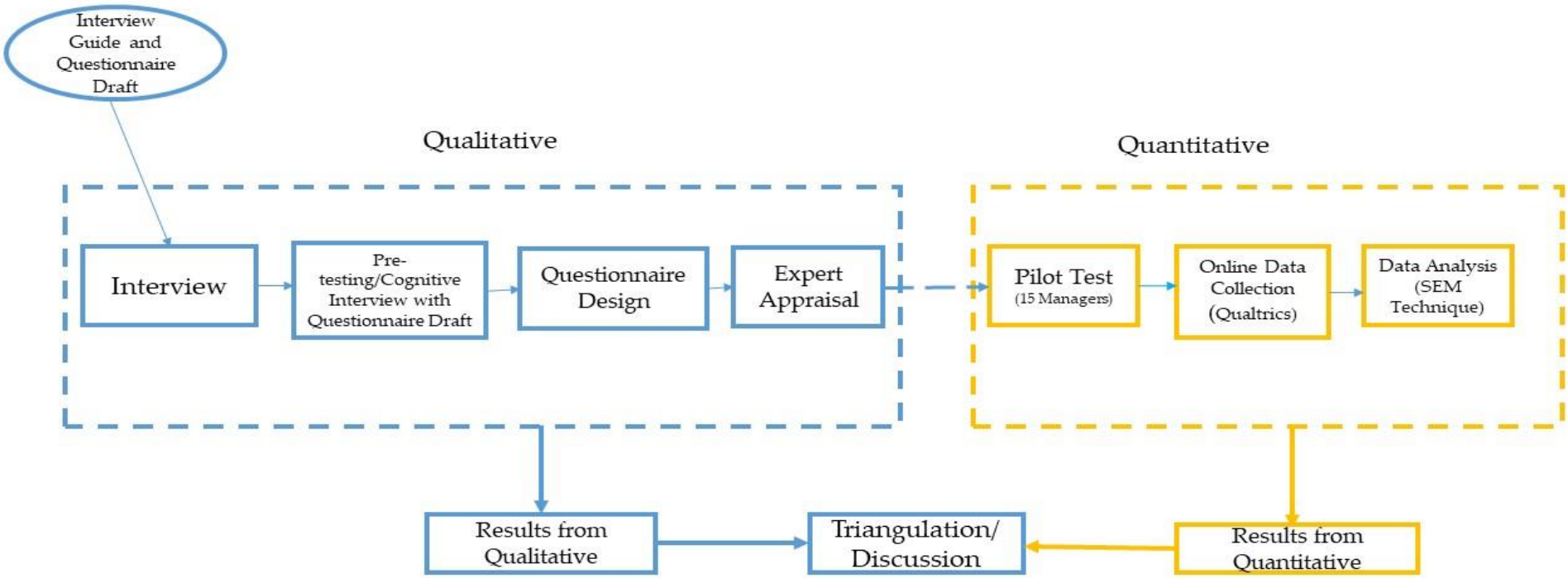

Figure 3.1 Methodological Framework of the Study. Source: Author's own (2020

3.3 Industry Profile and Population

The unit of analysis in this study is the food manufacturing firms in the UK and Greece. The sectors constitute one of the relevant industries to the economies of both countries, however, the dwindling sustainability performance of the manufacturing firms has led to the calls for more research to suggest ways the firms could improve their SSCP (Henningsson et al. 2004; Anastasiadis, Apostolidou, and Michailidis et al. 2020; Ghadge et al. 2020). The food processing/manufacturing sector is considered as the largest sector in the United Kingdom (UK) as it accounts for about 17% of the manufacturing sector in the UK. It employs nearly 400,000 workers and consists of about 6,800 businesses in the country. Lawrence, Lyons, and Wallington (2013) found that processing companies from the food sector consume more energy than other sectors in the UK. The industry has a record high level of workforce; however, the industry is gradually moving from the initial labour-intensive state as there are high levels of simple automation (Caroli et al. 2010). Furthermore, the industry is characterised by low-skilled workers while most of the firms with low automation makes the job physically painful and the health and safety issues have constantly become unresolved in the sector (Caroli et al. 2010). The sector is highly characterised by low-skilled employees resulting in payment of poor wages leading to serious labour issues within the industry.

The Greek manufacturing firms also contributes greatly to the Greek economy with its turnover considered as the highest in the country's secondary sector (Anastasiadis, Apostolidou, and Michailidis et al. 2020). The industry also accounts for the largest portion of the manufacturing sector with its employees representing about 28 per cent of the manufacturing sector's employment. However, the industry faces sustainability issues and many concerns have been raised on how human value and reduction in environmental impact can be achieved (Anastasiadis, Apostolidou, and Michailidis et al. 2020). Additionally, like the industry in the UK, there are low levels of technological adoption raising concerns for social dimensions. These issues have caused researchers to raise an alarm on the increment of studies that could help improve sustainability performance of Greek food manufacturing industry. Ghadge et al. (2020) asserted that the long supply chains of the food manufacturing firms contribute to the climate change and cause a lot of environmental and social problems making the industry very relevant for further research.

According to Ghadge et al. (2020), the dairy and other cold food supply chains use several refrigeration-related activities during processing, manufacturing and transportation contributing

immensely to climate change. This makes the food manufacturing industry very vulnerable to low sustainability performance requiring more research into the factors capable improving the SSCP. The manufacturing industry like a typical supply chain utilizes all parties in the supply chain making the sector suitable for a further research into their SCI. Additionally, both industries were selected due to easy availability of respondents, similarities in their supply chain activities, low sustainability performance in both industries and firms with global supply chains. The findings and conclusions from the study is expected to assist food manufacturing firms in improving their SSCP. The initial focus of the research was to assist the food manufacturing firms in improving their SSCP. The food supply chains in Greece were added due to the issues with data collection in the UK. The Greek food supply chains were selected mainly due to the sustainability issues in the industry, the similarity of their supply chain activities with UK's food supply chains and availability of respondents and data.

3.4 Qualitative Case Study Approach

The study adopts qualitative case study approach, due to its ability to combine the interviews with other secondary sources of data of respondents (Harrison et al. 2017; Yin 2017). Moreover, the case study method was adopted to obtain the direct opinion, views and perception of managers (Silverman 2006), enrich the analysis of the study and make increase the rigor of the results of the study. Cross case in lieu of a single case was highly preferred. This was due to the difficulty of generalisation, misjudgement of events and over exaggeration associated with single case studies (Voss, Tsikritsis, and Frohlich 2002). These issues are, however, mitigated in cross case studies accounting for the choice of multiple case studies in this research. Case study constituting of only interviews was performed in this study. The results of the interviews were to to directly obtain the views, perceptions, ideas and opinions of the managers (Miles, Huberman, and Saldana 2014; Silverman 2014) on OC, SCI and SSCP and their relationship and to further enhance the analysis by partly confirming the findings from the quantitative study to enrich the results of the study. Additionally, the results from the qualitative research were also expected to be used in enriching the questionnaire by confirming additional industry-specific constructs for measuring SSCP. Since OC differs from one organisation to the other, this research intends to use several firms purposely to obtain a holistic view of OC, SCI and sustainability practices across the firms in the UK and Greece. Most of the scales of the variables have already been developed in extant literature, however, the information from the interview is expected to confirm and also reveal other relevant scales which reflect the current practice in the industry.

3.4.1 Qualitative Data Collection

This section presents the process used in collecting data for the qualitative research aspect of this study. The procedure for the selection of the sample, the interview process, the respondents' information and the procedure for analysing the interview are discussed.

3.4.1.1 Sampling and Sample Size

Sampling is one of the most crucial process in every qualitative process (Onwuegbuzie and Leech 2007) as it influences generalisability decisions. Onwuegbuzie and Leech (2007) suggested that random sampling is an ideal technique for obtaining a representative sample, supporting a statistical generalisation and for increasing understanding of a particular phenomenon. Developing a suitable sampling technique is also crucial for determining the total number of respondents for the study. In this study, therefore, a simple random technique was employed in selecting the respondents from an already sampled firms. Stratified random sampling based on the size of the firm, profitability, types of products and location was used in selecting the firms for the study. However, simple random sampling was employed in selecting the firms for interview. This was to obtain equal representation of different sizes of firms for the interview. Onwuegbuzie and Leech (2005b: 2007) suggested a smaller sample size is useful, however, the sample size should be reasonable if the research intends to generalise its findings. They also stressed that sample sizes should not be too large to avoid complications with data analysis or extraction. Sandelowski (1995) also noted that a sample should be reasonable to achieve data and theoretical saturation or information redundancy.

Based on the suggestions of Sandelowski (1995) and the context of the research (food manufacturing industry), it was useful for a reasonable number of cases to be selected. Using *Financial Analysis Made Easy (FAME) database* (contains the list of firms in the UK) and *personal contacts* in Greece, a total of 1,535 (935-UK, 600-Greece) firms were selected. The selection was based on the usage of stratified random sampling method *(size of the firm, profitability, types of products and location and the availability of suitable e-mail address)* were used in selecting the firms for the study. From the list, 35 firms were randomly selected for the interview. Due to language barriers and time constraints, only firms in the UK were considered for the interview. To ensure generalisability, the list comprised mostly the major industry players as it was assumed their supply chain activities are benchmarked by the smaller scale food manufacturing firms. The firms selected for the interview were first contacted on phone to obtain the personal contact (e-mail and telephone number) of a top-level manager precisely supply chain/operations manager, general manager or the CEO. These managers were targeted because it was assumed, they had a

deeper knowledge and understanding of the type of cultural values, SCI and finally, sustainability performance of their supply chains. Out of the managers invited, only 11 agreed to grant the interview. This number was suitable as saturation was reached at the 10th interview.

Table 3.2 contains the profile of the firms and the various respondents of the study. Siggelkow (2007) noted that a limited number of cases can be adopted for a research, especially when the cases are useful for argumentation. Most of the respondents were key industry players, who are the large-scale manufacturers. These firms had many products in at least all the retailing outlets in the UK, therefore, it was perceived that the practices in these firms encapsulate those practices in other manufacturing firms not captured in the interview.

3.4.1.2 Respondents' Information and Interview Process

E-mails with the research profile and the semi-structured interview guide (see appendix II) were sent to the managers and the interview date and time were requested. The information and positions of the managers used in the interview are presented in Table 3.2. For the purpose of anonymity, the interviewed managers are referred to as REP 1, REP 2.....REP 11 and Table 3.2 also presents the details of the positions of the various respondents with the profile of their respective firms. The average time for the interviews was 36 minutes (see Table 3.3) and were conducted by the researcher due to the location and cost constraints. The interviews were partly conducted by face-to-face, telephone and skype (see Table 3.3). Due to time, logistical constraints, cost and outbreak of the pandemic (COVID-19), all but two of the interviews were conducted over the telephone (see Table 3.3). This number was suitable as saturation was reached on the 10th interview. Table 3.3 provides an overview of the duration of each of the interviews and other secondary sources of data used for triangulation purposes.

Table 3.2 Profile and Information of Companies and Respondents used for the interviews

Respondents	Position of the Respondent	Years of Experience	Type and Profile of Company	Locations of Company
Rep 1	**CEO**	**16 years**	**Type:** SME **Company profile:** Manufacturer and distributor of pancake	England
Rep 2	Chief Operations Manager	**27 years**	**Type: Large scale Manufacturer** **Company Profile:** Manufacturer and processor of potatoes, chips and other ready-made meals.	Scotland
Rep 3	Chief Manufacturing Manager	**10 years**	**Type: Large Scale Manufacturer** **Company Profile:** Manufacturer and distributor of own-brand food cooking products.	England
Rep 4	Owner and Managing Director	**29 years**	**Type: SME** **Company Profile:** Producer of frozen and ready-made foods for retailers.	Scotland
Rep 5	Operations Director	**20 years**	**Type: SME** **Company Profile:** The firm manufactures tasting foods, meat products and other ready-made foods	Scotland
Rep 6	Director	**26 years**	**Type: SME** Company Profile: Manufacturer of chocolate-related products.	England
Rep 7	Production Support Manager	**10 years**	**Type: Large Scale Manufacturer** **Company Profile:** It is a dairy manufacturing company with very famous products.	England
Rep 8	Managing Director	**26 years**	**Type: SME** **Company Profile:** The firm specialises in making and developing retailer label prepared foods.	England
Rep 9	Account Manager	**19 years**	**Type: SME** **Company Profile:** Deals in the processing of Seafish products	Scotland
Rep 10	Managing Director	**39 years**	**Type: Large Scale Manufacturer**	Wales

			Company Profile: Privately Owned manufacturer of cookies and biscuits.	
Rep 11	Supply Chain Director	**10 years**	**Type: Large Scale Manufacturer** **Company Profile:** Deals in the manufacturing of assorted consumer goods	England

Before the interview, statements about the objective of the research, the anonymity and protection of data were discussed with the interviewees and their permission for the recording of the interviews were sought. During the interview, the managers were asked to speak on the issues with reference to their firms and their supply chains. The participants were first asked questions about SSCP, SCI, OC and lastly, their opinions on the relationship between the concepts. This procedure was adhered to, due to the structure of the questions on the interview guide (see Appendix II). Direct cognitive interview was somewhat conducted after each of the interview, nonetheless, the potential questionnaire was sent to the respondents to assess and comment on the scales if they fairly relate to the actual practices in the industry.

Table 3.3 Information about interviews and other sources of information

Respondents	Mode of Interview	Interview Time	Other Sources of Data
REP 1	Face-To-Face	45 minutes	Website, financial report, database
REP 2	Telephone	30 minutes	Website, business and sustainability report, newsletter
Rep 3	Telephone	30 minutes	Website, business and sustainability report, newsletter and notes taken during interviews
Rep 4	Telephone	25 minutes	Website, business and sustainability report, newsletter, journals, FAME database
Rep 5	Telephone	45 minutes	Website, business and sustainability report, newsletter, FAME database, journals
Rep 6	Telephone	1 hour	Company website, technical newsletters, business report
Rep 7	Telephone	40 minutes	Company website, technical newsletters, business report, FAME database
Rep 8	Telephone	52 minutes	Company website, sustainability report technical newsletters, business report

Rep 9	Telephone	25 minutes	Company website, business and sustainability report, technical newsletters, notes taken during interview
Rep 10	Telephone	28 minutes	Company website, sustainability report, technical newsletters, notes taken during interview
Rep 11	Skype	25 minutes	Company website, sustainability report, technical newsletters, notes taken during interview

3.4.1.4 Interview Analysis

Merriam (1998) recommended for a simultaneous data collection and analysis in qualitative research and especially after interviews. A qualitative researcher should be able to familiarise with the data and write memos prior to the analysis (Braun and Clarke 2006) which was observed during the data collection. In this study, the interview analysis process suggested by Miles, Huberman, and Saldana (2014) were adopted. The procedure includes (1) transcription of the interviews; (2) in-depth exploration of the transcribed interviews and other notes or written memos for familiarisation with the data; (3) manual coding of the data adopting different colours for easy identification and analysis; (4) developing themes; (5) connecting and interrelating themes; (6) analysing the relationships and constructing the framework (see Figure 3.2). Manual coding was preferable due to the small number of interviews and the technicality of the concepts in this study (Basit 2003). The recorded interviews were transcribed, and the transcription was based on the structure of the questions on the interview guide, purposely for easy coding and categorisation. Simultaneous coding namely, process, in-vivo, descriptive and causation codings were employed (Miles, Huberman and Saldana 2014). The different kinds of coding were adopted to suit the aims and objectives of the research.

Different colours were used in coding the issues relating to each of the concepts. The colour 'blue' was used in highlighting all the codes relating to SSCP, SCI's codes were highlighted in 'red' while OC and codes establishing the relationships between the concepts were highlighted in 'green' and 'grey' respectively. The 'codings' were categorised into broader themes, that is, OC, SSCP and SCI and the themes were subsequently classified under each of the concepts of the study. Under SSCP, the broader themes generated were *factors influencing SSCP* and *measures of SSCP* and all the corresponding codes were recorded under these themes. Similarly, the themes relating to SCI were *factors influencing SCI*, *internal integration*, *customer and supplier integration* and again the codes relating to these themes were recorded. The broader themes of OC comprised *developmental,*

group, rational and hierarchical cultures. All the cultural values and codes corresponding to these dimensions or themes were recorded. For example, all issues relating to sustainability including factors influencing it and the sustainability measures were grouped under factors influencing SSCP, while issues relating to SCI and OC were grouped under each of the concepts respectively. In other words, the sub-themes comprise measures and influential factors of SSCP, the dimensions of CVF and the influential factors, practices and impediments of SCI. This ensured easy classification, identification and analysis of the relationship between the concepts. The themes were inter-linked, and the emerging factors linking the themes were identified. Lastly, the relationship between the various concepts in the data were developed.

The analysis of the data was very holistic as other issues very relevant to the field of the study were captured and reported. For example, the analysis revealed the various factors influencing and impeding SSCP and SCI in the firms. Additional information was collected from the identified secondary sources (see Table 3.3) and triangulation of both the interviews and secondary data was achieved. Triangulation is relevant in improving the reliability and validity of the study (Yin, 2013).

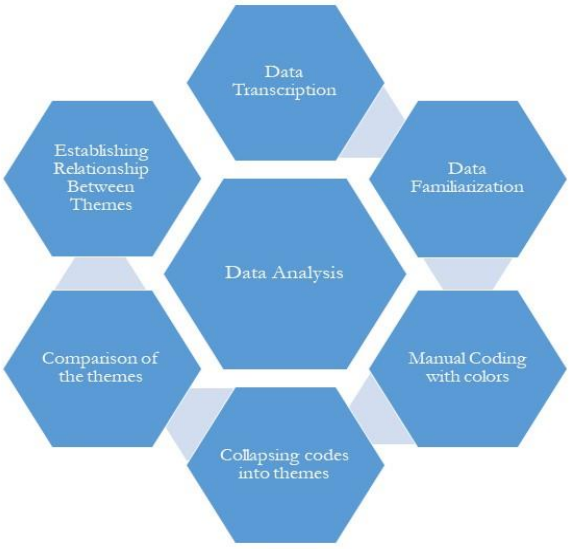

Figure 3.2 Data Analysis procedure. Source: Author's Own (2020)

3.5 Quantitative Approach

Table 3.5 provides a summary of the quantitative methodology and the respective methods employed by other related or similar empirical research. Evidently, all the research employed the

quantitative approach and used survey through a Likert-scale type of questionnaire for collecting the data for the studies. All but one studies employed the SEM technique in analysing the data. The CVF dimensions were used in operationalising OC while SCI was categorised into internal, customer and supplier integration and TBL dimensions namely, environmental, social and economic performance were used in operationalising SSCP. This accounts for the adoption of the survey approach through a Likert-scale type of questionnaire in this study. This also reveals the adoption of the SEM technique in analysing the data in this research. According to Table 3.4, there is lack of consensus on the relationship between OC and SCI whereas findings on the relationship between SCI and SSCP only supported the positive relationship between external integration and sustainability performance. Furthermore, the table reveals the lack of empirical research on the relationship between OC and SSCP indicating the need for current study to reveal the actual dimensions of OC which can aid manufacturing firms to easily implement and improve SSCP. In answering the questions, the respondents were asked to respond to the questions based on the practices in their firms and across the supply chain.

Table 3.4 Methodological Review of Extant Studies on Organisational culture, Supply chain integration and Sustainability Performance

Title	Authors (Year)	Journal	Research Type	Methodology and Methods	Dimensions of SCI	Dimensions of Organisational Culture	Dimensions of SSCP	Findings
Investigating the impact of organisational culture on supply chain integration	Braunscheidel, Suresh and Boisnier (2010)	Human Resource Management	Empirical	**Design**: Quantitative Approach Survey with Questionnaire **Sample Size:** 208 **Data Analytical Tool**: Structural Equation Modelling	Internal integration and External Integration (Customer and supplier integration)	Adhocracy Culture Market Culture Clan Culture Hierarchical Cultures		CC ↔ II (+ relationship) ↔ AC CI. SI (+ relationship) ↔ HC II (+ relationship) ↔ MC CI, SI (+ relationship)
Supply Chain Collaboration and sustainability: A profile deviation analysis	Blome, Schoenherr and Eckstein (2014)	International Journal of Operations and Production Management	Empirical	**Design:** Quantitative Approach Survey with a questionnaire Sample size: 259 **Data Analytical Tool:** Structural Equation Modelling	Supplier and customer Integration		Environmental Performance Social Performance Economic Performance	→ CI and SI +ve with environmental, social and economic performance
A nuanced view on supply chain integration: a coordinative and collaboration approach to operational and sustainability improvement	Weingarten and Longoni (2014)	Supply Chain Management: An International Journal	Empirical	**Design**: Quantitative Approach Survey with Questionnaire **Sample Size:** 90	Supplier and customer Integration		Environmental Performance Social Performance Economic Performance	CI and SI +ve with environmental, social and economic performance

				Data Analytical Tool: Structural Equation Modelling				
The impact of organisational culture on supply chain integration: A contingency and configuration approach	Cao, Huo and Zhao (2015)	Supply Chain Management: An International Journal	Empirical	**Design**: Quantitative Approach Survey with Questionnaire **Sample Size: 317** **Data Analytical Tool**: Structural Equation Modelling	Internal Integration, External Integration and Customer Integration	Hierarchical, Rational, Group and developmental culture		DC, GC, RC and II,CI and SI= + relationship HC and II and CI= - relationship
Drivers of supply chain integration and the role of organisational culture: Empirical evidence from Indonesia	Yunus and Tadisina (2016)	Business Process Management Journal	Empirical	**Design:** Quantitative Approach Survey with Questionnaire **Sample Size: 223** **Data Analytical Tool:** Structural Equation Modelling	Customer, Supplier and internal. SCI was measured as a unidimensional construct	Flexibility and control, Internal and external focus (Clan, Market, Adhocracy, Hierarchy)		Organisational Culture → Customer Orientation and SCI= + relationship
Supply chain integration and sustainability	Kang et al. (2018)	Industrial Data Management Systems	Empirical	**Design:** Quantitative Approach Survey with Questionnaire **Sample Size: 976**	Internal, Supplier and Customer Integration		Environmental Performance Social Performance Economic Performance	SI and CI → SMP = + relationship SMP → Sustainability Performance

				Data Analytical Tool: Structural Equation Modelling				
Supply chain integration: Does organisational culture matter?	M.G. Porter (2019)	Operations and supply chain management (OSCM)	Empirical	**Design:** Quantitative Approach Survey with Questionnaire **Sample Size: 201** **Data Analytical Tool:** Structural Equation Modelling	Internal and external integration	Hierarchical, Rational, Group and developmental culture		SCI → Firm performance = + relationship AC and CC → SCI = + relationship

Ac-Adhocracy culture, CC-Clan Culture, MC-Market culture, HC-Hierarchical culture, + = positive, - = negative, II-internal integration, SI-supplier integration, CI-customer integration, SCI- supply chain integration, SMP-sustainable management practices, DC- developmental culture, RC- rational culture, GC- group culture.

The aim of this quantitative approach was to explore the survey data by establishing the correlations between the variables through SEM. The OC and supply chain practices differ from one industry and firm to another, this study intends to use as many firms as possible in conducting the research. Since SEM is data sensitive and in order to improve the generalisability of the study, it was worthwhile to use a large sample size.

3.5.1 Sampling

Due to widespread of manufacturing firms in all the countries in the UK and the cities of Greece, stratified sampling was ideal for selecting the various food manufacturing firms for the study. The list of the food manufacturing firms from the UK and Greece were obtained from the FAME database and personal contacts in Greece. Factors such as *the size of the firm, profitability, types of products, location and the availability of suitable contact or e-mail address of a potential* respondent were used in selecting the firms for the study. Firms with a large number of employees and are profitable are capable of easily introducing sustainability practices into the firm and supply chain (Yunus and Tadisinia 2016). Firms with famous products in almost all the supermarkets are considered as employing sustainability measures due to the immense use of various transportation channels for their products. Firms with generic but no direct contact of a potential person were excluded since it takes long to receive responses from those firms.

A total of 25, 000 food manufacturing firms from the UK and Greece were obtained. After employing the stratified sampling method, a sample size of 1,535 (935-UK, 600-Greece) firms were selected and the link to the online survey were forwarded to them. Since OC, SSCP and SCI are highly sensitive and exclusive to certain level of management, it was worthwhile to target the top management.

3.5.2 Development of the Survey Instrument

The study intends to conduct a survey using a questionnaire in obtaining data for the research this is due to usage of the similar approach in previous studies (See Table 3.4). Studies such as (Braunscheidel, Suresh, and Boisnier 2010; Blome, Schoenherr, and Eckstein 2014; Weingarten and Longoni 2014; Cao, Huo, and Zhao 2015; Yunus and Tadisinia 2016; Kang et al. 2018; Porter 2019) all used survey through a Likert-scale type of questionnaire in obtaining information (data) for their research (see Table 3.4). With regards to the survey, several methods such as archival analyses, interviews and questionnaires are used in operations management research (Flynn, Huo, and Zhao 2010), however, conducting survey with questionnaire is the commonly used method (Cao, Huo, and Zhao 2015). The scales for measuring OC, SCI and SSCP have been well-developed, and the reliability and validity tested

and proven (see Appendix I and III). Appendix I contains the items extracted from both the interview and extant literature. The constructs with the asterisk (*) are the additional constructs obtained from interviews (also see Appendix III). The rest were obtained from extant literature which are all listed in Appendix I. Appendix III contains the main questionnaire used for the survey. However, the scales for operationalising the environmental, social and economic performance were enhanced through the measures obtained from the survey (see Fig. 4.2).

Multi-item scales were employed for the purpose of improving the internal consistency (Ketokivi and Schroeder 2004). Therefore, a questionnaire with sections each measuring OC, SCI and SSCP and the demographic information of the respondents was developed. Liu et al. (2010) stated that firm size, the type of industry, type of ownership and the size of a particular department affects the operations of the firm (see Appendix III). Yunus and Tadisinia (2016) in analysing the relationship between the drivers of SCI and firm performance considered firm age and size as control variables. Gualandris and Kalschmidt (2014) stated that firms with many employees, resources and capabilities find it easy implementing integration and sustainability practices. Due to this, the size of the firm (measured by the number of employees), sales turnover, firm's age and the years of relationship with external partners would be used as control variables. All the scales for measuring the variables are presented in appendix I and III. All the scales were measured on a seven (7)-point Likert scale where 1 = "Strongly Disagree", 2 = "Disagree", 3= "Somewhat Disagree", 4 = "Neither Agree nor Disagree", 5 = "Agree", 6 = "Somewhat Agree", 7= "Strongly Agree" (see Appendix III).

The first section of the questionnaire contained scales for measuring the SSCP of the food manufacturing firms. Many previous research have developed scales for evaluating the sustainability performance of manufacturing firms. Additionally, due to the recommendation of Shaw, Grant, and Mangan (2020), respondents were asked to comment on the measures used in assessing their SSCP. In as much as the constructs have been tested and found to be reliable, not all can be used in measuring the sustainability performance of firms in different industries. Additionally, due to the recommendation of Shaw, Grant, and Mangan (2020), respondents were asked to comment on the measures used in assessing their SSCP. As indicated earlier, the main purpose was to obtain industry-specific measures for operationalising SSCP. In this current research, nineteen (19) items were selected to assess the social, economic and environmental performance of firms. The scales were adapted from (King and Lenox 2001; Vachon and Mao 2008; Hassini, Surti, and Searcy 2012; Kang et al. 2018 etc.) (See Appendix I and III). Hassini, Surti, and Searcy (2012) conducted an extensive

review on the constructs that have been used in assessing the sustainability performance in previous studies. Therefore, this research carefully selected the constructs that can possibly be used in assessing the sustainability performance within the context of food manufacturing industry. Seven (7) items were selected to represent environmental (EV1-EV7) and economic performance (EP1-EP7) respectively (see Appendix III for details on the constructs). In assessing the social performance of firms, six (6) items (SP1-SP6) measuring the community-centred and employee-centred social performances were adopted (see Appendix III).

The second section of the questionnaire contained scales for assessing internal, customer and supplier integration of firms. The scales were developed from existing studies (e.g., Narasimhan and Kim 2002; Flynn, Huo, and Zhao 2010). These studies were selected due to the rigorous nature of the scales and the usage of those scales in extant literature. For example, Stank, Keller, and Daugherty (2001) studied the impact of SCI on firms' logistical service performance and in measuring the SCI of firms, the research adopted the comprehensive items for measuring SCI developed by World Class Logistics Research (Michigan State University 1995). Items such as maintaining integrated database, sharing of information, providing feedbacks and rewarding schemes were adopted. Flynn, Huo, and Zhao (2010) adopted some scales from Narasimhan and Kim (2002), the constructs developed were built around the use of information networks, communication with customer and supplier, maintaining database with customers and suppliers and developing systems for sharing internal and external data. With internal integration, six (6) items (II1-6) such as "My firm achieves data integration among internal functions through information network" were adopted. Seven (7) (CI1-7) and eight (8) (SI1-8) items each were selected to measure customer and supplier integration respectively (see Appendix III for details on the constructs).

In assessing the OC of firms, the research developed scales from existing literature. Items used in measuring developmental, group, rational and hierarchical culture were adapted from research (e.g., Naor et al. 2008; Braunscheidel, Suresh, and Boisnier 2010; Liu et al. 2010; Cao, Huo, and Zhao 2015; Yunus and Tadisinia 2016) and the organisational culture assessment instrument (OCAI). In measuring OC of firms, Braunscheidel, Suresh and Boisnier (2010) adopted the scales developed by the OCAI as it has been used in a range of research such as (Mcdermott and Stock, 1999). Additionally, Cao, Huo, and Zhao (2015) also adapted fourteen items such as "we pursue long-range programs for manufacturing capabilities in advance of needs" for measuring OC. Their research adapted the items from research (e.g., Stock, McFadden, and Gowen III 2007; Naor et al. 2008; Cameron and Quinn 2011; Yunus and Tadisinia 2016) which empirically assessed the role of OC in strengthening

the SCI of firms. The scales had been rigorously developed, validated and found to be reliable. These provide evidence of the choice of items for measuring OC in this study.

In measuring development culture, five (5) (DC1-5) items such as 'our organisation emphasises growth', 'the firm is a dynamic and entrepreneurial place always encouraging people to take initiative and risk', and 'the glue that holds our organisation together is commitment to innovation and development'. Four (4) items (GC1-4) such as "our supervisors encourage teamwork", 'much emphasis is placed on task and goal accomplishment' were used in measuring group culture. Similarly, rational and hierarchical culture were each measured with four (4) validated items. In assessing rational (RC1-4) and hierarchical culture (HC1-4), items such as 'our firm's incentive system scheme encourages great competitions among employees in the firm', 'the incentive scheme is fair in rewarding people who contribute the most of our objectives' and 'the firm is a controlled and structured place and formal procedures general governs what we do', 'every decision needs the CEO's approval' were used respectively (see Appendix III for details on the constructs).

The last section of the questionnaire contained questions assessing the various demographic or profile information about the respondents and their corresponding firms. Respondents were asked to indicate their position in the firm, the plant's estimated years of relationship with major customers and suppliers, their highest educational level, employee size, the product (s) manufactured at the plant, the location of the plant, the age of the firm since its establishment, the estimated sales revenue, and the frequency of reporting the sustainability performance of the firms (see Appendix III).

3.5.3 Pre-testing of the Survey Instrument (Questionnaire)

Currently, survey-based research is the common technique prevalent in supply chain research. Conducting a survey always require the use of a questionnaire which require a rigorous process in developing it. Confidence and obtaining good results from a survey research are always based on how true the respondents understand, interpret and provide the required answers to the questions in the survey. Previous literature has proven that the common menace with questionnaire type of survey is the inability of respondents to interpret the questions and provide the required answers (Hilton 2017). Respondents must interpret the questions, recall all the necessary information about the question before providing the correct answers to the questions. Respondents are likely to provide irrelevant answers when the questionnaire is not properly pre-tested, and the questions are not easily interpretable. Pre-testing the questionnaire assesses the effectiveness of the questionnaire before the final

distribution to the respondents, helps to refine the questionnaire and reveals errors in the questionnaire.

Hilton (2017) claimed that questionnaires are generally designed with the knowledge about the concepts and variables, therefore, mistakes may occur, and rigorous pre-testing seem to be the only approach for discarding or minimising all the errors. Pre-testing of the questionnaire simply enables experts and practitioners to assess the accuracy of the questions, ensures the questions are practical and easily understood by the respondents thereby reducing sampling error (Drenman 2003; Hilton 2017), increases the tendency of obtaining higher response rates and finally, evaluates how the questionnaire would perform in the field.

In this study, pre-testing of the questionnaire was highly relevant to ascertain how well respondents understood, interpreted the questions, assessed the face validity of the measure (Willis 2016), determined the appropriate method of administering the questionnaire and assessed how well the questions described the various variables in the study. There are no generally accepted approaches for conducting pre-testing and researchers are yet to arrive at the best practice with regards to pre-testing of the questionnaire. Currently, the most widely accepted method for pre-testing questionnaires is through cognitive interview method and expert appraisal. Cognitive interview aims at examining the questionnaire rather than the survey process and reveals the cognitive processes used by respondents in answering survey questions (Willis 2016). Cognitive interview combines both think out loud and probe questions in pre-testing the survey questions. During the cognitive interview, respondents are asked to think out loud while providing answers to the survey questions and at the same time the researcher introduces and follow-up with probe questions to assess how well the respondents answered the questions and why a particular answer is selected. The whole cognitive interview is based on the underlying principles provided by the cognitive theory (Willis 2016). In other words, the cognitive theory suggests that the cognitive interview is founded on the following processes: comprehension of the question, retrieval from memory of relevant information, decision and making the final response to the question.

According to the theory, these are processes a respondent undergoes during the think out loud stage of the pre-testing. Research have proven that the combination of think out loud and probing questions is the best approach to conduct the cognitive pre-testing of survey questions. Willis (2016) outlined several approach or procedures for conducting an effective cognitive pre-test. After the design of a questionnaire, the immediate phase before the actual cognitive interview is the expert appraisal stage (Willis 2016), where mainly, academic experts

are invited to review the questionnaire for errors and make suggestions for further modifications. However, in this research, the cognitive interview followed the main interview because the questionnaire was designed and updated based on the suggestions from the interview and the interviewees were asked to comment on each of the construct in the questionnaire. In other words, in this study, the cognitive interview was conducted immediately after the mainstream interviews. This was due to the availability of the respondents for the cognitive interview., immediately after the main interviews. During the process, the various interviewees were given the potential questionnaire and were asked to comment on the appropriateness and suitability of the questions. Each interviewee provided constructive feedback on the questions which were eventually implemented. This means, 11 managers were used for the cognitive interview. The expert appraisal stage followed immediately after the cognitive interview (see Fig 3.1).

The cognitive interview technique is, however, different from the Delphi technique employed by several supply chain researchers. Popular supply chain research (e.g., Seuring and Muller 2008) adopted Delphi technique which involves group of experts who adopts several methods in solving complex issues and usually the issues are solved through a consensus (Melnyk et al. 2009). However, the cognitive interview conducts pretesting with managers who are potential respondents of the questionnaire. In a nutshell, whereas a pretest of a questionnaire is conducted before a Delphi method, cognitive interview is a pretesting technique.

3.5.3.1 Expert Appraisal (Opinion)

Expert appraisal essentially deals with the use of academics or researchers' opinions in assessing how well survey questions measures a particular variable. It is considered as the next approach after designing a questionnaire or cognitive interview. The expert appraisal quickly followed the cognitive interview, or it was done after the cognitive interview (see Fig. 3.1). After, the cognitive interview, the main questionnaire was designed and sent to the researchers for their expert opinion. Willis (2016) claimed that expert opinion stage should always precede pilot testing. During the expert appraisal stage, the questionnaire is presented to experts such as researchers and in this case, lecturers purposefully for a critical review and opinions on how to modify the questionnaire (Willis, 2016). The questionnaire was sent to Ten (10) researchers of supply chain management and international business. All of them effectively reviewed and suggested various ways of improving the questionnaire. These researchers were selected due to their research experience in supply chain management and previous research and

knowledge on the issues in this current study and most importantly, their experience in the usage of questionnaires in conducting studies. The experts were first contacted via e-mail to obtain their consent before the questionnaire was sent to them. The first expert suggested structural and grammatical changes to the questionnaire. The other experts also recommended for the demographic section to be the last while sections covering the independent and dependent variables should be first and second respectively and this structure was adopted in this research.

The rest of the comments from the other researchers contained one or more of the following suggestions; reconstruction of sentences, adoption of unidimensional scales, inclusion of additional demographic questions, uniformity in the questions, adjusting the questions to suit the needs and objectives of the research, additional contact information, clarity in some of the questions and inclusion of a statement to the effect that respondents should provide their contact information if they require the results of the study. The suggestions were highly critical and helped design a good and appropriate questionnaire containing refined measures that can be used in future research in studying SSCP, SCI and OC. After the questionnaire successfully passed the expert opinion stage, the next stage for the questionnaire was pilot testing.

3.5.4 Pilot Testing

Most of authors conduct pilot testing before the actual survey. The research partly aimed at identifying an industry-specific constructs for measuring SSCP and possibly additional set of scales for assessing OC and SCI. During the interview process, the respondents were asked to identify the constructs and even though, the constructs obtained have been mentioned in extant literature, most of them have not been used extensively in examining sustainability performance, therefore, pilot testing was required to assess how the potential respondents would understand the questions. Furthermore, since multi-item scales were used, it was worthwhile to conduct a pilot test. The refined questions were sent to the 15 managers in the industry. The managers used for the pilot test comprised the 11 managers used in the interview and other 4 managers from the same industry. They were asked to fill-out the questionnaire and were contacted to obtain the feedback and provide any additional suggestions. A reliability and internal consistency using Cronbach Alpha were conducted and all the scales had α value of .70 and above (see Appendix I and III on the α values of each of the constructs). The questionnaire was then developed on Qualtrics for the survey.

3.5.5 Development of Web-based Survey

Due to complexities and cost associated with conducting survey, internet-based or online-based based has become the next easier and cost-effective option used by researchers. Conducting a survey on the internet or web has become as popular as conducting the conventional surveys (Brace 2018). Bradley (1999) identified open web, closed web, hidden web, e-mail URL embedded, simple email and email attachments as the main approaches to conducting web-based surveys. Web-based survey has become increasingly popular due to its fast distribution, response recycles and the ability to capture many respondents at a particular time compared to paper-based survey (Andrews, Nonnecke, and Preece 2003).

Brace (2018) opined that with web-based surveys, respondents can be more honest since interviewers are absent during the answering of the questionnaire. In developing a web-based survey, a link, radio buttons, check box selections and other features are created to enhance the survey, however, creating many questions may lead to increased attrition rate (Dillman 2011). Previous researchers have found that the complexities with internet central registries and the issue of double email addresses of respondents makes random sampling and non-response rate tracking impracticable with web-based survey (Kehoe, Pitkow and Morton 1997; Andrews, Nonnecke, and Preece 2003; Dillman 2011). This statement can be challenged because sampling actually takes place before the email addresses of the sampled respondents are obtained and invited to respond to the web survey. However, their assertion on the non-response rate could be true. Most often a link to web-based surveys must be sent individually to the respondents.

Currently, the most widely used professional survey platforms used by researchers who design non-interactive web-based experiments are SurveyMonkey and Qualtrics (Molnar 2019) of which Qualtrics has become the most predominant tool. Qualtrics possesses several advantages over other web-based survey platforms because it requires no special programming skills, strictly web-based and has user-friendly interface (Molnar 2019). Additionally, the features make it easier to design surveys and complies with the current industry expected standards. However, Qualtrics does not provide "real-time interaction" between the respondents of a research and according to Molnar (2019) no survey platform with real-time interaction has been developed yet. This research aims at reaching as many respondents as possible, hence, the questionnaire was developed on Qualtrics. Surveys conducted online are mostly cost-efficient and quicker than the traditional paper-based survey. Since this study aims at conducting a cost-effective, efficient and use a larger number of respondents, the

questionnaire was developed on Qualtrics by closely following the recommendations made by Dillman (2011). Dillman (2011) suggested that developing a survey on a trusted and official website adds legitimacy to the survey. As a result, the survey was developed with the University of Kent's account on Qualtrics. Developing a survey with a University's account provides credibility, legitimacy and authentication to the questionnaire and the study on the whole (Dillman 2011). Developing a survey on an institution's account provides avenue to reach a large pool of respondents efficiently and cheaply (Braunscheidel, Suresh, and Boisnier 2010).

During the development of the questionnaire on Qualtrics, the aim and purpose of the survey were explained in the first section. Subsequently, three sections each containing scales assessing OC, SCI and SSCP were developed in a matrix and the original Likert scale design format. In the second section, the respondents were asked to click on the best option (from 1-Strongly disagree to 7-Strongly Agree) that relates to the social, environmental and economic performance of the firms. Similarly, in the second section, the respondents were asked to select the answer that best describes the internal, customer and supplier integration. In the next section, respondents were asked to just select the option (1-Strongly disagree to 7-Strongly Agree) that best describes the OC practiced in the firm. In the last section, the respondents were asked to indicate from a number of options, the answer(s) that relate to the demographic information of the respondents and their firms.

Two separate set of surveys, one in English and the other in Greek were developed. The back-translation method was used in developing the questionnaire for the responders in Greece. First, an operations management professor translated the English version to Greek on line-by-line basis. Then an operations management expert in Greece translated the Greek version back to English. The back-translated version was compared with the original version of the English to check for discrepancies. Both the anonymous and official links to the online questionnaire from Qualtrics were obtained and sent out to the respondents in England and Greece.

3.5.6 Data Collection

In order to improve the response rate, emails were sent out to each of the participants to create the awareness of the research and alert them of the link to the survey. The e-mails with the links were subsequently sent out to the respondents. Each of the respondents was given a maximum of three weeks to a month for the survey to be completed. After the third week, reminder e-mails were sent out. A total of four round of reminders were sent and follow-up e-mails were sent to respondents who have not yet logged-in and participated in the

survey. After the fourth round of reminder emails, a total of 325 email addresses were found to be invalid, 48 were duplicated, 63 bounced and were undelivered while 115 declined to respond and 25 requested to be removed from the list. The reasons included respondents being out of office on a holiday, pressure at the workplace due to the Covid-19 pandemic and company's policy of not answering surveys. The potential sample size was drastically reduced to 959, out of this number, 375 responses were received. However, only 315 (UK-259, Greece-56) responses were found to be usable. The 60 unusable questionnaires had either missing or incomplete data and were therefore completely discarded. The overall response rate was therefore 32.85%. Table 3.5 provides a summary of the demographic information on the respondents and their firms.

3.5.6.1 Analysis of Variance Test (ANOVA)

Prior to merging the two separate data sets (UK and Greece), a test was conducted to determine whether there were any significant differences between the respondents and their responses on the demographic variables. Specifically, ANOVA tests were conducted purposely, to test the statistical differences between the means of two groups in terms of randomly selected demographic variables for each set of the responses from the UK and Greece. For each of the variables, no statistical differences were found at $p<.05$. Table 3.5 and 3.6 provides a summary of the results of the test performed.

Table 3.5 Comparisons of the Means of the Demographic Variables (Greece)

Variable	Sum of Squares	F-test	Df	Significance
Respondent's Position * Turnover	253.839	.527	55	.593
Product Type * Firm size	241.554	.852	55	.432
Firm Age * Product Type	241.554	1.695	55	.193

The above results connote a non-statistically significant difference between the means of the demographic variables of the data from Greece and therefore, indicates that the responses were not different for each of the respondents.

Table 3.6 Comparisons of the Means of the Demographic Variables (UK)

Variable	Sum of Squares	F-test	Df	Significance
Firm size * Firm Ownership	102.249	.451	248	.503
Years of working with suppliers * Educational level	336.506	1.729	248	.144
Annual Turnover * Product Type	1162.285	1.014	248	.401

In the UK data, the results in Table 3.6 represents a non-statistically significant difference between the respondents as the p-values were greater than the significance level of .05 ($p<.05$). This indicates a valid data for further analysis. Based on the results, both data sets were subsequently merged, and non-response bias was conducted.

3.5.7 Non-response Bias

The non-response bias was assessed using the method or approach suggested by Armstrong and Overton (1977). Their research recommended a comparison between the early and late respondents in relation to non-respondents. To achieve this, a Chi-square (χ^2) test was performed on some of the demographic variables to ascertain the validity of the non-response bias (Armstrong and Overton 1977). Therefore, the sample was split into two groups based on the time the surveys were received. The first group constituted those who had responded to the survey before the last set of reminders were sent. The last group comprised those who responded the survey after the lasts set of reminders were sent. With regards to the responses from the UK, the early group totalled **(n=180)** whereas the late group was **(n=79)** and with the responses from Greece, the early and late group responders totalled (**n=36 and 20**) respectively. The two groups were compared with five randomly selected variables with some selected demographic variables which did not reveal any statistical differences ($p<.05$). Based on this, non-response bias did not appear to be a problem in the data. Table 3.7 provides a summary of the χ^2 test conducted.

Table 3.7 Chi Square Test for Non-Response bias for Demographic Variables

Variable	χ^2-Value	Df	Asymptotic Significance (2-tailed)
Respondent's Position	28.355	28	.446
Years of working relationship with customers	60.733	24	.227
Years of working relationship with suppliers	49.695	28	.505
Firm's Age	21.032	18	.278
Turnover level	46.253	35	.097

Additionally, a test was performed to determine whether the amount of the non-respondents would have an impact on the overall analysis and results. In order to determine the significant differences between respondents and non-respondents, a chi-squared (χ^2) test was performed. All the potential respondents were coded and considered as non-responders. With values of ($\chi^2 = 21.870$, $p=0.129$), the test revealed no statistical difference between the respondents and non-respondents suggesting no bias both in the data and between respondents and non-respondents.

3.5.8 Demographic Information

Table 3.1 provides a general overview of the characteristics and frequencies of the information about the respondents and the firms used in this study. With regards to respondents' characteristics, they were asked to indicate their position and educational level. Most of the respondents were CEOs (24%), general managers (18.1%) and supply chain managers (16.8%) providing a plethora of credibility to the information provided in the survey. It can also be assumed that the respondents clearly understood the questions and were able to relate the questions to the issues in their firms and supply chains. The rest were finance managers/ Accountants (7.3%), line managers/supervisors (10.8%) and directors (14.2%). In terms of education, most of the respondents had postgraduate certificate (51.4%) while those

with bachelor's degree amounted to 39.0%. The rest had only college or high school diplomas and others amounting to 9.5 per cent.

The respondents were also asked to respond to questions about the features of their firm. In terms of the years of existence of the firm, 177 firms representing 56.2 per cent have been in existence for more than 20 years, 105 firms (33.3%) have been in existence between 15-20 years whilst 29 (9.2%) and 4 (1.3%) firms have been in existence between 10-15 and 5-10 years respectively. In this study, the size of the firm was also assessed using the number of employees. Two (2) firms representing .6 per cent were micro businesses, 26 firms (8.3%) were small businesses, 130 firms (41.3%) were SMEs while majority of the responding firms (157 firms, 49.8%) were large scale enterprises. Even though, there is an unequal representation of the different types of firms in this research, the blend of the firms used improves the generalisability and robustness of this research. The respondents were also asked to provide an estimation of the turnover level of the firm for the past accounting year. Two (2) firms had sales turnover of less than € 2 million, 23 firms representing 7.3 per cent had turnover between € 2-10 million, 70 firms represents 22.3 per cent had turnover between € 10-15 million while 220 firms representing 69.8 per cent had turnover of € 20 million and above..

Most of the firms used in the study were private (299 firms) representing 94.9 per cent while the rest were public firms. This represents the dominance of private firms in the food manufacturing industry. The study intended to use years of working with customers and suppliers as control variables and to determine whether firms with longer relationship with customers and suppliers has an impact of sustainability performance and integration activities of the firm. Seven (7) firms (2.2%) have of less than 5 years working relationship customers. Thirty-three (33) firms (10.5%) had 5-10 years working relationship with customers. Eighty-seven firms (27.6%) had 10-15 years working relationship with customers while 188 firms (59.7%) had more than 15 years working relationship with customers. In terms of suppliers, fourteen firms (4.4%) had less than 5 years working relationship with suppliers. Twenty-eight (28) firms (8.9%) had 5-10 years working relationship with their suppliers. Eighty-nine (89) firms (28.3%) had 10-15 years of relationship with their suppliers and 184 firms (58.4%) had more than 15 years working relationship with suppliers.

Table 3.8 Profile of Respondents (n=315)

	Frequency	Percentage (%)
Respondents' Characteristics		
Position		
CEO	78	24.8
Supply chain Manager	53	16.8
Marketing/sales Manager	25	7.9
Finance Manager/Accountant	23	7.3
Line Manager/Supervisor	34	10.8
General Manager	57	18.1
Directors	45	14.2
Education		
High School/Equivalent	7	2.2
College/Equivalent	21	6.7
Bachelor's Degree	123	39.0
Postgraduate	162	51.4
Others	2	.6
Firms' Characteristics		
Firm's Age (Years)		
5-10	4	1.3
10-15	29	9.2
15-20	105	33.3
20+	177	56.2
Number of Employees		
0-9	2	.6
10-49	26	8.3
50-249	130	41.3

250 or more	157	49.8
Turnover Level (€ Millions)		
Less than 2	2	.6
Between 2 and 10	23	7.3
Between 10 and 15	70	22.3
20 and Above	220	69.8
Ownership Type		
Private	299	94.9
Public	16	5.1
Working Years with Customers		
<5	7	2.2
5-10	33	10.5
10-15	87	27.6
>15	188	59.7
Working Years with Suppliers		
<5	14	4.4
5-10	28	8.9
10-15	89	28.3
>15	184	58.4

Summary of the Chapter

The chapter commenced with the identification and description of the philosophical assumptions of this study. Subsequently, the methodology and the various methods used in conducting this study were revealed. The mixed method approach utilising both qualitative and quantitative methods were used in arriving at the results of this research. The adoption of the mixed method approach necessitated the use of critical realism. Both the qualitative and quantitative methods were used sequentially, that is, the qualitative case method (interviews)

preceded the quantitative methods. The list of the firms in the UK was obtained from the FAME database while the list of the firms in Greece were obtained through personal contact. Eleven semi-structured interviews were conducted with managers in the industry for the purpose of identifying the relationships between the variables and extracting metrics which could be used in measuring the variables in the study. The interviews were subsequently coded, themes were derived and an in-depth analysis were conducted. A questionnaire was developed after the interview and it was taken through cognitive interview and expert opinion stages before conducting the pilot test. A total of 315 samples were obtained and the preliminary statistics which included ANOVA and non-response bias through chi-square tests were performed and explained. The data is analysed with SEM technique mainly to test the hypotheses of the study. The next chapter presents the results of the qualitative interviews and the framework from the analysed results is presented.

CHAPTER FOUR: RESULTS FROM THE CASE STUDY APPROACH

Introduction

This chapter provides an insight into the results obtained from the qualitative interviews. In this section, the data analysis, results and its implication for the research and finally, credibility of the qualitative research are presented. The main purpose of the qualitative study in this research was to obtain the direct opinions, perceptions and the real experiences of managers (Silverman 2006) on OC, SCI and SSCP. Furthermore, the information from the qualitative research is expected to play a significant part in discussing and arriving at a conclusion on the relationship between the variables. Due to the availability of numerous measures/constructs of SSCP, the qualitative research was also used to ascertain the actual measures or metrics of the various concepts pertaining to the food manufacturing industry. This would assist in determining the real measures to be used in designing the questionnaire for the survey (quantitative research) and also expected to contribute to future research in conducting further studies into OC, SCI and SSCP of food manufacturers.

4.1 Sustainable Supply Chain Performance

The results obtained from the interview analysis regarding SSCP and how it is measured are presented. The factors affecting SSCP of the firms are first presented followed by the measures of SSCP.

4.1.1 Factors Affecting Sustainable Supply Chain Performance

Many supply chain researchers have highlighted external factors such as NGOs, customers, the community, environmental regulations, governmental pressures and other pressure group as the main predictors of SSCP in manufacturing firms (Cantele and Zardini 2020). Furthermore, several other studies have identified internal elements such as top management support, human resource management, environmental training, employee empowerment, teamwork and reward systems and OC as essential factors triggering SSCP. Furthermore, Hassini, Surti, and Searcy (2012) also grouped the major factors for the adoption of SSCM into market forces, policy and regulations, science and technology, product development, process capability, sourcing and operations, transport and logistics, marketing and PR and social issues. Other authors have also considered supply and demand as other essential factors.

From the interview, other contributing factors identified in the industry included *investment, environmental responsibility, headquarters' directive, strong pressure from customers, weather, pressure from suppliers, profitability gains, scientific research and key performance indicators (KPIs)*. These factors were identified as influencing the decision to implement and achieve a better SSCP of the food manufacturing firms. In Table 4.1, the factors with "+++" are considered as very critical to the sustainability decisions in all the firms, while those with "++" influences most but not all of the firms and lastly, those with "+" are considered by only two firms. The criticality of the factors varies depending on the size of the firm, that is, whether it is large- or small-scale manufacturing firm. Comparatively, the sustainability decisions in the supply chains in the large-scale manufacturing firms were largely triggered by *profitability and good intentions*. Since most of the customers of the manufacturing firms are the renowned retailing firms in the UK, *customer pressure* constituted one of the largest drives for the implementation of sustainability practices in the supply chain and for the achievement of SSCP. Most of the respondents also acknowledged availability of investment as the main influencer of the implementation of sustainability in the supply chain. Since pursuing sustainability is expensive, firms are only moved to sustain the supply chain when there is *investment*. When asked about the factors triggering sustainability, one of the participants voiced that:

> *It has everything to do with ensuring there is adequate investment and doing something good for the environment* **(Rep 4)**

One of the respondents also said the selection of sustainable suppliers even depended on the availability of *investment*:

> *So, we have been looking for business in the origins processing in the origins, we started about 14 years ago, however it is easier now since there are many investments* **(Rep 6)**

Interestingly, most of the profitable and large-scale manufacturers among other things, consider sustaining the supply chain as a good gesture for protecting the environment. Since sustainability in the supply chain protects the environment and the society, the firms and their supply chains consider *good intention* as a good factor for pursuing and attaining a better SSCP. Regarding the large-scale manufacturing firms with plants in different locations, the decision to implement and improve SSCP is largely based on the *direction of the headquarters* and *budget of the firm*. In such firms, sustainability is implemented on piecemeal basis, therefore, the sustainability practices is based on the decisions, sustainability practices of the headquarters and budget allocations for the implementation of the sustainability practices. Based on this, one of the respondents had this to say:

Of course, we have a budget so if we are not meeting the budget, then we have to try reducing everything and to be honest, every year, it comes from the headquarters to reduce the usage of everything **(Rep 2).**

One of the most fascinating findings was the consistent pressure from customers to the food manufacturing firms to implement sustainability in the supply chain. With the firms used in this research, customers seem to constitute the strongest party in the chain enforcing the implementation of sustainability practices and the achievement of SSCP. Therefore, improving SSCP in such firms is highly dependent on the decisions and pressure of the customers. The customers are the renowned retailers in the UK (TESCO, Sainsbury's, Morrisons, ASDA, ALDI, LIDL), and they represent the powerful force in the supply chain. Due to this, the sustainability decisions are determined by the customers and such decisions are enforced both in the firm and across the supply chain. This implies that, within the context of sustainability, the decisions in the supply chain are made by the downstream customers and it is pushed all the way to the upstream suppliers. This means in as much as sustainability is concerned, there is a reversal chain as decisions and inputs now emanate from the customers (see Fig 4.1). With regards to this, one of the participants indicated that:

As a business we have a very passive approach to that as a business, but our customers are all the major retailers, with the major retailers, they have a major pressure on them on what they are doing about sustainability. What the retailers do is to pass the pressure down to the supply chain and pass it through to suppliers like ours **(Rep 8)**

The respondent continued by saying:

The retailers recognise the need and what the retailers do in my opinion is pass the problem down the supply chain to their suppliers and the suppliers provide the solution to the effectiveness of sustainability.

With most of the SMEs or small-scale manufacturing firms who are largely dependent on agricultural-based raw materials, *the type of weather* experienced affect the firm's decision to implement and improve the SSCP. Since the SMEs implement sustainability practices on a piecemeal basis and also dependent on raw materials, a good weather means the availability of enough raw materials. Consequently, profitability is increased and there is availability of investment for the firms to implement sustainability practices.

Montabon, Pagell, and Wu (2016) and Pagell and Wu (2009) expressed the need to integrate effectively in the supply chain in the quest to achieve high sustainability performance. This suggests the need to fully indulge customers and suppliers in the supply chain. In the food

manufacturing industry, both large- and small-scale manufacturers face pressure from and on suppliers to implement and improve SSCP. Kang et al. (2018) also reported the continuous intra-sustainability management practices that is currently ongoing between focal firms and suppliers along the supply chain. Impliedly, both suppliers and manufacturing firms must implement sustainability practices to improve SSCP and suppliers currently prefer to supply firms with well-ingrained sustainability system (s) in place. The *pressure between firms and suppliers,* therefore, acts as a major factor that help firms in implementing and achieving improved SSCP. Firms implement sustainability practices as a gesture to win many customers, thereby, improving the profitability of the firm.

For example, one of the participants had this to say:

> *A lot of our sustainability decisions is driven by profitability and when we improve environmental improvement and waste, when we do it, our profitability increases. It is not only the right thing to do, from the sustainability point of view for the environment is also for the business as well* **(Rep 6).**

With the seafood processors, one of the most intriguing factors was *scientific research*. Like the importance of a good weather condition to agriculture-dependent food manufacturing firms, the decision to go sea fishing depends on the scientific findings of the sea scientists. The sea scientists determine which of the fish to catch and those to avoid in order to sustain the water and the fish in it. In a good weather condition and based on the positive feedback from scientists, manufacturing firms are able to obtain plenty of fish for processing, thereby increasing the profitability for sustainability implementation. The decision to consider sustainability in the supply chain is highly dependent on the scientific research and decisions. Based on the influence of the weather and the decision of scientific researchers, one respondent opined that:

> *The information from the science as we are led by the scientist about what is available in the ocean, we must adhere to what the scientist tells us. And they give us guidelines on what fish is sustainable to catch, we have a meeting once a year, where all the leading specialists provide us update on what to catch the following year. So, the scientist tell us the type or kind of fish to catch and those that are diminishing in the sea* **(Rep 8)**.

Most of the firms' decisions to implement and attain higher SSCP is largely based on the *key performance indicators (KPIs)*. Sustainability practices have eventually been enlisted as part of the KPIs of the firms, and therefore, keeps firms in line to attain higher SSCP.

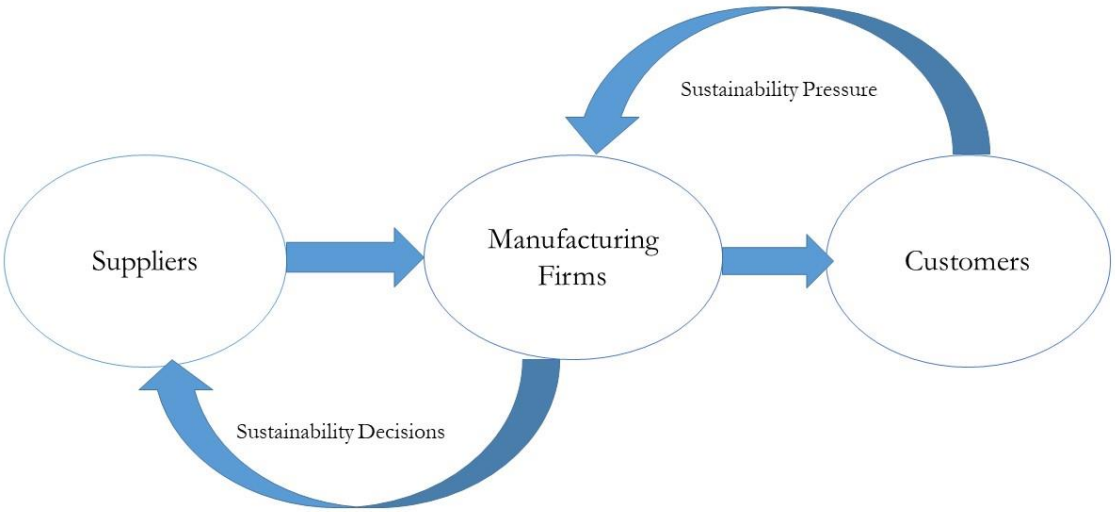

Figure 4.1 The reversal chain caused by sustainability. Source: Author's Own

Table 4.1 Thematic Analysis of the Results of Sustainable Supply Chain Performance of the firms

Factors Affecting SSCP		Environmental Performance Measures		Social Performance Measures	Economic Performance Measures		Factors Impeding SSCP	
Investment	++	Carbon Footprint Tracking	+++	Health and Safety measures	Increase in cost of		Budget Constraints	+
Environmental	+ +	Reduction of water usage	+++	+++	Manufacturing	+++	Cost of Production	++
Responsibility (Good		Reduction in energy usage	+++	Societal developmental	Improvement in		Cost Involved	+++
Intentions)	+	Waste Recycling	+++	projects ++	Distribution	+++	Decision-making structure	++
Environmental Standards	++	Reuse of waste products	+++	Local employment	Reduction in		KPI Constraints	++
Headquarters Directive	+++	Sustainable sourcing of raw materials	+++	+++	Profit/Investment	+++	Power of customers	++
Pressure from Customers	++	Environmental Standards/Certifications	+++	Equal opportunity for	Increase in cost of		Financial Constraints	++
Key Performance Indicators	+			advancement	raw materials	+++	Authority	+
Weather	++			+++	Increase in		Difficulty in Practice	+
Organisational Culture	++			Employee training	cost of finance	+++		
Pressure from Suppliers	++			++	Increased			
Size of the firm	++				sales revenue	+++		
Profitability gains	+				Improvement in			
Scientific Research	++				lead time	++		
Competition in the Industry	+							
Prices of Products	+							
Technology	++							
Quality of Products								

+ = minimal impact/consideration, ++ = high impact/consideration +++= very high impact/ consideration

4.1.2 Measures of Sustainable Supply Chain Performance

A sustainable supply chain must be able to perform the traditional function of attaining profit or loss while at the same time expanding the performance to include social and environmental dimensions (Pagell and Wu 2009). Even though, several criticisms have been levelled against the usage of the TBL as the measure of the sustainability performance of firms, this research considers it as an approach firms could use in assessing their sustainability performance. Fig 4.2 presents all the categories of the measures used by the food manufacturing firms in assessing their SSCP. The elements were extracted from the thematic analysis presented in Table 4.1. Most of the measures found during the interview, confirm and strengthen the measures that have been used in previous studies.

4.1.2.1 Environmental Performance

Depending on the firm and industry, firms have a way of deciding the environmental management practices necessary to improve the SSCP. Extant research has considered factors such as reduction in the discharge of solid waste, gaseous and liquid waste, reduction in water and energy consumption, recycling and repackaging and the implementation of environmental standards (Hassini, Surti, and Searcy 2012) as good measures of environmental performance. From the interview, both small- and large-scale food manufacturing firms to a large extent measure their environmental performance through reduction in water and energy usage, waste recycling, reuse of waste products, sustainable sourcing of raw materials and carbon footprint tracking/measurement (see Fig 4.2). Surprisingly, irrespective of the size of the firm and their supply chains, carbon footprint tracking, and measurement have been taken into full consideration. With regards to carbon footprint, it was said that:

> *With carbon footprint, we are neutral, we have done that few years ago, our carbonization is really low, and I think it is product, which is olive oil and what we are getting from Olive tree, that's why we are carbon neutral* **(Rep 2)**

Most of the firms are doing well in terms of sourcing their raw materials from very closer suppliers. This is to reduce the carbon emissions, save cost, improve delivery and improve the lead time to customers. In order to reduce the amount of waste to landfills site, the supply chains have started maximising the gains from waste by fully converting the waste from production into other useful products (circular economy). One of the participants reported that:

One of the key projects is actually about waste projects, let's say we produce with the wrong date, not fit for sales or lid on it because it is not readable, rather than send them to landfill, it goes onto a pallet for the staff to take home and actually eat **(Rep 6)**

4.1.2.2 Social Performance

The social performance measures can be categorized into employee-centred and community-centred performance (Das 2017). All the firms and their supply chains used in the interview had; well-instituted health and safety projects (employee-centred), employ locally (community-centred), equal opportunity for advancement (employee-centered), employee training (employee-centred) and perform societal developmental projects (community-centered). These further re-affirm the measures suggested by research (e.g., Abdul-Rashid et al. 2017; Kang et al. 2018). In terms of the societal developmental projects, most of the firms and their supply chains have well-established and/or undergoing societal enhancement project. The projects include tree planting, tidying-up of plastic waste in the community, educating the community, providing internship opportunity for the people in the community and providing employment opportunities to ex-convicts. One of the respondents had this to say:

We take part in the apprentice training scheme, we have quality and leadership management, an undergraduate level programs for employees, health safety measure training, food training, and solely dependent on the culture to invest much in the employees **(Rep 4)**

Another respondent also said:

In terms of societal development, we support small projects locally, and our suppliers at origin of our products is very sustainable. We go to the primary schools in the area to talk about how the cocoa can be cultivated and processed **(Rep 6)**

4.1.2.3 Economic Performance

The economic performance measures obtained from the interviews could be broken down into operational and financial performance (Flynn, Huo, and Zhao 2010). All the firms used in the interview and their supply chains consider improvement in delivery (distribution) and lead time as measures of operational performance while cost of manufacturing, investment, cost of raw materials, cost of finance and sales revenue are used as the basis for assessing the financial performance. However, most of the SMEs interviewed were experiencing financial constraints to the implementation and the achievement of SSCP. This is due to the cost associated with the implementation of sustainability practices preventing the attainment of SSCP. Nonetheless, the customer base is likely to increase due to the

implemented sustainability practices in the firm and supply chains leading to higher revenue. In other words, the implementation and continuous improvement of SSCP come at a higher cost to the firms especially with the SMEs but at the same time, making sustainable products increases demand and help firms maintain a certain level of profitability necessary to keep the firm running. The factors with the asterisks (*) are the new constructs obtained from the interviews. The rest had been used extensively in extant literature.

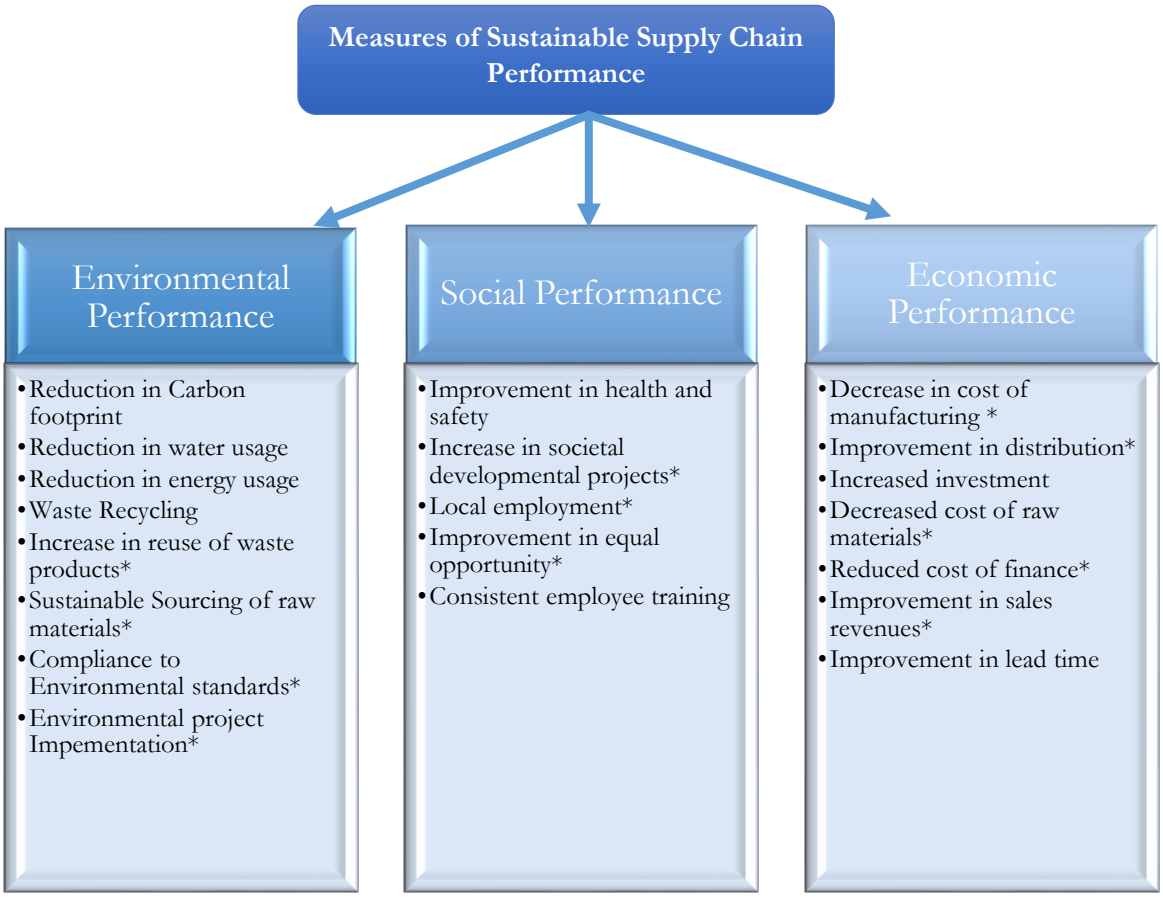

Figure 4.2 Classification of the performance measures of Sustainable supply chain. Source: Author's Own

4.2 Supply Chain Integration

Fascinating results were found in the industry concerning how firms integrate with their customers and suppliers (SCI) across the supply chain in this era of sustainability. The food manufacturing firms were keen on SCI. They also had established, well-defined structures and systems to support their integration activities to ensure the success of sustainability and SSCP. Table 4.2 displays all the factors affecting SCI, the internal, external and customer integration systems, the SCI practices and finally, factors impeding the SCI of the food manufacturing

firms and their supply chains. Table 4.2 also presents the factors or elements with high impact or those that are highly considered in making integration decisions in the food manufacturing firms.

4.2.1 Factors Influencing Firms' Decision to Integrate with Customers and Suppliers

The results from the interview revealed a deep insight into the in-built SCI systems of the firms. The firms' decision to integrate fully are influenced by several factors which are outlined in Table 4.2. The factors with "+++" are considered as critical factors influencing SCI in the firms, while those with "++" influences most and not all of the firms and lastly, those with "+" are considered by only one or two firms. Most of the factors were found to have a high impact on the firms' decision to integrate internally and with customers and suppliers. First, the firms and their supply chains consider *trust and honesty* as the major factors influencing the SCI decisions. With regards to external integration, the existence of trust acts as an enabler for free exchange of information between the supply chain partners. Furthermore, the trust that exist in the supply chain fuels firms' decision to integrate more with their customers and suppliers as trust underpins all the growth, demand and the overall profitability and the ability to overcome any unexpected change in demand (Bullwhip effect) of the food manufacturing firms. This confirms the assertion of studies (e.g., Mora-Monge et al. 2019; Collier and Sarkis 2021) which revealed the significance of trust in the supply chains. Based on the issue of trust, one of the respondents emphatically voiced that:

> ……. *we are trusted by our customers. Trust underpins everything, our customers need to trust we will deliver whatever the goes are time after time* **(Rep 5)**

As stated earlier on, most of the customers of the manufacturing firms are the major retailing firms in the UK, therefore, the products are produced to suit the *brand requirements* of the retailers. Producing to meet the *brand quality* and *demand* of the retailers require a close working relationship with the retailing firms. That is, producing strictly to match the taste and quality demands of customers requires a close working relationship between the food manufacturers and the customers. Kim and Cavusgil (2009) established a positive and significant link between brand and SCI. Currently, firms and customers (retailers) are entering into *contractual agreement* in the form of supply agreement and other brand production agreement which also help to establish a close working relationship with the customers. Achieving the terms and conditions in the contract require firms working closely with the supply chain partners, thereby, intensifying their level of integration. Based on this, one participant responded that:

From our side we produce private labelled products for Aldi, Tesco and we produce products for them. We have recently signed a 5-year agreement to be their sole suppliers **(Rep 7)**

Since firms produce to suit the brand image of their customers (retailers), a strong integration means firms can produce to meet the *quality* expectations of the customers. Furthermore, most of the large-scale manufacturers prioritise *profitability and good impressions* and consider these two factors as the important elements in forging a strong integration with customers. Profitability means firms pursue integration to effectively produce to meet the desire of customers at the right time and amount, thereby, amplifying the loyalty from customers. Consequently, demand is increased resulting in increased profitability of the firms. Much research (e.g., Flynn, Huo, and Zhao 2010) have confirmed the positive influence of SCI on the business (economic) performance of firms.

Recently, customers have their own *distribution systems* which transports the products from the firms to the customers. The system only works effectively when manufacturing firms and customers work collaboratively to ensure the products are available as agreed and both parties act according to the distribution plans set in the agreement. The consistent exchange of information between the food manufacturers, suppliers and customers improves the dynamic capabilities of the supply chain (Vanpoucke et al. 2014). Information is currently exchanged on several *information systems or channels*, and such systems are used by firms and their customers in sharing pertinent information needed in carrying out collaborative projects for a successful and profitable supply chain. Most of the firms also revealed that, establishing a strong integration with customers and suppliers helps in sharing information which could be used in producing the desirable products or services. The sharing of information between customers, suppliers and firms about desired products and processes aids firms in reducing the cost of production. With regards to cost of production:

Because our customer is trying to increase their profitability and profit margins, we have to also seek to reduce our cost and then we have to look to run our own business and then we look at our suppliers which can include, we buy lots of vegetables and lots of potatoes, it means we turn to our suppliers and put a lot of pressure on them and see what they can do to improve cost to us **(Rep 8)**

Interestingly, one of the respondents stressed that integration is very important in the industry, however, it is only being practiced in the firm due to the widespread nature of integration in the industry. This suggests the influence of *mimetic pressure* (Martinez-Ferrero and Garcia-Sanchez 2017) in forging integration among supply chain partners in the industry.

Evidently, the pressure to imitate other firms in the industry has a role to play in the implementation of integration in the firms. Additionally, like sustainability, most of the pressure to integrate originate from customers which influences the internal integration of the firms, and such pressures of the customers are passed onto suppliers.

Previous supply chain researchers found environmental-related factors such as (environmental uncertainty, technological uncertainty and demand uncertainty), information technology and strategy as antecedents of SCI of firms (Cao, Huo, and Zhao 2015)

Table 4.2 Thematic Analysis of the Supply Chain Integration of the firms

Factors Affecting SCI decisions	Internal Integration	Customer Integration	Supplier Integration	Factors Impeding SCI
Transparency +	Communication through news systems	Business Portal +++	E-mail Communication and	Head office directories and control
Trust +	(communiques, staff news and business	Communication via	portals +++	Language
Commitment from customers +	opportunity news) +++	customer's own system +++	Collaborative management	Distance
Customer's demand + + +	Interdepartmental reviews and meetings	Telephone conversations ++	of performance ++	Mode of transportation
Distribution system of customers ++	+++	Regular Meetings with	Joint Audit programs +++	Cost of transaction
The information systems of customers +	NPD and technical projects +++	customers ++	Joint meetings and	Different customer systems
Honesty +++	Worker-supervisor	Sharing of production strategy	conferences +++	Lack of transparency
Contract agreements +++	teamwork +++	and product information +++	Shared storage facility ++	Customers demand for cheaper products
Collaborative project management +++	Employee engagement ++	Collaborative sustainability	Collaborative NPD ++	Customer's decision
Impressing customers ++	Innovative Systems +++	decisions +++	Collaborative New Idea	Difference in distribution systems
Profitability goal ++		EDI ++	Development +++	Difference in communication systems of customers
Customer's brand +++		Pricing ++	Collaborative project	Unstable nature of management's job
Cost of production +++			management +++	The size of the company
Industry ++				Financial Constraints
Quality of products +				
Bargaining power +++				

				Lack of resources Strong bargaining power of customers Customer services Delivery Non-disclosure of full information Lack of funding Numerous Collaborative programs

+ = minimal impact/consideration, ++ = high impact/consideration +++= very high impact/ consideration

4.2.2 Internal Integration

All the respondents interviewed acknowledged the relevance of internal integration in enhancing the success of the supply chains of the food manufacturing firms (Flynn, Huo, and Zhao 2010) for the purpose of enhancing external integration and SSCP. The whole process of integration begins from within the firm (internal) before it is extended to the customers and suppliers. In this research, however, it was found that, within the context of sustainability performance, firms' intention to integrate is influenced by the quest to make quality products and meet the pressing needs of customers. Again, customer pressure plays a key role in forging a stronger internal cross-functional collaboration in the manufacturing firms. This is evidenced by the statement made by one of the participants:

> *Because there is much power in the retailers, the retailers put a lot of pressure on the suppliers, and the unfortunate thing is that that pressure is pushed further down the supply chain* **(Rep 8)**

A formidable internal integration guarantees a successful and strong integration with customers and suppliers. Both SMEs and large-scale manufacturing enterprises use internal communication channels such as (communique, staff news and business opportunity news), regular meetings and reviews, worker-supervisor and employer-employee teamwork in establishing and integrating departments and employees in the organisation. Common to the large-scale manufacturers was the use of cross-functional teamwork for new product development (NPD) e.g., sustainable products, innovative systems and high-level employee engagement activities in integrating the internal departments and functions.

NPD requires the design of a technical element that can stimulate higher demand and interest of customers. Since NPD especially sustainable new products is highly technical, it requires the assembling of highly skilled employees from different parts of the firm. The firms also use different software in the design of the new sustainable products; therefore, it is highly crucial to gather employees with enormous knowledge and skills about the software and the product. Similarly, responding to the world of constantly changing taste and preferences of customers, various manufacturers are designing innovative products to withstand competition. Common to the food manufacturing industry is the use of internal integration for the effective development of innovative products or services. This leads to high cross-functional integration within the firm to enhance sustainability performance. With regards to this, one respondent said:

I think we have to have good teamwork and have good collaboration, we constantly use software applications to help us for instance, if we look at planning, trying to plan a complicated factory, it can become very tricky so we look at planning systems, product development systems to ensure the production of profitable products, there is constantly changing markets, so we have to look at innovations and look at creating products, we can make cost effective **(Rep 8)**

These confirm the findings of previous research (e.g., Narasimhan and Kim 2002; Gimenez and Ventura 2005; Flynn, Huo, and Zhao 2010) who described intensive integration as sharing data, information and resources, joint establishment of firm's objectives, real-time searching of logistics-related operational data and the use of cross-functional teams in new process and product development. Figure 4.3 represents the overview of the internal integration systems practiced in the industry. The quest to meet customers' need and preferences including sustainability triggers the need for firms to integrate internally and such integration is extended to customers and suppliers. The communication systems, teamwork and regular meetings are the basic integration practices and channels used by the firms.

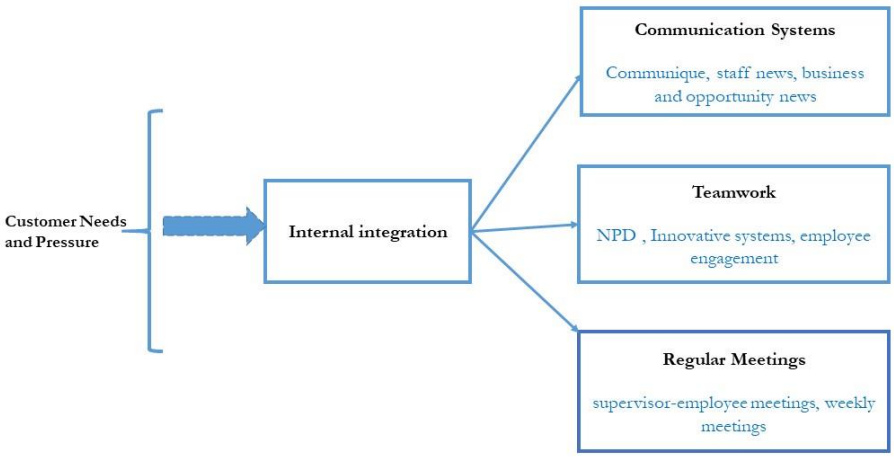

Figure 4.3 Internal integration systems in the industry. Source: Author's own (2020)

4.2.3 Customer Integration

Firms in the industry acknowledged the need to fully integrate with customers and have accordingly, generated matching systems to help establish the integration with customers to achieve a higher SSCP. Extant literature has suggested the various channels through which firms are integrating customers into the supply chain. Like internal integration, customer integration is also fuelled by the quest by the food manufacturing firms to be fully responsive to customer's needs and preferences especially the sustainability needs of customers. It should be noted, internal integration is the bedrock for establishing a strong customer integration especially within the context of sustainability. In this research, as presented in Fig. 4.4, the food manufacturing firms and the customers across their supply chains use business portal, customer's own technological communication system, telephone conversations, meetings as the various channels for collaborating with customers. The customer integration often manifest in the form of sharing of production strategy and ideas, collaborative decisions, electronic data interchange (EDI) and pricing strategies. The various channels provide a very important update and contribution to the customer integration activities of the firms.

The most common channel for customer integration found in all the firms was portals, which was used for exchanging information and receiving orders from customers. For one of the SMEs, most of the communication with customers take place on the telephone. The interview also confirmed the usage of *party and interpretive portals* to transmit information with wholesalers and the second-tier customers. Especially, any change in price, demand, products or any new changes in the supply are quickly passed on the other downstream members including wholesalers through the *party and interpretive portals*. With regards to exchanging information with wholesalers and customers, it was said:

> *We also have party portals, that is, when it is not customer specific, we have to put information into interpretive portals to be assessed by other wholesalers, so if they need any information, they check the data on that particular product* **(Rep 2)**

Most of the retailers have their customized communication system on which series of crucial information with the firms are exchanged. Regarding this, one respondent noted that:

> *Generally, the customers have their own portals, foot bread uses …, Iceland uses …, Morrisons uses.., so the customers all have portals and feed very important information to the portals and every customer have accurate data of origin and increasing information and they all have their set*

standards of production, our customer say we should not use any of that, we need to feed into that **(Rep 2)**

The EDI is also of the systems considered by the food manufacturing firms in exchanging information and other electronic data with the customers. As part of the integration process, the focal firms and customers share; sustainable production strategy, new production information, pricing, sustainability performance enhancement information and other vital information in the supply chain. These partly confirm the findings of research (e.g., Stank, Keller, and Daugherty 2001; Flynn, Huo, and Zhao 2010; Koufetoros, Vonderembse, and Jayaram 2005; Wong, Boon-Itt, and Wong 2011) who found that firms with a strong customer integration mainly share ideas for NPD (sustainable products) and development of other innovative phenomenon in the supply chain. Due to the importance of sustainability in the supply chain, customers and firms are now engaging in the execution of sustainability practices and collaboratively engaging in projects enhancing sustainability performance (Kang et al. 2018). Information on sustainable packaging, production process and other valuable sustainability related information are provided by the customers. Fig. 4.4 provides a summary of the customer integration practices and the systems commonly practiced by the firms used in the study.

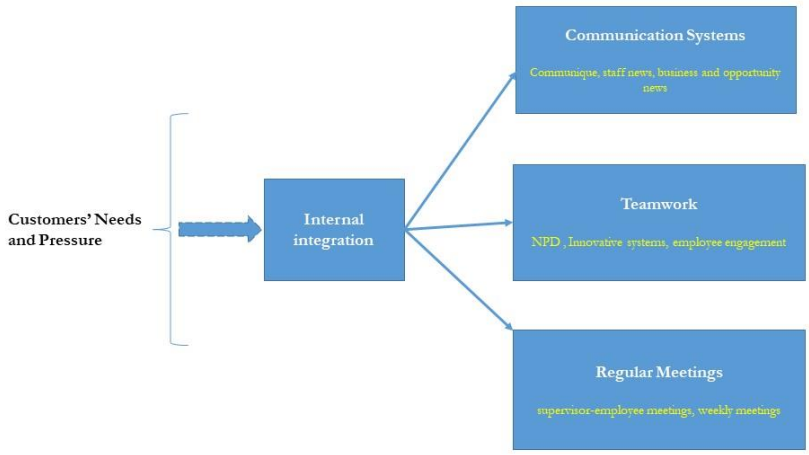

Figure 4.4 Customer Integration System. Source: Author's own (2020)

4.2.4 Supplier Integration

Like customer integration, the pressure to form a strong integration to enhance sustainability is based on the pressure from customers and of course, a strong internal integration within the firms. Though, research (e.g., Zhang et al. 2018) found that internal integration does not necessarily influence supplier integration of manufacturing firms, this study holds that firms can only form a strong supplier integration across the supply chain when there is a formidable and strong cross-functional integration in place in the food manufacturing firms. The pressure from customers for firms to meet the sustainability needs or demands especially, the pressure to produce sustainable products, are passed down to the suppliers. Therefore, the quest to integrate strongly with suppliers emanates from the pressure from customers and internal integration acts as an antecedent to a successful supplier integration for sustainability enhancement. One of the participants stated:

> *What the retailers do is to pass the pressure down to the supply chain and we pass it through to suppliers like us* **(Rep 7)**

In terms of communicating and collaborating with suppliers, unlike customer integration, most of the firms especially the SMEs use emails while the large-scale manufacturers use portals. Currently, firms engage in joint audit programs, meetings and conferences mainly to discuss the progress and the methods that could be implemented to meet customers' needs and preferences. One of the firms has a shared storage facility with their suppliers. The information about orders is sent and received via emails normally on a spreadsheet format. The supplier integration in the supply chain often manifest in the form of collaborative performance management, NPD (sustainable products), development of new ideas, collaborative project management, exchange of information about sustainability and new ideas which could improve the supply chain while at the same time satisfying the need of customers. Similarly, Ragatz et al. (2002) and Wong, Boon-Itt, and Wong (2011) further emphasised that a typical supplier integration engulfs information exchange, strategic partnership, collaborative product designs and supply chain strategies between firms and their suppliers.

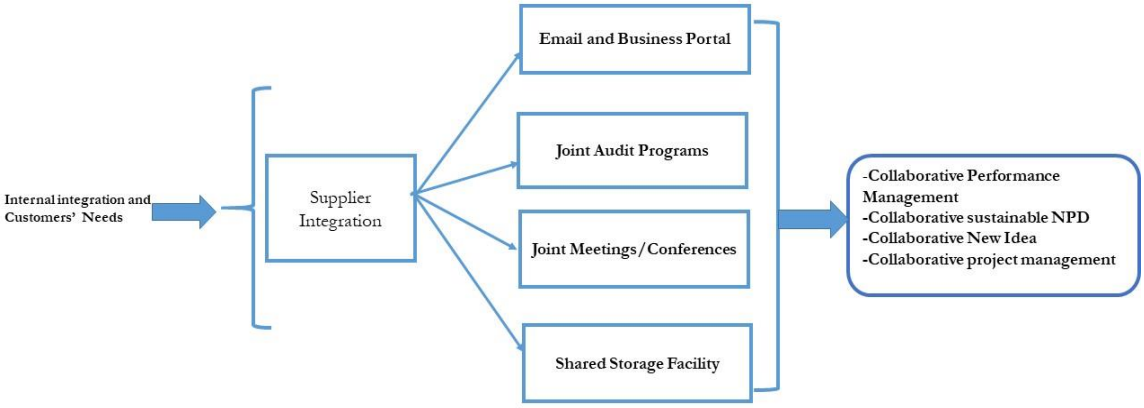

Figure 4.5 Supplier Integration System. Source: Author's own (2020)

4.3 Organisational Culture

The findings on OC of the firms were overwhelming. All the firms had well-instituted OC in place, for example, most of the firms have designed abbreviations which represent the cultural values practiced in the firms. The emergent and dominant values common to all the firms were *teamwork, honesty, respect, openness, integrity and safety. Honesty, respect, openness and integrity* are practiced in both the internal and external boundaries of the firms to build an esprit de corps within the organisation, stimulate employee commitment and transparency and at the same time ensuring there is utmost trust and transparency in the supply chain and dealings with the external environment. However, other interesting values could have emerged if the interview size were larger. The cultural values found were categorised under the dimensions of the CVF (developmental, rational, hierarchical and growth culture). Fig. 4.6 and Table 4.3 represent the various values classified according to CVF identified in the research.

Table 4.3 Analysis and Classification of the cultural values based on Competing Value Framework

Developmental Culture	Rational Culture	Hierarchical culture	Group Culture
Continuous Improvement **Quality** **Sustainability culture** **Recognition** **Safety** **Career Development** **Employee sensitisation** **Excellence** **Key Performance Indicator** **Openness**	Internal promotion Award Schemes	Centralized Decision-making	Teamwork Honesty Integrity Trust Employee engagement Group Support Respect Passion

4.3.1 Developmental Culture

Firms with high level of developmental culture always seek for growth, resource acquisition, innovation, creativity, adaptation, change and responsiveness (Denison and Spreizter 1991). According to the results from the interview, both SMEs and the large-scale manufacturers have continuous improvement, quality, recognition, safety, career developmental goals, employee sensitisation, excellence, key performance indicators and openness as values defining the OC existent in the firm (see Table 4.3 and Fig. 4.6). These values can be considered as flexible and seek to strengthen the external orientation of the firm (Porter 2019). Moreover, the values increase the image of the firm and the firm's capability of effectively securing enough external resources. The key performance indicators contain elements that keep firms in check and enable them to perform according to set standards. One of the key tenets of developmental culture is shifting employees' focus towards the long-term objectives of the firms (Cao, Huo, and Zhao 2015). Regarding this, one participant instituted that:

> *Honesty and Transparency. Absolutely as an organisation we work in teams and we are working on sensitizing employees towards achieving the long-term goals, that is why we are working with the continuous improvement specialist at the moment* **(Rep 1)**

4.3.2 Rational Culture

The tenets of rational culture rely on the use of monetary rewards, awards and incentives to stimulate increased performance and productivity among employees. The main aim of this culture is to generate competition and motivate employees to improve their performance. Surprisingly, most of the manufacturing firms especially the small-scale food manufacturers do not have well-instituted incentives, award or bonus schemes in place. Due to the constraints inhibiting the financial performance of the small-scale manufacturing firms, most of them employ temporary workers and therefore pay them the normal wages through their various agencies of employment without incentives. Additionally, the supply chain strategies such as sustainability and SCI are built into the strategy of the organisation. Due to this, the members in the firms are expected to respect and work according to the set strategies. As a result, this research does not consider rational culture as very prevalent in the industry and therefore, have minimal influence on the SSCP and the supply chain strategies (including SCI) of the food manufacturing firms. One of the participants said:

> *We don't rely on incentives for the employees* **(Rep 4)**

Also, one participant clarified that since most of their employees are on temporary contracts, it was not necessary to institute incentive schemes in the firm. In view of this, one respondent said:

> *Incentives do not actively play a major role because most of our employees are not employed directly as they are through the agencies* **(Rep 6)**

One of the reasons can be attributed to inability of the firms to make the required turnover. Consequently, the firms only pay at the legitimate (minimum) wage to the employees. Regarding this, one of the respondents said:

> *Our turnover is not that great to pay higher incentives to employees, so we pay the legitimate wages, and the people are happy* **(Rep 2)**

The respondents further agreed that the incentives used in the firm do not account for the sustainability performance or profitability achieved by the firm. This means rational culture has limited influence on the supply chain strategies or performance of the firms. The negative impact of rational culture contradicts the findings of Cao, Huo, and Zhao (2015) who found rational culture as positively influencing internal integration, but partly confirms the results of (Braunscheidel, Suresh, and Boisnier 2010; Porters 2019) who also found no positive influence of rational culture on supply chain strategies. Nonetheless, one of the large-scale

manufacturing firms had a well-instituted incentive and award schemes necessarily to stimulate higher productivity in the firms. This means, the negative influence only holds for SME manufacturers, the results could have been different if many large scale manufacturers were used in the firms. An increment in the number of interviews may have changed the results, especially, with regards to rational culture. Rational culture may be highly used in other large firms not captured in the interviews of this study.

4.3.3 Hierarchical Culture

In terms of the authority structure, the interviews most of the interviewed firms have a flat authority structure. This is because the size of most of the firms prevents the practice of flexible decision-making structure. Hence, all decisions had to be taken by top management. Moreover, the flat authority structure suggests strict and centralized control in the firm. This means all authority flow from the top management which consequently slow down decision-making process in the firms. However, since the large-scale manufacturers mostly have different manufacturing sites, flexibility is always the best option to improve productivity and quickly meet the needs and preferences of customers (Porters 2019). The participants from the large-scale manufacturing firms acknowledged the practice of flexible culture due to the numerous manufacturing sites of the firm. Though, most of SMEs have a strict authority structure, supply chain performance is still increasing and at the same time the expected objectives of the firm are being achieved. This is due to the ability of the managers to make quick and strategic decisions, especially with issues relating sustainability. In terms of sustainability, the presence of hierarchical culture escalates the achievement of higher SSCP due to the ability of the firms to channel employees' behaviour to work according to the established sustainability policies and standards in the supply chain. The strictness of the decision-making helps to easily control, maintain discipline and ensure employees act according to set sustainability standards. Furthermore, the flat authority structure is useful for harnessing the skills of the lower-level employees. One respondent voiced that:

> *Just because the structure is barely flat, I am the managing director, I have general manager, sales, production manager and technical director and they all have people reporting directly to them. One of my aims is to harness the skills set of employees to ensure the organisation prosper* **(Rep 3)**

Flexible structure also encourages quick decision-making thereby helping firms to attain set objectives. The results contradict the findings of research such as (Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Porter 2019) who found the negative influence

of a strict authority structure in manufacturing firms. Regardless of the positive impact of hierarchical culture, the usage of other forms of large-scale manufacturers would have provided an additional perspective on the types of authority structure used in these firms. Large interview could have provided a wider scope of knowledge or information on the authority structure.

4.3.4 Group Culture

The group cultural values seemed to be the dominant values widely practiced in the industry. In terms of the group culture, the values practiced include *teamwork, participatory decision-making, open communication and strong collaboration inside the organisation* to establish a strong employee commitment and attainment of firm's objectives. Since group culture invokes and establishes a clan or family- like atmosphere in a firm, the consistent practice of these values improves internal integration and ensure these objectives are achieved. The most widely practiced group cultural values present in most of the firms include *teamwork, honesty, integrity, trust, employee engagement, group support, respect, group support, passion and strong employee commitment* (See Table 4.3 and Fig. 4.6). These values empower the firms to maintain strong teamwork and cooperative spirit to attain high productivity. Teamwork is a highly crucial element for a stronger internal and external integration. Because group culture intensifies internal integration, it provides a solid basis for extending such coordination to external supply chain partners. Furthermore, the existence and usage of employee engagement, respect, group support, passion and other group cultural values are all characterised by flexibility which enables firms to create enough flexibility within the internal boundaries.

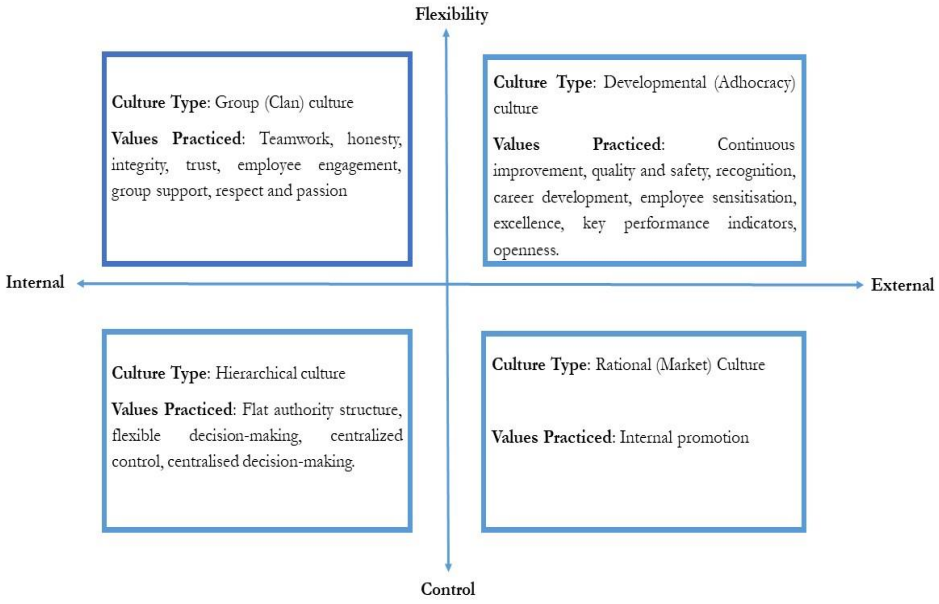

Figure 4.6 Classification of the values in line with competing values framework**.** Source: Author's own (2020)

4.4 Relationship between Organisational Culture, Supply Chain Integration and Sustainable Supply Chain Performance

In this section, the results from the interview on the relationship between OC, SCI and SSCP are presented. The section begins with the relationship between OC and SCI, followed by the relationship between OC and SSCP and subsequently, the relationship between SCI and SSCP. From the analysis of the results, the possible mediation role of SCI on the relationship between OC and SSCP was also discovered and presented.

4.4.1 Organisational Culture and Supply Chain Integration

All the respondents acknowledged the influence of their OC on SCI. As indicated, only developmental, group and hierarchical culture are largely practiced in the food manufacturing firms used in the study. Since SCI is strongly practiced in the firms, it can be ascertained that all the cultural dimensions except rational culture are useful in establishing the strong collaboration between the supply chain partners. It must be noted that, the results could have changed if large manufacturing firms were involved in the study (interview). However, to a greater extent, the pursuance of SCI is influenced by the pressure of customers. When asked about how the OC of the firm influences SCI, one of the respondents claimed that:

The customers push us to do a lot and be focused **(Rep 7)**

The drive to produce and meet the desires of the downstream customers, who are the strongest party in the supply chain, push the firms to forge a closer working relationship with the customers. The firms indicated that the flexible cultural values which assist in establishing a resilient integration in the supply chain are teamwork, transparency, honesty and humility (Cao, Huo, and Zhao 2015; Porter 2019). Even though, the group, hierarchical and developmental culture are mostly practiced in the firms, teamwork (group culture) was found to be the dominant culture which enable firms to forge a stronger relationship with customers and suppliers. With this, one of the respondents clearly stated that:

I think it does to some extent because we have teamwork as a value, we actively try to work as a team with our customers **(Rep 8)**

The teamwork that exists in the firms manifests in the form of interdepartmental and cross-functional teamwork for NPD and handling of other activities for the organisation. This enforces and strengthens the internal integration in the manufacturing firm. In this research, SCI was found to operate through the focal firms, customers and suppliers working together through meetings, conferences and inter-organisational teams. Additionally, teamwork across the supply chain manifests in the form of a collaborative team between the supply chain partners. This suggests that the cross-functional team meet regularly to discuss and share ideas on improving the supply chain performance. In relation to this, one respondent testified that:

The customers have people that are responsible for developing products and those people work closely with our people. So, we do share that particular value with our customers **(Rep 8)**

The existence of teamwork in the firms enable the members to successfully integrate with customers and suppliers. This means that group culture plays a significant role in the formation of a strong SCI in the food manufacturing industry.

Braunscheidel, Suresh, and Boisnier (2010) found developmental, rational and group culture to possess a strong influence on SCI. Their research found no relationship between hierarchical culture and SCI whereas this study found hierarchical culture to play a key role in the internal and external integration of firms. Both Porter (2019) and Cao, Huo, and Zhao (2015) also confirmed a positive relationship between developmental and group culture and the dimensions of SCI. Additionally, their research confirmed no relationship between rational

culture and all the dimensions of SCI. Contrary to the findings in this research, their study did not find any relationship between hierarchical culture and SCI. Moreover, contrary to their research, this study confirmed no influence of rational culture on integration of firms while hierarchical culture was confirmed to play an active role in forging SCI. This is because rational culture was considered as not influencing any strategy of the firms as incentives are not highly considered especially in SMEs. The significance of hierarchical culture confirms the assertion that, the strict and authoritative nature of the culture enables the shifting of employees' focus towards solely achieving the desired objectives of the firms. And since SCI has generally been accepted in the industry, employees' attention is shifted towards forming a strong collaboration with customers and suppliers.

The dominance of teamwork is a new information that can help firms strengthen the internal collaboration necessarily to attain a stronger SCI. Linnenluecke and Griffiths (2010) also indicated that firms keen on hierarchical culture could pursue SCI if it leads to sustainability performance. The teamwork helps firms build a strong internal integration and such integration is extended to both customers and suppliers. The findings of the interview confirms that internal integration acts a prerequisite to a strong external integration (Han and Huo 2018).

It must, however, be noted that the results of the influence of rational culture on SCI only applies to SME manufacturers used in this research. Due to limited capital, and the effort to increase profitability, the SMEs use control and centralisation rather than incentives to influence their strategies. The results are likely to change in large manufacturing firms and Multi-national Companies (MNCs) as incentives in such firms are expected to push members to achieve the overall objectives of the supply chain. Based on this, it can be projected that the results on the influence of rational culture on SCI may be positive in the quantitative analysis especially if larger manufacturing firms are involved in the survey.

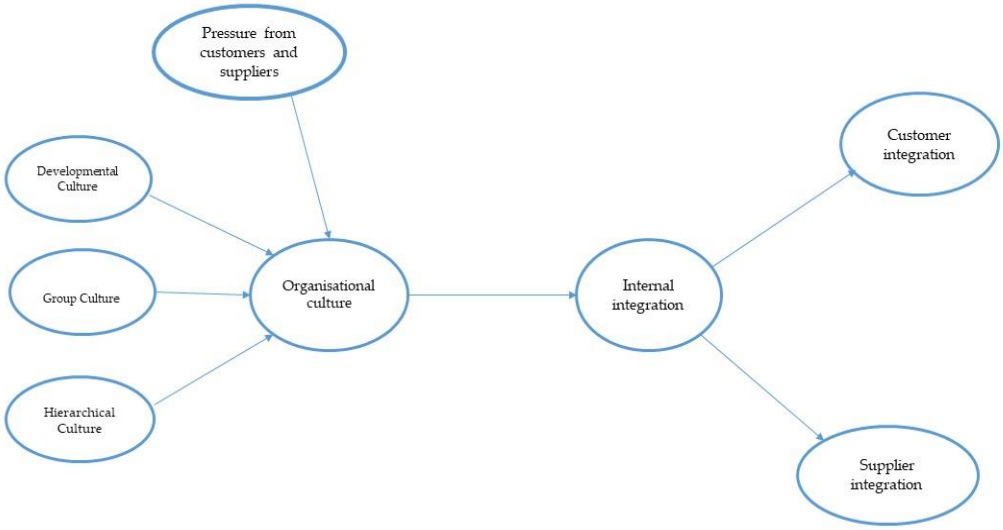

Figure 4.7 The relationship between Organisational Culture and Supply Chain Integration.

Source: Author's Own (2020)

4.4.2 Organisational Culture and Sustainable Supply Chain Performance

Most of the food manufacturing firms and their supply chains used in the study considered their culture as critical to the current success of their sustainability performance. Based on the dominance of group, developmental and hierarchical cultures in the firms, it could be projected that, the values inherent in these cultures contribute and enable the implementation and improvement of SSCP. Based on this, one participant testified that:

> *Sustainability is already part of the culture in the firm, so the teamwork and the strict sustainable polices that are discussed and passed down to workers definitely helps in attaining our sustainability performance* **(Rep 9)**

The responses from the interview indicate that the values inherent in developmental, group and hierarchical culture largely influence the firms' implementation of sustainability practices and subsequent achievement of SSCP. Developmental culture sensitises employees towards sustainability while group culture enables the firms to create sustainability teams. These teams collate ideas about sustainability and how to successfully improve environmental, social and economic performance. This suggests that the internal developmental and group

cultural values enable the creation and building of the needed trust, integrity, honesty and teamwork spirit (intra-firm integration) needed to establish a good relationship with the teams from customers and suppliers. This illustrates the vital role of developmental and group culture. The teamwork (group culture) built through trust and participatory decision-making, enable the members in the firm to form a formidable team with customers and suppliers across the supply chain. The cultures improve the firms' ability to collaborate successfully with the supply chain partners to share ideas, information and resources to improve sustainability and at the same time strengthen internal integration of the firms. One participant responded that:

> *Making quality products, teamwork is important in my firm, too many decisions are currently made by the executives, I think decisions have to be made lower down in the organisation because of speed, it is a very fast-moving industry and sometimes we move slowly because many decisions are made up. There are certain decisions which are made by the top-level management and I think they shouldn't because most of the managers can make these decisions and I think most of the executive feel the need to make too many decisions* **(Rep 8)**

As indicated earlier, since incentives, rewards and gifts are not actually considered and practiced in the firms, it is regarded as having no direct influence on the SSCP of the firms. Therefore, rational culture is said to play no part in the achievement of higher SSCP of food manufacturing firms. Developmental culture is characterised by flexibility and expansion of resources from the environment, and this influences firms' decision to sustain the supply chain for the purpose of protecting the environment and society. This ensures trust on the part of the customers to remain loyal to the firms' which improves the economic performance of the supply chain. Hierarchical culture helps to ensure uniformity in the firms' practices as it encourages employees to stick to the acquisition of the skills needed to produce and act sustainably and at the same time, it creates sustainability culture into the supply chain especially in the supply chain of the large manufacturing firms with many production sites. This research concludes that integrated competing values (developmental, group and hierarchical culture) directly lead to the implementation and improvement in the SSCP (Wijethilake, Upadhaya, and Lama 2021). The results partly confirm the assertions of Linnenluecke and Griffiths (2010) on the direct influence of the dimensions of OC on SSCP as it presents an empirical proof of the direct influence of the dimensions of CVF (except rational culture) on SSCP.

All but two of the firms admitted to a positive influence of their culture on SSCP. One respondent from the two firms confirmed that since customers are always enforcing firms to implement sustainable polices, the achieved SSCP cannot be attributed to culture but to

customers. Another factor could be the inability of the supply chain of such firms to make the required level of profit necessarily to implement sustainability practices in the supply chain. With regards to profitability, it was stated that:

> *I can't see that relationship with the most of it. Because the business is a very difficult one to make profit in, it is all about managing cost, we can manage cost by either having more revenue, prices up, put the volume up and push the cost down* **(Rep 8).**

4.4.3 Supply Chain Integration and Sustainable Supply Chain Performance

This section reveals the influence of the various dimensions of SCI on SSCP (Environmental, Social and Economic Performance).

4.4.3.1 Internal Integration and Sustainable Supply Chain Performance

In this study, SCI was argued as a critical element in achieving the SSCP of the manufacturing firms in the study. It was found that the teamwork existent in the firms create a strong sense of collaboration across the departments and functions, thereby, maintaining a strong internal integration. The results confirmed that those manufacturing firms with a strong sense of collaboration were able to extent such integration to customers and suppliers. Since sustainability is introduced in the firms on piecemeal basis, cross-functional teamwork enables top management to gradually build sustainability culture in employees. Like the findings in this research, Sehnem et al. (2019) claimed that the continuous education and training of employees ensure the sustainability policies and practices in the firms are adhered to. The findings in this study therefore revealed and confirmed the direct impact of internal integration on SSCP.

4.4.3.2 Customer Integration and Sustainable Supply Chain Performance

The power of the customers in the sustainable supply chain makes them inevitable on the quest for focal firms to achieve a better SSCP. However, the internal integration of the firms is a precursor to the formation of a strong customer integration. In terms of the impact of customer integration on SSCP, most of the firms admitted that the presence of customer integration is a precursor for the implementation and achievement of higher SSCP. Since customers (retailers) pushes the firms to implement certain sustainability practices and design products according to their preferences, it is highly crucial to establish a close working relationship with customers. With regards to this,

> *Yes, customers play a major role in achieving sustainability performance. We have collaborative groups across the customer base, and we solve all sustainable issues together* **(Rep 1)**

The direct impact of customers was also stressed by another participant who stated that:

> …. *helps the company implement various There is a positive impact, because when we are working together and collaborating, it sustainable practices since sustainability is critical* **(Rep 7)**

This suggests that a close working relationship with customers is highly necessary for the attainment of a higher SSCP. The close collaboration manifests in the form of establishing a strong teamwork between the focal firms and customers to discuss and implement sustainable supply chain practices. Kang et al. (2018) also found a positive relationship between customer integration and SSCP of firms. Blome, Schoenherr, and Eckstein (2014) and Weingarten and Longoni (2015) also shared the same results of a positive relationship between customer integration and sustainability performance. In the relationship, however, customers dictate the sustainability terms, and in the quest to achieve the sustainability performance, customers perform regular sustainability checks for example, wastage rate checks and perform other audit functions in the supply chain to ensure the focal manufacturing firms are producing according to the sustainability plans and standards of the supply chain. One respondent stated that:

> *So, our customers would be the local Tesco's, Sainsbury's, so on and so forth. They are very essential in our sustainability practices. They set the dictate what standards we need to manufacture to, they audit us regularly, they liaise with stakeholders, they provide feedback they ensure we are BRC excite, they operate the wastage rate* **(Rep 4)**

Kang et al. (2018) also found customer integration as an enabler of inter-organisational and intra-organisational SMPs. Confirming their findings, this research revealed a direct relationship between customer integration and SSCP (see Fig. 4.8). However, customer integration can only be strengthened and successful if firms have a strong internal integration in place and both parties share resourceful ideas for the attainment of a better SSCP.

4.4.3.3 Supplier Integration and Sustainable Supply Chain Performance

Kang et al. (2018) and Mani, Gunasekaran, and Delgado (2018) have reported on the relevance of supplier integration to the implementation and achievement of sustainability practices and performance. In this study, like the collaboration with customers to achieve a higher SSCP, the food manufacturing firms were found to form a strong and close working relationship with suppliers to achieve a higher SSCP. The collaborative relationship is established through joint meetings and collaborative team working activities which consequently enable the firms in achieving a higher SSCP. Again, good internal integration is

needed for supplier integration to be successful. Upstream suppliers play a crucial role in improving SSCP, because sustainability in the supply chain starts with the supply of sustainable raw materials. Since there is an already existent sustainability team comprising the focal firms and customers, a team from the upstream suppliers is also included in the already existent team. A sustainable collaborative relationship between firms, customers and suppliers is established with the sole aim of sharing ideas, resources, skills, plans and information for the purpose of obtaining an improved SSCP. The response of the participants on this issue revealed a direct relationship between supplier integration and SSCP. For example, one participant revealed that:

> *we come together as a group and we discuss everything in the group with regards to performance and sustainability issues* **(Rep 1)**

Ultimately, the pursuance of supplier integration is influenced by customer pressure and intensified by the internal integration. This suggests that the supplier integration and SSCP framework begins with customers' pressure on firms to implement sustainability in the supply chain. The pressure is passed on to suppliers, thereby, leading to the establishment of a stronger supplier integration. This finding corresponds to the result of Kang et al. (2018) who found a positive relationship between supplier and firm's inter-and-intra organisational SMPs. Blome, Schoenherr, and Eckstein (2014) and Weingarten and Longoni (2015) also confirmed a positive relationship between supplier integration and sustainability performance. Suppliers provide the needed sustainable raw materials while at the same time forming a stronger relationship with the focal manufacturing firms. The relationship helps both firms and suppliers to attain a higher SSCP as sustainability performance is currently measured across the supply chain. As the supply chains extend beyond borders, firms can only accurately determine the environmental and social impact of the supply chain when data are collaborated between the supply chain partners.

As stated earlier on, internal integration has been the main force behind a successful customer and supplier integration. The teamwork established through a strong and stable internal integration enable firms to form a solid and strong integration with customers and suppliers. This confirms the findings of the Flynn, Huo, and Zhao (2010) and Stank, Keller, and Daugherty (2001) who found internal integration as an enabler of both customer and supplier integration. In this research, like Han and Huo (2020), internal integration is found to be the bedrock of both customer and supplier integration and the availability of a strong teamwork in a firm acts a precursor to the attainment of higher SSCP.

4.4.4 Supply Chain Integration as a Mediator between Organisational Culture and Sustainable Supply Chain Performance

OC has been found to play a major role in achieving a better SSCP and SCI (internal, customer and supplier integration). Meaning, all the CVF dimensions except rational culture were found to have a direct influence on SSCP and SCI. It has been established that the various dimensions of OC can help the firms in establishing a strong SCI and for SSCP to be enhanced, there must exist a collaborative working relationship between the partners. In a nutshell, firms with a well-built OC including teamwork stand a strong chance of building a strong integration with customers and suppliers. The integration is established in the form of exchanging data and information about sustainability especially during the computation of environmental and societal impact of the supply chain (Wijethilake, Upadhaya, and Lama 2021) and this helps firms in enhancing SSCP. Adopting the integrated competing values alone does not guarantee a successful SSCP, the food manufacturing firms need the coordination of information from the global supply chain partners to achieve a higher SSCP. The mediation role of SCI in the OC and SSCP relationship is depicted in Fig. 4.8.

Though the various values in each of the identified cultures enable firms to successfully implement sustainability practices, SSCP is intensified when there is a strong collaboration between the supply chain partners. Meaning, collaboration with supply chain partners enhances firms' access to resources, skills, tacit knowledge and ideas needed to successfully implement and achieve a higher SSCP. The most widely practiced values in the firms were categorized into developmental, group and hierarchical culture. The dominant value which helps in building a strong internal integration is teamwork, and the teamwork together with trust, integrity and honesty help in establishing a strong customer and supplier integration. The customer and supplier integration are manifested in the form of collaborative partnership to solve sustainability issues, thereby, enhancing SSCP. In a nutshell, group culture characterised by teamwork greatly enhances the establishment of strong SCI, through the teams, high levels of sustainability ideas, skills, knowledge and resources are exchanged to improve the SSCP.

4.5 Framework from the Qualitative Research

The framework provides a summary of the results obtained from the interviews. This framework contributes enormously to the *literature of OC, SCI and SSCP* by establishing the linkage between the competing values, SCI and SSCP. To the best of knowledge, this has never been performed in extant literature. The adoption of the culture is influenced by *customer and supplier pressure, needs and demands of customers*. Integrated competing values or three types of

OC, namely, *developmental, group and hierarchical cultures* were found to be dominant in the industry while *rational culture* characterised by the use of incentives is not considered in the industry. The group culture dominated by *teamwork* is used in influencing the sustainability behaviour of internal employees. The strong teamwork, developmental and a culture of strictness (hierarchical culture) stimulate the SSCP of the food manufacturing firms. The teamwork strengthens the internal integration of the firms and it provides the necessary foundation needed for forming a strong collaboration with customers and suppliers. Teams from the firms, customers and suppliers form a collaborative partnership to improve the sustainability performance of the supply chain. Fig 4.8 also presents the mediation role of SCI in the relationship between the individual dimensions of OC and SSCP. The framework provides a strong basis for future research to examine the relationship between OC, SCI and SSCP.

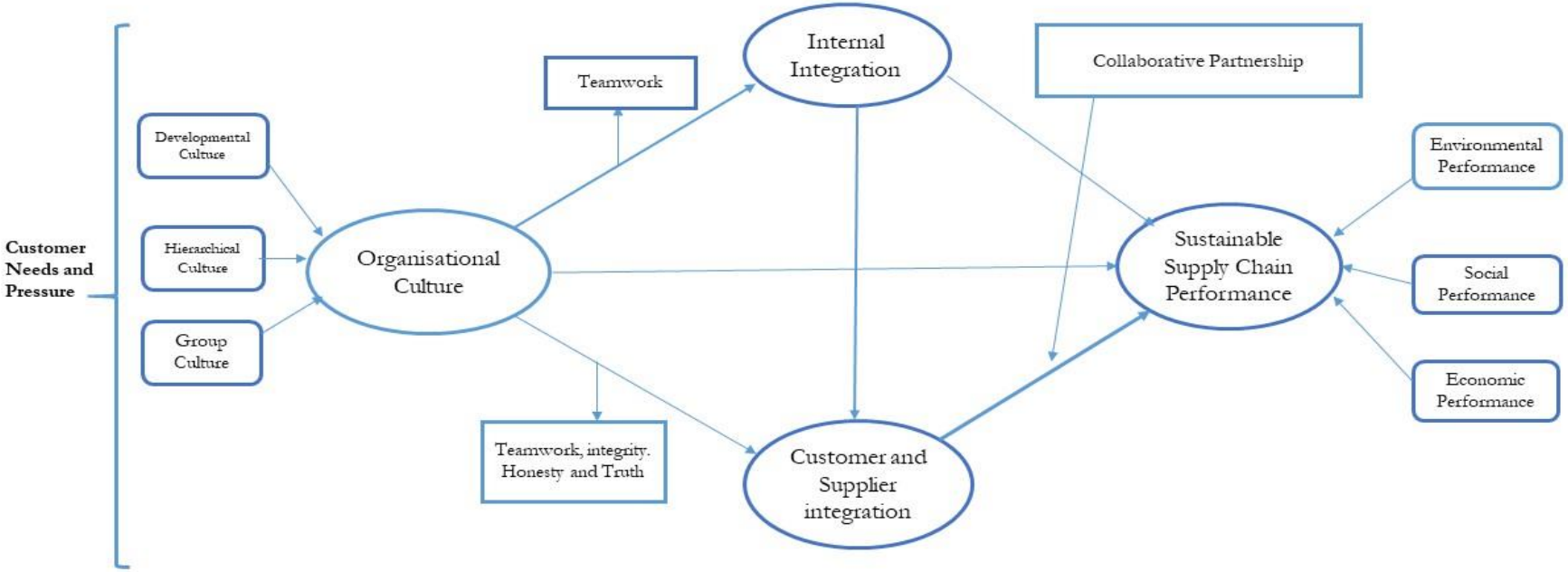

Figure 4.8 A framework explaining the relationship between Organisational Culture, Supply Chain Integration and Sustainable Supply Chain Performance. **Source:** Author's own (2020)

4.6 Reliability and Validity

Reliability and validity are very crucial in case study research. According to Voss, Tsikritsis, and Frohlich (2002) validity can be achieved through construct, internal and external validity. In establishing the construct validity, an in-depth review of constructs for measuring SSCP, OC and SCI was conducted. Therefore, the interview guide made up of rigorous set of questions extracted from extant literature was designed. To ensure internal validity, the same pattern of coding and analysis were followed in each of the transcribed interviews. The multiple case studies and usage of key industry players improved the generalisability of the research. In terms of reliability, a case study protocol was followed during the interview stage and the case study report was sent out to the respondents for confirmation and feedback.

Summary of the Chapter

In this chapter, the results regarding the relationship with the various variables from the interview analysis were presented. As part of the objective of the interview, the various metrics or factors used in measuring the dimensions of OC, SCI and SSCP were also revealed. Additionally, the various influencing factors of sustainability performance and SCI were identified and elaborated. According to the analyses, only three dimensions of OC namely, developmental, group and hierarchical cultures are considered and used in the firms to influence SCI and sustainability performance. However, group culture (teamwork) emerged as the dominant culture enabling the top management to build the required sustainability spirit in the firm. Teamwork enables the cross-functional collaboration of talents, ideas and views and it also enables the training of employees to achieve the necessary sustainability performance in the firm. The availability of teamwork also prepares and enables the firms to establish a strong and formidable working relationship with the customers and suppliers to pull resources, ideas, skills and information necessary for the achievement of an increased sustainability performance in the supply chain. This suggests that, even though, group culture and other types of culture can help firms improve their sustainability performance, they need a strong collaboration with customers and suppliers to achieve that. The chapter ended with a framework summarising the new findings from the qualitative research.

CHAPTER FIVE: RESULTS OF THE QUANTITATIVE ANALYSIS

Introduction

This chapter elaborates on the methods and the statistical technique(s) employed in statistically analysing the data for this study. In the first section, the *normality* of the data is tested with Statistical Package for Social Sciences (SPSS) 27 as this is crucial in determining the type of SEM and software package (s) to adopt for the analyses. In the next section, the confirmatory and explanatory factor analysis are performed and presented. With regards to the validity, the *discriminant validity and average variance extracted (AVE) tests* are conducted to ascertain the convergent validity while *Cronbach Alpha and composite reliability* are performed to also ascertain the reliability of all the measuring items. The next section presents the main results from the structural model exhibiting the relationships between the variables of the study. The structural model reveals the results from the testing of the hypothesis accompanied by the probability values (p-values) of each of the relationship. In discussing the relationships, the *path coefficient*, *coefficient of determination* and the *p-values* are used. An additional analysis (hierarchical regression analysis) is performed to further ascertain the relationship between the individual dimensions of the variables. The structural model is assessed with *predictive capability*, *predictive relevance* and the effect of change on the *coefficient of determination* when the latent variables are deleted. A test for *measurement invariance* and *model fit* were conducted. The chapter ends with the summary of the results.

5.1 Normality Test

Prior to selecting the type of SEM analysis to perform, it is highly significant to determine the distribution of the data (Akter et al. 2017; Sarstedt et al. 2017) due to the different sensitivity of data to the different approaches (variance-based or the co-variance-based approach) of SEM. Compared to the variance-based approach, the co-variance-based SEM has high sensitivity to non-normally distributed data (Akter et al. 2017; Sarstedt et al. 2017) and therefore, obtaining a valid result with such kind of approach may be quite challenging especially when data is non-normal. In order to determine the distribution of the data used in this study, Shapiro-Wilk normality test for complete samples was conducted (Shapiro and Wilk 1965). Shapiro and Wilk (1965) stressed that performing a normality test is highly significant for considering the type of method and other important determinants such as outliers and errors. The Shapiro-Wilk test of normality employs robust technique in

revealing normality of data. In this study, the SPSS 27 was used in performing the Shapiro-Wilk test for normality.

Both the dependent variables and the independent variables of the study were subjected to the test at a two-tailed significance level $p<.05$. Whereas normality test with significance level (see Table 5.1) of greater than .05 ($p>.05$) is considered as having a normal distribution, the test of the data in this study, revealed results to the contrary. The normality tests for all the variables were significant ($p<.05$) signifying a non-normal distribution of the data in this study.

Table 5.1 Shapiro-Wilk Normality Test

Variable	Statistic	Df	Significance
Environmental Performance (ENVP)	.938	315	.000
Economic Performance (ECP)	.926	315	.000
Social Performance (SP)	.934	315	.000
Internal Integration	.905	315	.000
Customer Integration	.917	315	.000
Supplier Integration	.922	315	.000
Developmental Culture (DC)	.928	315	.000
Group Culture (GC)	.919	315	.000
Rational Culture (RC)	.915	315	.000
Hierarchical Culture (HC)	.870	315	.000
Years of working with customers	.726	315	.000
Years of working with suppliers	.735	315	.000
Turnover Level	.589	315	.000
Firm Size	.766	315	.000
Years of Existence	.730	315	.000
Educational Level	.735	315	.000

In Table 5.1, the normality test for both the main and the demographic variables suggest non-normal distribution of data, hence, a variance-based approach to SEM was appropriate for conducting the SEM analysis.

5.2 The Variance-Based Structural Equation Modelling Approach

Depending on the goal of the study and the expected outcome of the analysis, it is highly recommended that a researcher selects either a co-variance-based or variance-based SEM approach. The co-variance-based approach SEM (CB-SEM) or the factor-based SEM (Joreskog 1973) employs parametric, complex modelling technique and constrictive approach for analysing SEM. The CB-SEM has been the preferable approach by most organisational and management researchers (Hair, Howard, and Nitzi 2020) due to its ability to; (1) integrate and concurrently perform analysis of manifest and latent variables and further examine their correlations by employing several multivariate analytical techniques such as regression, confirmatory factory analysis (CFA) and path analysis (2) account for a larger proportion of the measurement error in both the dependent and independent variables thereby generating a guaranteed and accurate estimates of the parameters (3) effectively allows the testing of different or unrelated models to select the theoretically precise and satisfactory model (Zhang, Dawson, and Kline 2020). However, the CB-SEM has been criticised for its distributional constraints in analysing a large model (Hair et al. 2011; Akter et al. 2017), strong focus on mostly small models limiting its ability to analyse and validate 'large and complex models' (Akter et al. 2017, p. 1011) and only consistent with normally distributed data (Sarstedt et al. 2017). Statistical packages such as AMOS, LISREL, Mplus and STATA are compatible with the CB-SEM approach.

The variance-based SEM (VB-SEM) approach, on the other hand, is a soft and partial least squares SEM technique which has emerged as an alternative to CB-SEM approach (Wold 1982; Sarstedt et al. 2017). The VB-SEM is a non-parametric approach that estimates the parameters of a model through the combination of ordinary least squares with regression-based analysis. The VB-SEM is gradually gaining popularity due to its ability to allow estimation of complex models with many constructs and indicators and has a strong predictive capability (Henseler and Sarstedt 2013; Sarstedt et al. 2017). Unlike the CB-SEM, VB-SEM is very flexible with data distributions, data requirements, makes no assumptions about data, provides simplified manner of expressing relationships between constructs and indicators and importantly, assumes non-normality among data distributions making it suitable for analysing almost all kinds of data. One of the prominent statistical packages for performing VB-SEM is partial least squares-structural equation modelling popularly referred to as PLS-SEM. The

PLS-SEM has been built to effectively perform VB-SEM and it is gradually being accepted as an appropriate SEM tool used across several disciplines. The PLS-SEM assumes non-normality among data distributions, making it appropriate for analysing the data in this study since the data is non-normally distributed. Since the indicators and latent variables in this study are numerous (see Appendix III) and PLS-SEM has been built to handle such complex models, it is very rational to analyse the data with the PLS-SEM in this study. Akter et al. (2017) also highlighted the ability of PLS-SEM to analyse complex models with more parameters than mere observations. Studies conducted by Sarstedt et al. (2017) shows that PLS-SEM, unlike tools for CB-SEM, is capable of handling models with many reflective-formative indicators and has a strong predictive capability and statistical power. The reasons provided above makes it highly suitable to perform the SEM analysis in this study with PLS-SEM accounting for the use of PLS 3.2.9 in analysing the measurement and structural model in this study.

5.3 Reflective Measurement Model

In a PLS-SEM approach, the measurement model is assessed to determine the relationship between the latent variables and their indicators. Two different types of measurement model; reflective and formative models (Diamantopoulos and Winklhofer 2001) are usually assessed to determine how effective the indicators measure their latent variables. In this study, the indicators used in operationalising the latent variables were reflective of their main latent variables (Appendix 1). According to Sarstedt et al. (2017), in PLS-SEM, reflective measurement models are often characterised by a direct relationship from the latent variables to the indicators and the indicators are often considered as error-prone. Similarly, Sarstedt et al. (2016) also claims that reflective measurement models are often composite latent variables with indicators influenced or affected by their latent variables. As indicated earlier, PLS-SEM has the advantage of effectively analysing reflective-formative models, therefore, confirmatory factor analyses (CFA) and exploratory factor analyses (EFA) were performed to measure the various reflective models of the study.

5.4 Confirmatory Factor Analysis

The CFA has been generally accepted as the approach to test; the relationship between the latent variables and their indicators, the validity of the latent variables and provides an insight into the possible regression results of the structural model. In this study, the CFA was performed with the following steps:

Step 1: The loadings for each of the measuring items are assessed.

Step 2: The indicator reliability is determined by squaring the individual indicators for the purpose of measuring the amount of variance between the indicators and the constructs

Step 3: Cronbach Alpha (α) and Composite reliabilities are used in revealing the reliability of each of the indicators.

Step 4: Average Variance Extracted (AVE) is used in assessing the convergent validity of each of the indicators

Step 5: Discriminant validity assessing the uniqueness of each of the constructs is performed.

Step 6: Analysing the T-values of the various indicators

Step 7: Determining the VIF of the various indicators to assess multi-collinearity issues.

In the first step, the standardised indicator loadings (factor loadings) and T-statistic obtained through a bootstrapping procedure were determined. The threshold for indicator loadings is usually .70 while a t-statistic of above $\pm$ 1.96 are generally accepted (Fornell and Larcker 1981; Hair et al. 2011). However, indicator loading of .50 is sometimes considered as acceptable (Hulland 1999). In Table 5.2, all the factor loadings exceeded the threshold of either >.70 or >.50, suggesting that a large amount of variance in the indicator variables are highly explained by the latent variables. Next, the internal consistency reliabilities of the measuring items were measured in two ways; Cronbach Alpha (α) and Composite Reliabilities (CR). According Sarstedt et al. (2017), Cronbach Alpha represents a lower bound and therefore, assumes lower values while composite reliability is the upper bound of internal consistency therefore, it is highly recommended both methods are used in estimating the internal consistency reliability. Reliability of indicators simply assesses the consistency of the items to yield same response when different methods are used (Nunnally 1978) and help in estimating the proportion of variation not emanating from the random measurement error (Zhang et al. 2020). The CR and α values between 0.70 and 0.95 represent very good or satisfactory reliability levels. In Table 5.2, all α values ranged from .80-.90 meeting or exceeding the threshold values of >.70, indicating highly reliable constructs. Appendix III contains the details and definitions of each of the constructs listed in Table 5.2.

Table 5.2 Reliability, Convergent Validity and Multi-collinearity Test

Constructs and reflective indicators	Factor Loadings (Range)	VIF	T-values	Cronbach Alpha (α)	Composite Reliability (CR)	AVE
Environmental Performance (ENVP)						
EV1	.535	1.450	17.899			
EV2	.697	1.724	14.820			
EV3	.776	2.307	16.739	.819	.867	.489
EV4	.799	2.565	16.813			
EV5	.777	1.981	17.382			
EV6	.728	1.672	17.629			
EV7	.525	1.260	11.434			
Economic Performance (ECP)						
EP1	.780	2.555	22.963			
EP2	.826	2.962	26.329			
EP3	.730	1.779	19.468	.855	.890	.538
EP4	.604	1.511	14.674			
EP5	.744	1.781	19.314			
EP6	.749	1.855	22.115			
EP7	.681	1.630	14.457			
Social Performance (SP)						
SP1	.720	2.205	19.259			
SP2	.738	2.731	18.692			
SP3	.786	2.073	18.721	.826	.874	.537
SP4	.776	1.849	17.256			
SP5	.748	1.962	22.787			
SP6	.618	1.555	14.900			
Internal Integration (INTI)						
II1						
II2	.735	2.014	24.634			
II3	.766	2.214	21.692			
II4	.778	1.878	23.385	.851	.890	.574
II5	.813	2.204	24.093	.		
II6	.761	2.199	20.957			
Supplier Integration (SI)	.686	1.716	19.221			
SI1						
SI2	.651	2.103	18.031			
SI3	.781	2.658	22.317			
SI4	.784	1.987	21.935			
SI5	.739	1.961	20.517	.871	.899	.531
SI6	.803	2.371	25.852			
SI7	.552	1.376	12.001			
SI8	.729	2.260	22.923	.		
Customer Integration (CI)	.755	2.292	22.839			
CI1						
CI2	.730	2.381	17.899			
CI3	.789	2.781	18.937			
CI4	.678	1.579	15.830			
CI5	.769	1.792	19.564	.845	.883	.520
CI6	.611	1.512	13.599			
CI7	.750	1.926	21.147			
	.706	1.698	19.581			

Development Culture (DC)						
DC1	.789	2.226	23.273			
DC2	.875	3.020	26.812			
DC3	.842	2.524	26.428	.878	.912	.674
DC4	.854	2.732	24.018			
DC5	.737	1.631	21.326			
Group Culture (GC)						
GC1	.793	1.817	22.423			
GC2	.679	1.519	15.327			
GC3	.845	2.161	23.360	.843	.889	.616
GC4	.828	2.248	20.520			
GC5	.770	1.856	18.006			
Rational Culture (RC)						
RC1	.887	3.627	22.740			
RC2	.904	4.483	23.702			
RC3	.918	4.644	28.071			
RC4	.923	4.518	27.009	.936	.952	.798
RC5	.830	2.375	16.946			
Hierarchical Culture (HC)						
HC1	.668	1.174	10.759			
HC2	.900	5.041	30.121			
HC3	.915	9.318	29.140	.872	.914	.730
HC4	.910	7.597	19.387			

In the next step of assessing the measurement model, the convergent validity which addresses the extent to which latent variables explain the variance in their indicator variables and assesses how each of the variables converges in their indicators (Sarstedt et al. 2017) was performed. The convergent validity is normally assessed using the average variance extracted (AVE) between all the indicators of a particular variable, also referred to as communality (Sarstedt et al. 2017). It is computed by the mean of the squared loadings of the indicators of a particular construct or latent variable. The acceptable threshold for AVE is 0.50 or higher (Fornell and Larcker 1981). In table 5.2, all the AVE scores for the constructs except those of environmental performance ranged between .50-.80 indicating that all the variables explain more than 50 per cent of the variance of its indicators. Most studies also used individual factor loadings and T-statistics in determining the convergent validity of the constructs. The higher factor loadings, T-statistics and AVE scores suggest that constructs or latent variables explain higher levels of variances in its indicators.

Table 5.3 Discriminant Validity Analysis and inter-item correlation

Var.	CI	DC	ECP	ENVP	GC	HC	II	RC	SP	SI
CI	***.721***									
DC	.029	***.821***								
ECP	.245*	.052	***.734***							
ENVP	.118	.037	.407***	***.699***						
GC	.124	.781***	.220***	.021***	***.785***					
HC	.100	.523***	.073	.011	.572***	***.854***				
II	.440***	.220**	.124	.298***	.089	.016	***.757***			
RC	.144	.514***	.017	-.035	.544***	.474***	.041	***.893***		
SP	.105	.137	.304***	.209***	.146*	.060	.406***	.038	***.733***	
SI	.565***	.343***	.101	.140	.294***	.168***	.523***	.188***	.100	***.728***
Mean	6.082	5.996	6.092	6.083	6.110	4.138	6.139	5.625	6.135	6.081
ST.Dev	.700	0.763	.693	.638	.690	1.260	.693	1.128	.677	.683

Notes: *n*=315, the square root of the average variance extracted is indicated on the diagonal in bold and italics, CI-customer integration; DC-developmental culture; ECP-economic performance; ENVP-environmental performance; GC-group culture; HC-hierarchical culture; II-internal integration; RC-rational culture; SP-social performance, SI-supplier integration, ***p<0.001, **p<0.01, *p<0.05.

After establishing the reliability and the convergent validity of a reflective measurement model (latent variables), the next step in PLS-SEM is to ascertain the discriminant validity. The discriminant validity examines the extent to which one latent variable is critically distinct or different from other variables in terms of how it either correlates with other constructs or its indicators measure only that variable (Sarstedt et al. 2017; Hair et al. 2020). In PLS-SEM, several approaches including hetero-monotrait ratio (HTMT) of correlations between the constructs (Henseler et al. 2015) and the comparison of the correlations with the AVE of the various latent variables are used in measuring the discriminant validity of the measurement model. It is argued that a good discriminant validity means the AVE of the various constructs exceeds the square of the correlations between the constructs. Alternatively, a good discriminant validity could also mean the square root of AVE being larger than the correlations between the latent variables (Fornell and Larcker 1981) which was adopted in this study. In Table 5.3, the square root of AVE indicated on the diagonal and in bold italics far exceeds the correlations among the constructs suggesting a good discriminant validity among the latent variables.

5.5 Exploratory Factor Analysis (Common Method and Acquiescence Bias)

Mackenzie and Podsakoff (2012) indicated that any measuring instrument, when used in measuring constructs are bound to possess systematic trait variance (whether the constructs indeed measures what it intends to), systematic error variance (arises from employing specific methods to analyse the constructs) and random error variance. Liu et al. (2010) reported that collecting data from a single source at a single point in time is likely to create a common method bias. Mackenzie and Podsakoff (2012, p. 544) highlighted that the common method bias is very likely, in situations where certain factors; prevent the respondents from providing accurate answers; limits the cognitive ability of the respondents; diminishes the motivation to respond and causes respondents to 'satisfice'. In this study, since the data was collected from a single source (i.e., food manufacturing firms), top managers and also collected during the pandemic, the problem of common method bias was likely to occur. Similarly, acquiescence bias occurs when respondents; struggle in understanding the questions in an instrument and when they are fatigued to provide answers to long sets of questions at the end of the instrument. Acquiescence bias was likely to occur due to the individualistic and collectivist culture of the UK and Greece respondents respectively. The presence of the individualistic and collectivist culture is likely to influence the responses of the respondents and may be tempted to answer the questions based on their cultural beliefs.

Liu et al. (2010) suggested two methods for eradicating the common method and acquiescence bias. First, through the use multi-method models which could include, null models, method-only model, trait-only, trait and method model. Second, using method variance marker. Additionally, Podsakoff et al. (2003) also recommended the use of Harman's single factor test through a stringent exploratory factor analysis (EFA). Harman's single factor test for all the items was conducted and the results revealed a total of 10 factors with corresponding eigenvalues greater than 1.0. These underlying factors explained 67.15 per cent of the variance in the data. Moreover, the first factor accounted for 40.70 per cent, meaning, it was not the major factor explaining the variance in the data. The Full Collinearity Variance Inflation Factor (FCVIF) was also conducted with PLS-SEM. Koch (2015) indicated that FCVIF values of less than 3.3 for most of the variables. The FCVIF values met or exceeded the threshold indicating that common method bias did not seem to be a major problem in the data. Additionally, the questionnaire was very short, the questions were straight forward, and standardised questions organisational-specific questions were adopted to curtail acquiescence bias.

Both the confirmatory and exploratory factor analysis indicate a satisfactory reflective measurement model, thereby, providing an avenue for analysing the structural model.

5.6 Structural Model Assessment

Unlike the statistical packages of CB-SEM, PLS-SEM do not provide the opportunity to perform stringent model fit indices, nonetheless, it employs the co-efficient of determination (R^2), path coefficients and the reliability scores to assess the model fit of the structural model (Braunscheidel, Suresh, and Boisnier 2010). At the structural model assessment stage, it is highly relevant to assess the collinearity issues before interpreting the relationship between the latent variables. Collinearity check has been considered as very important as it focuses on revealing potential bias in the regression analyses (Sarstedt et al. 2017; Hair et al. 2020) and also determines the correlation between predictor (exogenous) variables as higher correlation between the variables could create potential issues in the regression analyses and results of the structural model. In PLS-SEM, variance inflation factor (VIF) is used in assessing the collinearity issues and VIF values above 5 assumes collinearity problems. In Table 5.2, all the values of VIF except those of hierarchical culture were below the threshold of less than 5 (>5). This is indicative of the absence of multi-collinearity issues in the relationship among the latent variables in the structural model. After the collinearity issues are checked, the next pertinent stage focuses on the predictive capabilities and relevance of the model, which are determined by the; coefficient of determination (R^2), cross-validated redundancy (Q^2) and the path coefficients (Sarstedt et al. 2017). The next section presents the structural model with the regression coefficients and also discusses the R^2 and the path coefficients from the regression analysis. Tables 5.6 and 5.8 provide a summary of the results including the f^2 change of the R^2 of the predictor variables.

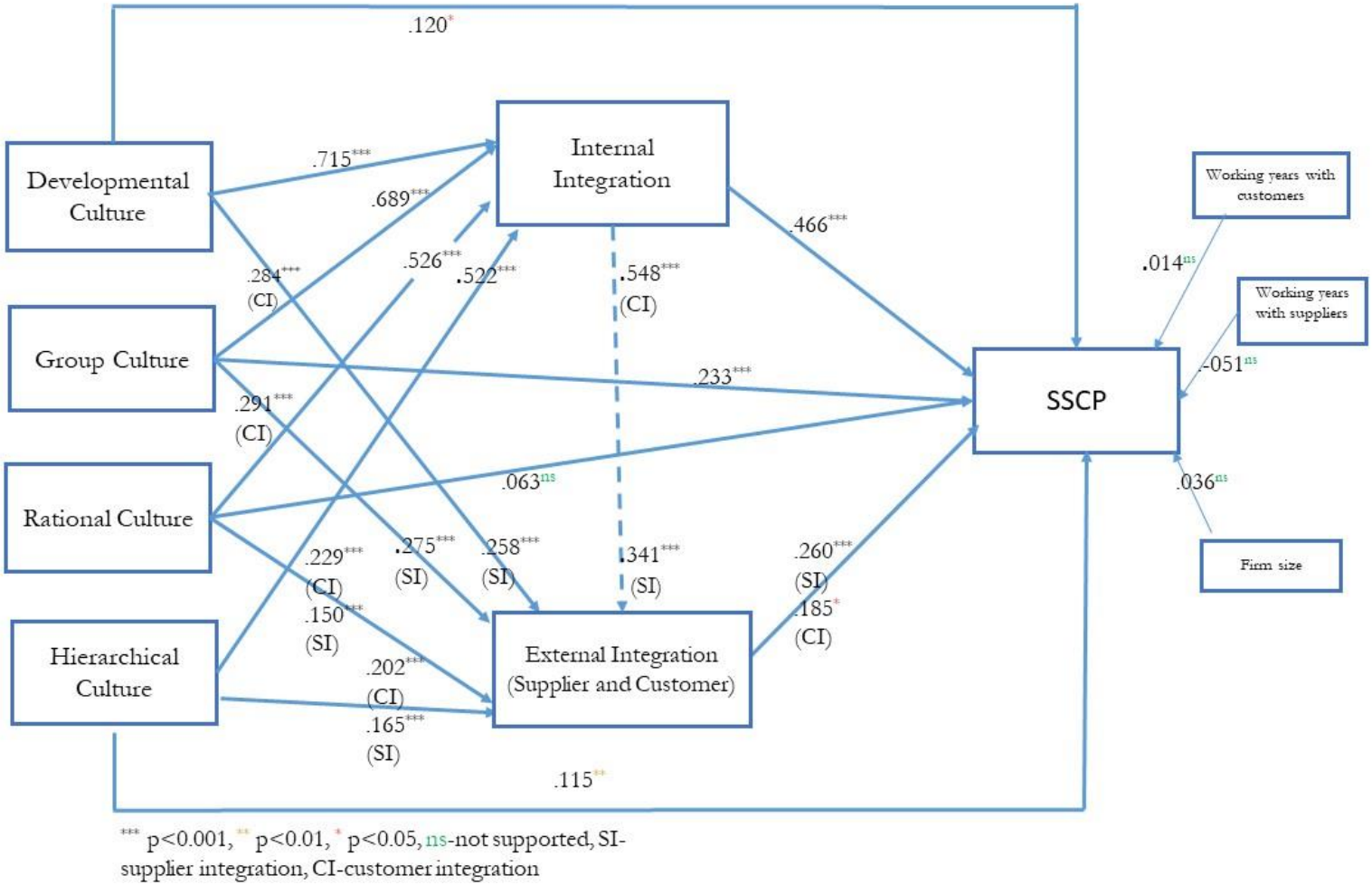

Figure 5.1 Model with the results. Source: Author's Own (2020)

Figure 5.1 presents the structural model together with the path coefficients and the varying degrees of the statistical significance of the various relationships. During the analysis procedure, the individual cultural elements were tested separately with the dimensions of SCI and SSCP. The SSCP was treated as a second order construct where all the dimensions of SSCP (economic, environmental and social performance) were merged to form a composite variable, SSCP.

5.6.1 Hypothesis 1a-1d

Hypothesis 1a-1d postulated a positive and significant relationship between the dimensions of OC and SSCP. In Fig 5.1, the research found and confirmed a positive relationship between developmental culture and the SSCP of the firms (β=.120, $p<0.05$, R^2=0.752). The path coefficient which shows the relationship between developmental culture and SSCP was very high with a β value of .120 and the relationship was significant at the two-tailed level, $p<0.05$. These results highly support ***H1a***, which postulated a significant and positive relationship between developmental culture and SSCP. The R^2 value of .752 supersedes the threshold of .50 and it is indicative that developmental culture accounts for about 75 per cent of the variance in SSCP. The results confirm the assertion of Linnenluecke and Griffiths (2010), who predicted a positive relationship between a culture dominated by developmental values and SSCP.

The study further hypothesised a positive relationship between rational culture and SSCP in hypothesis ***H1b***. Since rational culture is characterised by the use of incentives to influence the behaviour of people in a firm to achieve the sustainability goals, it was expected to yield a positive result on the sustainability performance of the firms. In Fig 5.1, the results generated a positive but statistically unsupportive relationship between rational culture and SSCP. The results (β=.065, p=0.107, R^2=0.747) indicate a positive but unsupported relationship and predictive capability. The path coefficient revealed a β value of .065, which indicated a positive albeit a weak relationship between rational culture and SSCP. The relationship was not supported at a p-value of .107 ($p>0.05$). The R^2 value of .747 shows rational culture can explain about 75 per cent of the variance in the SSCP. The results show the irrelevance of incentives in influencing SSCP. The unsupportive relationship contradicts the claims by Linnenlueke and Griffiths (2010) who predicted a positive relationship between rational culture and SSCP. The results mean hypothesis H1b is not fully supported.

In hypothesis ***H1c***, it was postulated that group culture dominated by teamwork is expected to exert a positive influence on the SSCP of the food manufacturing firms. The

results of the research confirmed a positive and significant relationship between group culture and SSCP. With these results (β=.233, p<0.001, R^2=0.768), the path coefficient revealed a higher β value of .233 indicating a strong relationship between group culture and SSCP, and the relationship was statistically significant and supported at p<0.001. Moreover, the R^2 value of .768 represents a strong predictive capability as 77 per cent of the variance in SSCP is explained by the predictor variable, group culture. These results further confirm the positive relationship between group culture and SSCP predicted by (Linnenluecke and Griffith, 2010). The results also confirm the positive impact of group culture found by (Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Porter 2019). The results further prove the power of teamwork and its significance in influencing the achievement and improvement of the SSCP of food manufacturing firms. This also confirms the findings from the case study interviews. The results, therefore, support hypothesis H1c.

In hypothesis ***H1d***, the study asserted a positive and supported relationship between hierarchical culture and SSCP. The results indicated a positive and strong relationship between hierarchical culture and SSCP (β=.117, p<0.01, R^2=0.765). The path coefficient showed a β value of .177 and the relationship was statistically supported at p<0.01. The R^2 value of .765 shows a higher correlation and predictive capability of hierarchical culture as it explains 77 per cent of the variance in SSCP. The positive relationship of the path coefficients and the strong predictive capability of the model is indicative of the strong impact of hierarchical culture. Contrary to these results, most research such as (Braunscheidel, Suresh, and Boisnier 2010; Linnenluecke and Griffiths 2010; Cao, Huo, and Zhao 2015; Porter, 2019) all found a negative impact of hierarchical culture on supply chain strategies. The results demonstrate the ability of a culture characterised by strictness and high levels of control to exert a positive influence on SSCP. With the results obtained, hypothesis H1d was supported.

In terms of the predictors of SSCP, group culture had a highest significant effect (.233), followed by developmental culture with an effect of .120 and then hierarchical culture also with a significant effect of .115. Rational culture had no significant effect on SSCP.

5.6.2 Hypothesis 2a-2d

Hypotheses 2a-2d reveals the results from the relationship between the dimensions of OC and SCI.

5.6.2.1 Developmental Culture and Supply Chain Integration

The second set of hypotheses H2a-2d, postulated a positive relationship between the dimensions of OC and SCI (internal, customer and supplier integration). In hypothesis ***H2a***, it was hypothesised that developmental culture is expected to exert a positive relationship with

the dimensions of SCI. The findings confirmed a very strong and supportive relationship between developmental culture and internal integration (β=.715, p<0.001, R^2=0.511). The path coefficient, β=.715 indicates a strong relationship between developmental culture and internal integration, and the relationship is supported at a statistical significance level of p<0.001. The coefficient of determination (R^2) value of .511 highlights the predictive capability of the model and means that developmental culture explains 51 per cent of the variance in internal integration. In other words, developmental culture is highly predictive of internal integration. Similarly, developmental culture had a strong and supported relationship with customer integration (β=.284, p<0.001, R^2=0.606). The path coefficient showed a β value of .284, which demonstrates a positive relationship between developmental culture and customer integration and the relationship was statistically supported at the significance level of p<0.001. The R^2 value of .606 indicates a strong predictive capability of the model and shows developmental culture explains more than half of the variance in customer integration. These results prove that developmental culture is highly necessary and allows for smooth integration with customers of the firms.

In the same vein, with values of (β=.258, p<0.001, R^2=0.785), developmental culture was found to exert a strong and positive relationship with supplier integration. The β value of .258 indicates a strong and positive relationship between developmental culture and supplier integration, and the relationship was supported at a significance level of p<0.001 while the R^2 value of .785 indicates that a larger proportion of variance in supplier integration is accounted by developmental culture. This suggests that developmental culture is a strong enabler of supplier integration. Research such as (Braunscheidel, Suresh, and Boisnier 2010; Linnenluecke and Griffiths, 2010; Cao, Huo, and Zhao 2015; Porter 2019) all found a positive relationship between developmental culture and the dimensions of SCI. The results obtained in this study fully support hypothesis H2a-2d of the study.

5.6.2.2 Rational Culture and Supply Chain Integration

In hypothesis ***H2b***, rational culture was postulated to exert a positive relationship with the dimensions of SCI, that is, internal, customer and supplier integration. This research found a positive relationship between rational culture and internal integration (β=.526, p<0.001, R^2=0.277). The path coefficient indicated a β value of .26 suggesting a positive relationship between rational culture and internal integration, and the relationship was supported at a significance level of p<0.001. However, the coefficient of determination (R^2) of .277 depicts a weaker predictive capability of rational culture in the model. This suggests rational culture accounts for only 27 per cent of the variance in the internal integration. Even though, the path

coefficient exhibits a stronger relationship, the weaker coefficient of determination shows a weaker predictive strength of rational culture. The study also found a strong and positive relationship between rational culture and customer integration. The values (β=.229, p<0.001, R^2=0.604) reveal the strength of the relationship between rational culture and customer integration.

The path coefficient displayed a β value of .299 indicating a strong and positive relationship between rational culture and customer integration and the relationship was supported at a significance level of p<0.001. The R^2 value of .604 indicates a strong predictive capability of rational culture in the model suggesting that rational culture explained 60 per cent of the variance in customer integration. Alternatively, this means that rational culture highly predicts customer integration, and it is a very important precursor of customer integration. Rational culture also had a positive relationship with supplier integration with these results (β=.150, p<0.001, R^2=0.769). The path coefficient of .150, indicates a strong and positive relationship between rational culture and supplier integration which was supported at a significance level of p<0.001. The coefficient of determination (R^2) indicates a strong predictive capability of the model as rational culture accounts for 77 per cent of the variance in the supplier integration. This suggests the strong influence of rational culture on supplier integration and provide enough evidence that rational culture is highly necessary for supplier integration to take place and the results fully support the claims of hypothesis ***H2b***.

5.6.2.3 Group Culture and Supply Chain Integration

The impact of group culture on internal, customer and supplier integration were postulated in hypothesis ***H2c***. In this study, group culture dominated by teamwork was found to exert positive and strong influence on internal integration (β=.689, p<0.001, R^2=0.475). The path coefficient showed a β value of .689 which indicates a strong and positive relationship between group culture and internal integration. The relationship was statistically supported at p<0.001 significance level while the coefficient of determination (R^2) of .475 showed a moderate predictive capability of the model. Group culture explains 48 per cent of the variance in internal integration. Even though, the R^2 is not very strong, it is enough to show the predictive power of group culture in the model.

In other words, group culture is highly important for internal integrations to be effective in the food manufacturing firms. The study also revealed a strong and positive relationship between group culture and customer integration (β=.291, p<0.001, R^2=0.613). The path coefficient revealed a β value of .291 indicating a strong and positive relationship between group culture and customer integration. The relationship was supported at a statistical

significance level of p<0.001 and the coefficient of determination (R^2) with a value of .613 showed group culture effectively accounts for 61 per cent of the variance in customer integration in the model.

This could be viewed as a strong relationship between group culture and customer integration. A food manufacturing firm with a strong group culture can form a strong collaboration with customers. The research also found a strong and positive relationship between group culture and supplier integration (β=.275, p<0.001, R^2=0.792). The path coefficient depicted a positive β value of .275 and the R^2 of .792 showed group culture accounts for 79 per cent of the variance in supplier integration. The strong coefficient of determination denotes group culture must be present for supplier integration to be effective. Considering the total significant effect on integration, group culture → internal integration, had a strong significant effect, followed by group culture → customer integration.

5.6.2.4 Hierarchical Culture and Supply Chain Integration

In hypothesis ***H2d,*** hierarchical culture was expected to exert a positive influence on the dimensions of SCI. The results proved that hierarchical culture has a strong and positive influence on internal integration (β=.522, p<0.001, R^2=0.272). The path coefficient with a β value of .522 represents a strong and positive relationship between hierarchical culture and internal integration which was significant at p<0.001. However, the coefficient of determination (R^2) was weak as only 27 per cent of the variance in internal integration was explained by hierarchical culture. The weaker coefficient of determination indicates a weak predictive capability of the model. Even though, the relationship is strong, the predictive effect of hierarchical culture is very weak. Similarly, hierarchical culture was found to have a positive and strong relationship with customer integration with the coefficients (β=.202, p<0.001, R^2=0.597). The path direction from hierarchical culture to customer integration indicates β value of .202 suggesting a positive and strong relationship which is supported at p<.0001. The R^2 value of .597 is indicative of the predictive power of hierarchical culture on customer integration as it explains much of the variance in customer integration.

The predictive capability of the model shows that hierarchical culture is highly necessary for customer integration. Hierarchical culture was also found to have a strong and positive relationship with supplier integration (β=.165, p<0.001, R^2=0.776). The path coefficient with β value of .165 depicts a strong and positive relationship between hierarchical culture and supplier integration with the relationship being statistically supported at a significance level of p<.001. The R^2 is high for the model indicating a larger proportion of the variance in supplier integration is explained by hierarchical culture. These findings of the impact of hierarchical

culture are very intuitive as it contradicts the findings of previous research such as (Braunscheidel, Suresh and Boisnier 2010; Linnenluecke and Griffith 2010; Cao, Huo, and Zhao 2015; Porter 2019). These results fully support hypothesis ***H2d***.

With regards to the predictors of SCI, developmental culture had a strong predictive and significant effect, followed by group culture, rational culture and lastly, hierarchical culture.

5.6.3 Hypothesis 3a-3C

Hypotheses 3a-3C posited a positive relationship between internal, customer and supplier integration and SSCP (see Fig 4.1). The results indicate a positive influence of internal integration on SSCP with the values (β=.466, p<0.001, R^2=0.752) as proposed in hypothesis ***H3a***. The path coefficient, with a β value .466 portrays a strong and positive influence of internal integration on SSCP and the relationship was supported at a significant level of p<.001. The study fully supports the assertion of hypothesis ***H3a.*** The study also found a positive influence of customer integration on SSCP with the results showing (β=.185, p<0.05, R^2=0.752) confirming ***H3b***. The path coefficient reveals a β value of .185 indicating a strong and positive relationship between customer integration and SSCP, the relationship was supported at significance level of 5%, therefore, hypothesis *H3b* was supported. In the same vein, supplier integration was found to expend a positive influence on SSCP of the food manufacturing firms showing results (β=.260, p<0.001, R^2=0.752), thereby, supporting hypothesis *H3c*. The path coefficient revealed a positive relationship between supplier integration and SSCP and the relationship was supported at a significance level of p<.001 as postulated in hypothesis ***H3c***. The unified R^2 value of .752 indicates that internal, customer and supplier integration explain 75 per cent of the variance in SSCP, therefore, hypothesis H3c was supported. Internal integration was also confirmed to possess a positive relationship with customer and supplier integration with the coefficients (β=.548, p<0.001, R^2=0.754) and (β=.341, p<0.001, R^2=0.754) respectively. This means, as confirmed by the interviews, internal integration serves as a precursor for external integration. That is, the strength of external integration highly depends on the strength of internal integration. As confirmed in chapter 4, the dimensions of OC lead to a strong internal integration which enables the manufacturing firms to form a strong integration with customers and suppliers and through this integration, resources, knowledge and skills are shared for the improvement of SSCP.

In terms of the significant effect of the predictor variables, internal integration had a higher significant effect (internal integration → SSCP ($.466^{***}$), followed by supplier integration (SI) → SSCP ($.185^{*}$), and supplier integration (SI) → SSCP ($.260^{***}$). Additionally,

and confirming the findings in the interviews, internal integration had a strong and positive relationship with customer and supplier integration. The relationship was supported at a significant level of $p<0.001$ while the R^2 value for customer and supplier integration were 61 per cent and 79 per cent respectively. In the interview, it was confirmed that internal integration serves as an enabler for supplier and customer integration. The positive relationship between internal and external integration provides quantitative proof of the assertion in the interview.

5.6.4 Mediating Role of Supply Chain Integration

The final section highlights the findings from Hypothesis ***H4***, where the mediation role of the dimensions of SCI on the relationship between the various dimensions of OC and SSCP are tested.

5.6.4.1 Hypothesis 4 (H4)

The study also examined the potential mediating role of SCI on the relationship between the dimensions OC and SSCP, that is, whether SSCP can be intensified after adopting a sustainability-oriented culture. Table 5.4 shows the mediating role of the various dimensions of SCI on the various dimensions of OC and SSCP and the role played by SCI as a composite variable on the OC and SSCP relationship. The table also shows the value of the indirect effect, the bias-corrected confidence interval at 95 per cent and the significance level assessed at varying levels ($p<0.001$, $p<0.01$, $p<0.05$).

Table 5.4 Mediation Role of Supply Chain Integration on Culture and Sustainability Performance Relationship

	Direct Effect	Indirect Effect	Bias-corrected 95% confidence interval			Hypothesis Testing (p-values)
			Bias	**Lower Bound**	**Upper Bound**	
DC -->II-->SSCP	0.026	0.318	-0.003	0.183	0.423	*** Supported
DC-->SI-->CI-->SSCP	0.213	0.049	0.002	0.012	0.120	** Supported
DC-->SCI-->SSCP	0.117	0.068	0.002	0.025	0.134	*** Supported
GC -->II-->SSCP	0.201	0.292	0.001	0.195	0.403	*** Supported
GC-->SI-->CI-->SSCP	0.004	0.039	0.000	0.012	0.090	** Supported
GC-->SCI-->SSCP	0.002	0.051	0.002	0.020	0.092	*** Supported
RC -->II-->SSCP	0.245	0.250	0.001	0.148	0.351	*** Supported
RC-->SI-->CI-->SSCP	0.112	0.044	0.000	0.016	0.107	*** Supported
RC-->SCI-->SSCP	0.123	0.064	0.001	0.026	0.121	*** Supported
HC -->II-->SSCP	0.150	0.221	0.003	0.153	0.292	*** Supported
HC-->SI-->CI-->SSCP	0.052	0.026	0.000	0.011	0.051	** Supported
HC-->SCI-->SSCP	0.019	0.043	0.002	0.017	0.080	* Supported

CI-customer integration; II-internal integration; SI-supplier integration; SSCP=Sustainable Supply Chain Performance; DC-developmental culture; GC-group culture; HC-hierarchical culture; RC-rational culture. ***p<0.001, ** p<0.01, * p < 0.05

In hypothesis ***H4a***, SCI was hypothesised to mediate the relationship between developmental culture and SSCP. The results in Table 5.4 indicate that the composite SCI has specific indirect effect (0.068) on the relationship between developmental culture and SSCP, and the mediation relationship was supported at p<0.001 significance level. Prior to that, the results indicated a mediation role of internal integration on the developmental culture and SSCP relationship supported at a statistical significance level of p<0.01 and external integration was also found to mediate the developmental culture and SSCP at an indirect effect value of .005 statistically supported at a significance level of p<0.001. These, therefore, suggest that SCI mediate the relationship between developmental culture and SSCP supporting hypothesis ***H4a***.

The results also revealed a mediation relationship of SCI on the relationship between group culture and SSCP, indicating indirect effect value (.051) at a statistical significance level of p<0.001 as predicted in ***H4b***. The results also revealed a high mediation role of internal integration on the group culture-SSCP relationship with indirect effect value (.292) at a significance level of p<0.001 while external integration mediates group culture and SSCP with an indirect effect value of (.039) at a significance level of p<0.01. These results indicate that internal, external and composite SCI play a crucial role on the relationship between group

culture and SSCP. The results indicate a mediation relationship between group culture and SSCP, thereby supporting, hypothesis **H*4b***.

Hypothesis ***H4c*** predicted a mediation relationship of SCI on the relationship between rational culture and SSCP. Even though, rational culture had an unsupported relationship with SSCP, SCI was found to play a crucial role in achieving improved SSCP for firms with rational culture. Internal integration, with an indirect effect value of .250 was found to fully mediate the relationship between rational culture and SSCP at a supported significance level of $p<0.001$. External integration also mediated rational culture and SSCP relationship and was supported at an indirect effect value of 0.044 with a significant value of $p<0.001$. The composite SCI plays a full mediation role on the rational culture-SSCP relationship with an indirect value of (0.064) and the relationship supported at a significance level of $p<0.001$. The results prove that with a rational culture, firms require a strong SCI, that is, integration relationship both within and outside the firm to attain a higher SSCP. The results fully support hypothesis ***H4c***, which postulated a mediation role of SCI between rational culture and SSCP.

Lastly, hypothesis ***H4d*** hypothesised a mediation role of SCI on the relationship between hierarchical culture and SSCP. The results found SCI to be mediating the relationship between hierarchical culture and SSCP. With an indirect value of .221 and supported at a significance level of $p<0.001$, internal integration was found to mediate the relationship between hierarchical culture and SSCP. External integration also mediated the hierarchical culture and SSCP relationship with an indirect value of .026 which was supported at a statistical significance level of $p<0.01$. The composite SCI was also found to mediate the relationship between hierarchical culture and SSCP with indirect value of 0.043 and supported at a statistical significance level of $p<0.05$. This indicates that with a strict culture, higher levels of collaboration are still needed to achieve higher levels of SSCP.

Based on the results in Table 5.4, the mediation effect of SCI on rational culture→SCI→SSCP relationship was the highest (full mediation), followed by the mediation effect of SCI on developmental culture→SCI→SSCP, group culture→SCI→SSCP relationship and lastly, hierarchical culture→SCI→SSCP relationship, which all showed a partial mediation due to the positive direct effect between the various dimensions and SSCP.

5.6.5 Control Variables

The study adopted several control variables to assess their impact on the SSCP of the firms. Gualandris and Kalchschmidt (2014) and Kang et al. (2018) used firm size as a control variable as firms with resource availability and many employees are likely to successfully

implement and improve sustainability performance. In this research, it was also assumed that the relevance of customers and suppliers on SSCP can be realised depending on the number of years the firms have worked with their supply chain partners. Therefore, length of working relationship with customers and suppliers and firm size were used as control variables. In Fig 5.1, the working relationship with customers had a positive but statistically unsupported relationship with SSCP (β=.014, p=0.764) while the length of working relationship with suppliers also had a negative and statistically unsupported relationship with SSCP (β=-.049, p=0.249). Moreover, firm size also had a positive but unsupported relationship with SSCP (β=.037, p=0.415).

5.7 Test for Measurement Invariance

OC and sustainability may be perceived differently across the UK (individualist culture) and Greece (collectivist culture) which demands the testing of the measurement invariance to compare the groups (Henseler et al. 2016). Measurement invariance is necessary to ensure the rigidity of validity and conclusions (Henseler et al. 2016) and can be attained through multigroup analysis. Measurement invariance can be simply explained as the difference between the loadings and weights of the measurement models of constructs within a model (Eberl 2010). Henseler et al. (2016) highlighted that the difference in the measurement models of constructs could emanate from the different meanings assigned to variables by the respondents. This suggests that respondents in both the UK and Greece could attribute different meanings to the dimensions of OC, SSCP and SCI. Measurement invariance of composite models (MICOM) in PLS was developed by Henseler et al. (2016) to handle such issues. Measurement invariance was obtained by comparing the original correlation with the 5 per cent quantile. Based on the results in Table 5.5, the original correlations between the variables were greater than the 5% quantile at significance level of $p>0.05$, establishing that no issues exist with measurement invariance in the data. Additionally, the permutation-based confidence levels establishing the means values and the variances was performed to assess if there were any differences between the composite mean and variance across the groups.

Table 5.5 Measurement Invariance using MICOM

Variables	Original Correlation	Correlation Permutation	5.0% quantile	Permutation p-values
SSCP	1.00	1.00	0.999	0.122
II	1.00	1.00	1.000	0.218
CI	1.00	1.00	0.998	0.097
SI	1.00	1.00	1.000	0.086
DC	1.00	1.00	1.000	0.127
GC	1.00	1.00	0.999	0.008
HC	1.00	1.00	1.000	0.242
RC	1.00	1.00	0.997	0.232

CI-customer integration; II-internal integration; SI-supplier integration; SSCP=Sustainable Supply Chain Performance; DC-developmental culture; GC-group culture; HC-hierarchical culture; RC-rational culture. $^{***}p<0.001$, $^{**}p<0.01$, $^{*}p < 0.05$

5.8 Additional Analyses (First Order Constructs)

The study performed additional hierarchical regression analyses mainly to ascertain the relationship between the first order constructs, that is, the impact of each of the dimensions of OC and SCI on the individual dimensions of SSCP (environmental, social and economic performance). This was very important as SSCP was treated as a second order construct in the structural model (see Fig 5.1). Regarding the relationship between the first order constructs of OC, SCI and environmental performance. In both models, all the dimensions of OC except rational culture had a positive and supported relationship with environmental performance. Rational culture had a negative and an unsupported relationship with environmental performance. Additionally, all the dimensions of SCI had a positive and a significant relationship with environmental performance. These findings confirm the results in the structural model. With regards to the control variables, only years of relationship with suppliers and firm size influenced the achievement of environmental performance of the firms. These confirm the findings of (Gualandris and Kalchschmidt 2014) that firm size has an influence on the adoption of sustainability practices by manufacturing firms. In terms of

the R^2, model 2 showed a larger R^2 and adjusted R^2 of .668 and .657 respectively indicating good predictive capability of the variance in environmental performance than model 1. The f^2 value for model 2 was also larger and significant at 14.780. This implies that elimination of the predictors is likely to cause a significant change in the R^2. Therefore, model 2 had a better predictive capability than model 1.

Developmental culture had a positive and a supported relationship with social performance in both models. Group and hierarchical cultures also had a positive and supported relationship in both models whereas rational culture had a positive albeit an unsupported relationship with social performance in both models. Interestingly, all the dimensions of SCI had a strong and positive relationship with social performance which was significant at $p<0.001$. Again, these results confirm the findings and the interactions between the dimensions of OC, SCI and SSCP in the structural model. In model 3 and 4, length of working relationship with customers had a positive but an unsupported relationship with social performance. Whereas length of working relationship with suppliers had a positive and supported relationship in model 3 despite its negative effect on social performance in model 4. Similarly, firm size had a positive and supported relationship in model 3 but a negatively supported effect on social performance in model 4. The R^2 of model 4 showed a larger predictive capability with values of R^2 and adjusted R^2 values of 66 per cent and 64 per cent respectively. The f^2 of model 4 indicates a significant change in the R^2, therefore, model 4 is a good predictor of social performance than model 3.

Furthermore, developmental culture had a positive relationship with economic performance in both models. Group and hierarchical cultures both had a positive and supported relationship with economic performance in both models. Unfortunately, rational culture still had a positive but unsupported relationship with economic performance. Internal integration had a positive and supported relationship with economic performance of firms. Both customer and supplier integration had a positive and significant relationship with economic performance. The unsupported relationship between rational culture and economic performance further attest to the unsupported relationship between rational culture and SSCP in the structural model. The results also confirm the findings in the structural model on the relationship between OC, SCI and SSCP. In measuring the effects of the predictors on economic performance, length of working relationship with suppliers had an unsupported and negative effect on economic performance in model 6 and also an unsupported relationship in model 5. Length of working relationship with customers had a positive but unsupported relationship with economic performance in both models. Firm size, on the other hand, had a

positive control relationship in model 5 but an inverse effect with economic performance in model 6. Comparing both models, model 6 had a strong predictive capability since the R^2 and the adjusted R^2 are 67 and 66 per cent respectively.

Table 5.6 Hierarchical Regression Analyses

	Environmental Performance		Social Performance		Economic Performance	
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Constant	4.901	1.064	5.073	.971	4.971	.692
Years (Suppliers)	.120*	.057*	.123**	-.019**	.60ns	-.100*
Years (Customers)	.004ns	.004ns	.012ns	.002ns	.076ns	.50ns
Firm Size	.186*	.195*	-.136**	-.003**	.169ns	-.031ns
DC	.057**	.044**	.059**	.066**	.043**	.048**
GC	.094*	.008*	.148**	.151**	.264***	.263***
RC	-.006ns	-.010ns	.021ns	.035ns	.024ns	.039ns
HC	.029*	.056*	.033**	.062**	.050*	.092*
II	-	.395***	-	.424***	-	.267***
CI	-	.137**	-	.115*	-	.229***
SI	-	.160**	-	.086**	-	.086*
R²	.094	.668	.065	.656	.066	.673
Adjusted *R²*	.085	.657	.056	.644	.057	.663
F	10.697***	14.780***	7.237***	14.248***	7.259***	10.562***

CI-customer integration; II-internal integration; SI-supplier integration; SSCP=Sustainable Supply Chain Performance; DC-developmental culture; GC-group culture; HC-hierarchical culture; RC-rational culture. ***p<0.001, ** p<0.01, * p < 0.05

The f^2 effect on the R^2 in model 6 is larger than the values in model 5, indicating that model 6 has a strong predictive capability than model 5. Based on this juxtaposition, it could be concluded model 6 is a good predictor of economic performance than model 5. The results in the hierarchical regression analysis are not far-fetched from the results from the structural model. Developmental, group and hierarchical cultures have a positive and significant relationship with all the three dimensions of the SSCP. Meanwhile, rational culture which was found to possess a negative and unsupported relationships with the dimensions of SSCP in the hierarchical analyses is akin to the results found in the structural model analysis.

5.9 Assessment of the Structural Model and Model Fit Indices/Analysis

PLS-SEM provides opportunity for the structural model to be assessed even though the predictive capability has been validated with the values of the R^2. In order to establish further rigor, this study investigated the *significance of the model fit, predictive relevance and unobserved heterogeneity* (Akter et al. 2017). Assessment of the model fit is highly significant for establishing the *predictive capability, predictive relevance and the impact on the* R^2 *of the endogenous variables if there are any significant changes in the exogenous variables (latent variables)* (Akter et al. 2017; Sarstedt et al.

2017). In assessing the predictive capability, R^2 is used while predictive accuracy or relevance is examined using the Geisser's Q^2 (Geisser 1974) and f^2 is used in assessing the change and effect on the R^2 of the endogenous variables when exogenous variables are deleted. The predictive capability, R^2 of the various path relationships has already been established in the analysis of the structural model, the values of Q^2 and f^2 are presented in Table 5.7. As a threshold, f^2 values of 0.02, 0.15, and 0.35 are respectively considered as small, medium and large effect on the exogenous variables (Sarstedt et al. 2017). In Table 5.7, f^2 value for developmental culture to internal integration *(DC → II)* was large with a value of 1.047, implying that deletion of DC will change the R^2 (.511) by more than 100%. The results are indicative of the importance of DC as a predictor of II. Additionally, f^2 value of group culture to internal integration *(GC → II)* was .904 while hierarchical culture to internal integration (HC → II) and rational culture to internal integration *(RC → II)* had f^2 values of .575 and .383 respectively. Similarly, these show that the deletion of hierarchical culture (HC) and rational culture (RC) would largely affect the outcome of the R^2 of internal integration (II). Other values for the path relationships exceeded the medium effect while a few were relatively smaller.

Table 5.7 Construct Cross-validated Redundancy

	SSO	SSE	Q^2 (=1-SSE/SSO)
CI	2205.000	1411.231	0.360
DC	1575.000	1575.000	
ECP	2205.000	1386.771	0.371
ENVP	2205.000	1421.371	0.335
GC	1575.000	1575.000	
HC	1260.000	1260.000	
INTI	1890.000	1188.455	0.371
RC	1575.000	1575.000	
SP	1890.000	1249.845	0.339
SUPI	2520.000	1607.139	0.362

CI-customer integration; DC-developmental culture; ECP-economic performance; ENVP-environmental performance; GC-group culture; HC-hierarchical culture; II-internal integration; RC-rational culture; SP-social performance, SI-supplier integration.

The Q^2 (cross-validated redundancy) acts as evaluation criterion for the cross-validated predictive relevance which is normally obtained through a blindfolding procedure (Hair et al. 2017). The blindfolding procedure essentially deletes some data points and provides further

assessment of their original values. Due to this, an omission distance (D) which is often between 5 and 12 (recommended in literature) is used (Hair et al. 2017). For example, an omission distance of 5 implies that every fifth data point of the indicators is eliminated. Since the procedure often engages in omission and prediction of every data point in the measurement model, an omission distance of 5 often results in 5 blinding folds. According to Hair et al. (2017), as a rule of thumb, Q^2 values larger than zero (0) stipulate a high predictive relevance of the path model (structural model). The recommended omission distance in PLS-SEM is 7 and above, therefore, with an omission distance (D) of 7, the cross-validated redundancy (Q^2) values of the endogenous variables in this study ranged between .30-.36 (see Table 5.7), indicating a very high predictive relevance of the structural model (path model). The Q^2 values obtained are customer integration (.360), economic performance (.371), environmental performance (.335), internal integration (.371), social performance (.339) and supplier integration (.362).

Table 5.8 Model Fit Indices and Significant Testing Results

Path	Path Coefficient	T-Values	Significant?	f^2 effect size
H1a-H1d				
H1a: DC→SSCP	0.120	2.085	Yes	0.021
H1b: RC→SSCP	0.063	5.278	No	0.010
H1c: GC→SSCP	0.233	1.508	Yes	0.095
H1d: HC→SSCP	0.115	2.653	Yes	0.040
H2a-2d				
H2a: DC→II	0.715	19.505	Yes	1.047
DC→CI	0.284	4.782	Yes	0.098
DC→SI	0.258	4.885	Yes	0.139
H2b: RC→II	0.526	19.969	Yes	0.383
RC→CI	0.229	3.979	Yes	0.097
RC→SI	0.150	4.576	Yes	0.065
H2c: GC→II	0.689	11.042	Yes	0.904
GC→CI	0.291	4.791	Yes	0.117
GC→SI	0.275	3.485	Yes	0.170
H2d: HC→II	0.522	13.571	Yes	0.575
HC→CI	0.202	4.158	Yes	0.072
HC→SI	0.165	4.354	Yes	0.203
H3a-3c				
H3a: II→SSCP	0.466	7.232	Yes	0.214
H3b: CI→SSCP	0.185	2.409	Yes	0.041
H3c: SI→SSCP	0.260	3.358	Yes	0.059
H4a-4d				
H4a: DC->SCI->SSCP	0.068	3.570	Yes	
H4b: GC->SCI->SSCP	0.051	3.415	Yes	
H4c: RC->SCI->SSCP	0.064	3.687	Yes	
H4d: HC->SCI->SSCP	0.043	2.549	Yes	

CI-customer integration; II-internal integration; SI-supplier integration; SSCP=Sustainable Supply Chain Performance; DC-developmental culture; GC-group culture; HC-hierarchical culture; RC-rational culture. $^{***}p<0.001$, $^{**}p<0.01$, $^{*}p<0.05$

The study also assessed the unobserved heterogeneity in the data as it is very significant forwho identifying any potential bias in the parameter estimates and also reveals any invalid computations or conclusions (Akter et al. 2017). In assessing the model fit, standardised root mean square residual (SRMR), normed fit index (NFI), exact fit criteria and root mean squared residual (RMS_theta) are used. The SRMR analyses the difference between the observed and the implied correlations to determine the level of discrepancies between the observed and expected correlations. The rule of thumb for an acceptable model fit <.10 or .08 (Hu and Bentler 1999; Henseler, Ringle, and Sarstedt 2016). The NFI compares the χ^2 of the proposed model against the χ^2 value of a null model. According to Bentler and Bonett (1980), NFI value of between 0 and 1 is considered as a good fit. The exact fit criteria are measured in two ways; d_ULS (the Euclidean distance) and d_G (the geodesic distance) and both assess the empirical or the proposed covariance matrix with the implied covariance matrix. The difference between

the two models should be non-significant for a model fit to be established. The RMS_theta is useful for assessing reflective measurement models as it helps in ascertaining the degree to which the residuals of the outer model correlate. Models with RMS_theta values of below 0.12 indicates a good fit (Henseler et al., 2014).

Table 5.9 Model Fit Analysis

Model Fit Parameters	Values
SRMR	0.07
NFI	.66
D_ULS	16.516
D_G	3.521
RMS_Theta	0.125

The values of the model fit indices in Table 5.9 indicate a good model fit of the proposed model in the research. As a rule of thumb, the SRMR is less than 0.08, the NFI is closer to 1 while exact fit criteria measures (d_ULS and D_G) were all non-significant indicating no significant difference between proposed and the implied model. The RMS_theta met the minimum threshold of 0.12.

5.10 Summary of the Results

Table 5.9a provides a summary of the findings of the analysis between the various variables in the study. It highlights the path direction; the parameter estimates with the t-values and the significance level of each of the path coefficients or relationships. The higher t-values indicate the strength of the model. The table also shows the results from the control variables, working relationship with customers and suppliers and firm size.

Table 5.9a Summary of the Results (Structural Model)

Path (from-to)	Path coefficients *(t-values)* p-values	Summary
H_{1a}: DC --> SSCP	0.120 (2.085) *	Supported
H_{1b}: GC --> SSCP	0.233 (5.278) ***	Supported
H_{1c}: RC --> SSCP	0.063 (1.508) ns	Not Supported
H_{1d}: HC --> SSCP	0.116 (2.653) **	Supported
H_{2a}: DC --> II, CI, SI	.715 (19.505) ***, .283 (4.782) ***, .258 (4.885) ***	Supported
H_{2b}: GC --> II, CI, SI	.689 (19.969) ***, .291 (3.979) ***, .275 (4.576) ***	Supported
H_{2c}: RC --> II, CI, SI	.526 (11.042) ***, .229 (4.791) ***, .150 (3.485) ***	Supported
H_{2d}: HC --> II, CI, SI	.522 (13.571) ***, .201 (4.158) ***, .166 (4.354) ***	Supported
H_{3a}: II --> SSCP	.423 (7.232) ***	Supported
H_{3b}: CI --> SSCP	.175 (2.409) *	Supported
H_{3c}: SI --> SSCP	.263 (3.358) **	Supported
$H_{4a:}$: DC-->SCI-->SSCP	.068 (3.570) ***	Supported (Partial mediation)
H_{4b}: GC-->SCI-->SSCP	.051 (3.415) ***	Supported (Partial mediation)
H_{4C}: RC-->SCI-->SSCP	.064 (3.687) ***	Supported (Full mediation)
H_{4d}: HC-->SCI-->SSCP	.043 (2.549) *	Supported (Partial mediation)
Working relationship with customers --> SSCP	0.014 (0.317) ns	Not Supported
Working relationship with suppliers --> SSCP	-.051 (1.228) ns	Not Supported
Firm size	.036 (0.816) ns	Not supported

Summary of the Chapter

This chapter elaborates on the results, findings and interpretations from the statistical analyses of the data. Prior to selecting the best SEM technique for the analyses, a normality checks on the data were conducted as it helps in determining whether CB-SEM or VB-SEM is suitable for the analysis. Since the normality check revealed a non-normal distribution among the data set, VB-SEM, specifically, PLS-SEM was appropriate in conducting the required path analyses for the research. In assessing the measurement models, confirmatory and exploratory factor analysis were conducted. The reliability, discriminant validity, AVE, factor scores indicated a valid measurement models as all the values met or exceeded the threshold. This implied that the indicators highly measured the latent variables and the latent variables highly explained a larger amount of the variance in the indicators. The exploratory factor analysis through Harman's single factor test and FCVIF revealed that multiple factors

explained most of the variables in the study. The VIF was also assessed before analysing the structural model and all the VIF values except one revealed no issue with multi-collinearity. The structural model was analysed with the path coefficients, the significance levels of each of the relationships and the coefficient of determination. All the hypotheses except rational culture→SSCP was not supported in the study. The structural model was assessed with Q^2 and f^2 where all the values met or exceeded the threshold. The model fit was also assessed with SRMR, RMS_Theta, exact fit criteria and NFI. Measurement invariance was also established through MICOM and the original correlations of the variables were greater than the 5% quantile. The results further proved that the model perfectly fits the data in the study. An additional analysis was performed to assess the impact of the dimensions of OC and SCI on the individual dimensions of SSCP. Like the structural model results, all the dimensions of OC except rational culture had a positive and significant relationship with environmental, social and economic performance. In the next chapter, the results from both the qualitative interviews and quantitative analyses are combined in discussing the general findings of the study.

CHAPTER SIX: DISCUSSION OF THE GENERAL FINDINGS OF THE STUDY

Introduction

Based on the results from the interviews and the quantitative findings, this section elaborates on findings from both approaches and their implications for the research questions and objectives of this study. After each of the discussions, the theoretical contributions are presented. The discussions are made in conjunction with the theories used in the study and the section also explains how the results align or misalign with the theories identified in the study. The theoretical contributions of the findings are presented after each discussion. The last section focuses on the practical implications of the study.

6.1 Relationship between Organisational Culture and Sustainable Supply Chain Performance

One of the aims of this study was to ascertain the extent to which OC influences SSCP and determine the type (s) of dimension which greatly impacts on SSCP from the perspective of the institutional theory. So far only Linnenluecke and Griffiths (2010) has theoretically asserted the possible relationship between OC and SSCP. In this section, the empirical findings on the relationship between the developmental, group, rational and hierarchical cultures and SSCP are discussed. The section begins with the relationship between developmental culture and SSCP, and subsequently followed by the discussions on the relationship between group, rational and hierarchical cultures and SSCP. The theoretical contributions are presented after each of the discussions.

6.1.1 Developmental Culture and Sustainable Supply Chain Performance

Due to the values inherent in a developmental culture, it was argued to have a positive impact on SSCP and the individual dimensions of SSCP of the firms. The study found a positive and supportive relationship between developmental culture and SSCP. The results proved the assertion of the institutional theory, as firms with intensive developmental culture are practicing sustainability mainly to gain legitimacy and increase profitability in the environment. The results constitute a new introduction to OC and SSCP literature as previous studies have not empirically assessed their relationship. The findings empirically confirm the theoretical assertion of Linnenluecke and Griffiths (2010) which predicted a positive

relationship between developmental culture and sustainability performance. Others (e.g., Braunscheidel, Suresh, and Boisnier 2010; Zu, Robbins, and Fredenhall 2010; Cao, Huo, and Zhao 2015; Yunus and Tadisinia 2016; Porters 2019) all highlighted the positive impact of developmental culture on supply chain strategies such as six sigma practices and SCI but not SSCP. Developmental culture elaborates on long term flexibility while shifting focus on external control through elements such as growth, creativity, resource expansion, and long-term orientation and encourages employees to consider the long-term values of the firm (Zu, Robbins, and Fredenhall 2010; Cao, Huo, and Zhao 2015). In this study, the positive impact of developmental culture on SSCP in the food manufacturing supply chains means firms which enable employees to generate new ideas, maintain dynamism, commit to long-term innovation and creativity and focus on long-term production and goals of the firm are capable of successfully implementing and improving the environmental, social and economic performance of the firm and its supply chain.

The values inherent in developmental culture ensure employees' views are considered and as its name depicts, continually educates and develops employees. Developmental culture also provides avenue for employees and managers to be innovative and creative in developing new ideas towards the improvement of various operations in the firm (Yang et al. 2020). Cadden et al. (2020) argued that organisations focused on developmental culture are results-oriented, maintain high levels of problem-solving skills and cooperation between departments and functions in the firms and fully ensure employees contribute to the success of the organisation. Such culture focuses on developing, educating and motivating employees resulting in employee satisfaction which consequently maximises the social performance. Similarly, the constant sharing of creative ideas in such firms ensure coordination of efforts to efficiently manage resources in the firm and such gestures are extended to the management of resources outside the firm. Since developmental culture is externally oriented and strives to positively position the firm in the market and the environment, reasonable steps are taken to control the use of resources (Linnenlueke and Griffiths 2010) and avoid negative impact on the environment, thereby, achieving maximum environmental performance. This also improves firms' image and legitimacy in the environment, thereby, confirming the institutional theory. Additionally, developmental culture enables the introduction of new products and quickly react to changing demands, thereby, maximising the economic performance.

Wijethilake, Upadhaya, and Lama (2021) confirmed that the values of developmental culture play a crucial role by ensuring expansion through sustainability-related innovations, continuous improvement and developing a sense of community engagement and

development. These qualities ensure sustainability practices and performance are easily ingrained and achieved.

6.1.1.1 Theoretical Contribution of the Relationship between Developmental Culture and Sustainable Supply Chain Performance

The findings in this research empirically confirms the theoretical assertion of Linnenluecke and Griffiths (2010) which only theoretically proposes a positive relationship between developmental culture and sustainability performance. Therefore, the findings on the positive impact of developmental culture and SSCP in this study introduces a new insight into extant literature by empirically confirming that the values inherent in a developmental culture instil sustainability innovation, continuously train and develop employees, educate, shift employees towards the long-term orientations. These enable food manufacturing firms to achieve high levels of SSCP. As a result, the findings in this research constitutes one of the few or first research to empirically confirm the positive influence of flexible culture such as developmental culture on the environmental, social and economic performance, thereby, contributing immensely to the literature of SSCP and OC.

6.1.2 Group Culture and Sustainable Supply Chain Performance

Since group culture is dominated by teamwork and intensifying interpersonal relationships, it was argued to exert a positive influence on SSCP. The findings empirically confirmed a positive influence of group culture on SSCP confirming the theoretical prediction of (Linnenlueke and Griffiths 2010) and the institutional theory. Research focusing on the relationship between group culture and SSCP has not been forthcoming, most of the research such as (Braunscheidel, Suresh, and Boisnier 2010; Zu, Robbins, and Fredenhall 2010; Cao, Huo, and Zhao 2015; Yunus and Tadisinia 2016; Porter 2019) indicated the positive impact of developmental culture on supply chain strategies such as six sigma practices and SCI. Wijethilake, Upadhaya, and Lama (2021) highlighted that since group culture is people-oriented, it is eligible for empowering, training and developing, building teamwork spirit and leadership orientation in a firm. The presence of these factors is essential for enforcing organisational change towards sustainability (Wijethilake, Upadhaya, and Lama 2021).

The results, therefore, introduces a new perspective into the literature of OC and SSCP. Group culture focuses on achieving strong levels of cooperation among the employees in an organisation (Cao, Huo, and Zhao 2015). Like developmental culture, group culture also accentuates on flexibility, however, its focus is mainly geared towards maintaining internal control and orientation through strong human relations, cohesion and frequent participation

of members (Zu, Robbins, and Fredenhall 2010; Yang et al. 2020). In this study, the positive influence of group culture and SSCP implies that values such as emphasising growth through teamwork, developing and ensuring employee commitment and concern, acquiring resources through teams, using teams to accomplish goals and tasks and achieving organisational goals through teams are critical to the improvement of environmental, social and economic performance of the firms.

Cadden et al. (2020) asserted that employee-oriented culture such as group culture is necessary for personal development and education, which creates an enabling environment and good working condition for employees. The teamwork improves the employee-supervisory relationship (Linnenluecke and Griffith 2010) and ensure sustainability ideas and training are passed onto the employees. The cross-functional teamwork also enables a quick dissemination of sustainability practices and sharing of pertinent ideas for the improvement of sustainability performance in the supply chain. Developing and educating employees lead to a higher employee satisfaction which essentially stimulates an improved social performance in the firm. Such culture is also highly significant in creating an enabling environment for parties in the supply chain to work cooperatively to attain the stated objectives (Porter 2019; Hong et al. 2020).

Despite the focus of group culture on maintaining internal control, the teamwork and the cooperative spirit created in the firm and even in the supply chain, create an avenue for consistent sharing of creative ideas and information for the management of resources both in the firm and across the supply chain. In this culture, employees can share creative ideas on how firms could prevent negative impacts on the environment which leads to an improvement in the environmental performance of the firm and the supply chain. Likewise, this practice improves the legitimacy of the firm in the environment, thereby, validating the institutional theory. Working in teams also enable workers to improve the agility of the supply chain (Geyi et al. 2020), thereby stimulating enough profitability.

6.1.2.1 Theoretical Contribution of the Relationship between Group Culture and Sustainable Supply Chain Performance

This study argued for a positive relationship between group culture and SSCP. The findings empirically confirm the proposal of Linnenluecke and Griffiths (2010) which theoretically predicted the positive influence of group culture and sustainability performance. Again, their research constitutes the only study theoretically expounding on the relationship between those two, therefore, the empirical findings of this current research introduce a new perspective into the literature of OC and sustainability performance by indicating that culture

characterised by group cultural values enables management and employees to learn, empower and share ideas and views about sustainability leading to a higher environmental, social and economic performance. Additionally, this research constitutes one of the rare researches which empirically confirms a positive influence of group culture on SSCP of firms from the institutional theory perspective.

6.1.3 Rational Culture and Sustainable Supply Chain Performance

Since rational culture involves the use of incentives and benefits, it was expected to have a strong influence on the SSCP of the firms in this study. However, the results proved that rational culture has no supported relationship with SSCP. The results contradict the assertion of Linnenluecke and Griffiths (2010) which predicted a positive influence of rational culture on sustainability performance. Due to this, the results of the impact of rational culture on SSCP in this study generate a new insight into how a culture dominated by rational values exert an insignificant influence on the sustainability performance of the food manufacturing firms and their supply chains. Rational culture emphasises on maintaining control and stability while achieving external control through incentives, rewards, task-focus, competition and goal orientation (Zu, Robbins, and Fredenhall 2010).

The insignificance of rational culture on the sustainability performance of the firms means encouraging competition, achieving stated objectives and maintaining internal control through incentives and rewards is not a prerequisite for firms to implement and improve SSCP. The ultimate reason could be attributed to the recent demands and calls by governmental agencies, NGOs, consumers and activists for firms to implement sustainability practices (Adesenya et al. 2020). This means that the firms are required to implement sustainability practices and achieve a certain performance level regardless of the type of goals or policies maintained within the internal boundaries of the firm. In other words, firms are supposed to instil sustainable practices in their operations to avoid fines and other punitive measures from the government or boycott from the consumers. Impliedly, employees are required to assist the firms and the supply chain to attain the required sustainability performance regardless of the wages, salaries or incentives system practiced in the firms. Another manager also clearly specified that most of the operatives are outsourced from employment agencies with zero-hour contracts and are required to attain the stated objectives of the firm or the supply chain without any extra incentives.

The results suggest that usage of incentives may not be necessarily essential in attaining the required environmental, social and economic performance. However, influencing employees' behaviour through monetary and non-monetary rewards may improve employee

satisfaction leading to increased social performance. Employees in such work environment would be willing to achieve more to attain the stated objectives in the firm as the culture sparks competition among employees. As a result, economic and social performance of such firms and their supply chains are likely to improve. The unsupported relationship of rational culture on SSCP conforms to the findings from the qualitative interviews.

6.1.3.1 Theoretical Contribution of the Relationship between Rational Culture and Sustainable Supply Chain Performance

This study further argued for a positive relationship between rational culture and SSCP, however, this was not supported by the findings. The results empirically contradict the theoretical prediction of Linnenluecke and Griffiths (2010) which proposed the possibility of rational culture positively influencing the social, economic and environmental performance. The findings also contradict the findings of Wijethilake, Upadhaya, and Lama (2021) which found that rational culture is conducive for enforcing organisational change towards sustainability. The results, therefore, introduce new intuitions into extant literature on OC and SSCP by confirming that rational culture is not appropriate for achieving of higher SSCP in food manufacturing firms and their supply chains. This makes the results of this research highly significant by revealing a non-significant influence of rational culture on social, economic, environmental and the overall SSCP.

6.1.4 Hierarchical Culture and Sustainable Supply Chain Performance

Even though, hierarchical culture is characterised by strictness and centralised authority system, it was still argued to have a positive relationship with SSCP in this study. The findings confirmed a strong relationship between hierarchical culture and SSCP, which is partially consistent with the prediction of Linnenluecke and Griffiths (2010) which proposed a positive relationship between hierarchical culture and only economic performance. The findings also validate the institutional theory as the inclusion of sustainability in the hierarchical culture dependent firms enables the realisation of the legitimacy and positive image in the environment. Since hierarchical culture is characterised by strictness and researchers propose the difficulty of introducing strategies into such culture, the positive relationship between hierarchical culture and SSCP means firms can easily introduce sustainability practices into the firm and supply chain and enforce employees to comply with the new standard, thereby, improving SSCP.

Hierarchical culture is characterised by strong levels of top-down control and authority in the firm and the procedures, routines and decision-making are centralised and made by top-

level managers or supervisors. The lack of flexibility associated with such kind of culture makes it very difficult for innovation and creativity to be practiced which could hinder the implementation of sustainability practices. Cadden et al. (2020) indicated that a firm practising a job-oriented culture like the hierarchical culture, does not necessarily consider the achievements of employees, always focus on profitability and controls employees' behaviour, resulting in the negative relationship between this culture and supply chain strategy implementation. Despite these assertions by previous researchers, the findings of this research are nuanced by suggesting a strong and positive influence of hierarchical culture on sustainability performance. Meaning, the positive relationship of hierarchical culture on SSCP shows that maintaining a controlled and structured place, adopting general procedures, encouraging the referrals of small issues to the top management and requiring the CEO's approval for every decision are critical for the implementation and improvement of the SSCP in the firm and the supply chain.

Wijethilake, Upadhaya, and Lama (2021) also opined that maintaining a control culture such as hierarchical culture is useful for sustainability practices such as budgeting decisions, sustainability-related investments and environmental assessments such as LCA. As Linnenluecke and Griffiths (2010) highlighted, the strict rules associated with hierarchical culture ensure employees adhere to the goals and objectives of the organisation of making and increasing the profitability. The profitability goals and the strict rules create an environment where the employees focus on increasing the profitability levels of firms, thereby, improving the economic sustainability of the firm which could be projected to the supply chain. Inferring from the results of this study, maintaining strict rules about environmental policies and other rules about sustainability in the focal food manufacturing firms could stimulate a higher environmental performance. The lack of flexibility and intolerance associated with hierarchical culture is expected to reflect negatively on the social sustainability performance of the firms. However, since every firm is aiming towards achieving a higher SSCP, several social performance enhancing measures would be introduced. This study maintains that adopting the values associated with hierarchical culture is necessary for shaping employees' attitude towards achieving the required SSCP levels. Also, maintaining strict sustainability rules in the focal manufacturing firms and supply chain could be the surest way to ensure management, employees and supply chain partners work towards achieving the desired sustainability levels.

6.1.4.1 Theoretical Contribution of the Relationship between Hierarchical Culture and Sustainable Supply Chain Performance

This research argued for a positive relationship between hierarchical culture and SSCP which was confirmed by the findings of this research. Unlike Linnenluecke and Griffiths (2010) which theoretically proposed a positive impact of hierarchical culture on just economic performance, this current research empirically found a positive influence of hierarchical culture on SSCP (social, economic and environmental performance) using the institutional theory. The findings conform to the claims of (e.g., Wijethilake, Upadhaya, and Lama 2021) which asserted that a strict culture is necessary for driving change towards sustainability. The findings in this research, therefore, introduces a new insight into the literature of OC and SSCP by maintaining that a strict/control culture such as hierarchical culture can shift employees and organisational attitude towards implementing and achieving higher levels of SSCP. The results in this research embodies one of the few studies to confirm the positive impact of hierarchical culture on SSCP.

6.1.4.2 Summary of the theoretical contributions of the relationship between organisational culture and sustainable supply chain performance

Generally, the research argued that all the dimensions of OC is likely to have a positive relationship with SSCP. The findings in this research confirmed a positive relationship between all the dimensions of OC except rational culture and SSCP. The findings partly confirmed the theoretical predictions of (Linnenluecke and Griffith 2010) which predicted a positive relationship between the dimensions of OC and sustainability performance. The findings also contradict the results of (Wijethilake, Upadhaya, and Lama 2021) which found that all the dimensions of the CVF are relevant for shifting organisational change towards sustainability. Miska, Szocs, and Schiffinger (2018) found a relationship between national culture and sustainability practices by employing the GLOBE factors, which has its foundations in Hofstede's cultural dimensions. This illustrates the lack of research on the relationship between OC and SSCP from the perspective of firm-specific culture utilised by the CVF. The findings in this research empirically confirmed the predictions of Linnenluecke and Griffiths (2010) on the relationship between growth and developmental cultures and SSCP, and however, contradicted the predictions on the relationship between rational culture and SSCP. Hierarchical culture was also found to exert a positive influence on SSCP contradicting the predictions of (Linnenluecke and Griffiths 2010). The findings in this research therefore contribute enormously to the literature of OC (CVF) and SSCP by confirming that an

integrated competing values, thus, developmental, group, hierarchical cultures are conducive and necessary in the quest for food manufacturing firms to increase their SSCP.

6.2 The Relationship between Organisational Culture and Supply Chain Integration

The second aspect of the study aimed at empirically assessing the role of OC in achieving a stronger SCI from the RBV theory. In this section, the empirical findings on the impact of developmental, group, rational and hierarchical cultures on internal, customer and supplier integration (SCI) are discussed. The relationship between these two, have been investigated by Braunscheidel, Suresh, and Boisnier (2010); Cao, Huo, and Zhao (2015) and Porter (2019), however, the findings of these research are divergent leading to lack of consensus on the how the variables are linked, thereby, requiring a further investigation into the relationship. The section starts with the impact of developmental culture on SCI, followed by the discussion on group culture, rational and hierarchical culture on SCI. The theoretical contributions are discussed after each discussion section.

6.2.1 Developmental Culture and Supply Chain Integration

In this study, using the RBV theory, developmental culture was expected to have a strong and positive influence on internal, customer and supplier integrations. The study confirmed a positive impact of developmental culture on internal integration of the firms. The results are consistent with the findings of Cao, Huo, and Zhao (2015) and Porter (2019) and however, contradict the results of Braunscheidel, Suresh, and Boisnier (2010) which found an unsupported relationship between developmental culture and internal integration. The strong and positive relationship between developmental culture and internal integration reveals the significance of a flexible culture in an attempt to achieve a strong collaboration inside the firms. In other words, the results suggest that emphasising growth through the development of new ideas, maintaining a dynamic and entrepreneurial atmosphere, committing strongly to innovation and creativity, and shifting much focus on the achievement of the long-term goals of the organisation are very critical for maintaining a strong collaboration among functions, employees and departments in the food manufacturing firms.

The flexibility, creativity, employee development and education, continuous push for long-term success of the organisation helps in strengthening the cross-functional and inter-departmental coordination and communication, consequently increasing the internal integration in the firm. This is true as the various teams from different departments meet to share creative and innovative ideas for the success of the firms. In such firms, highly organisational members are brought together, and their skills are harnessed and developed in achieving both firms' and supply chains' performance. The education and training feature

associated with this culture enable easy organisational learning and improve supervisor-employee relationship thereby achieving a strong internal integration.

The study further confirmed a very strong and supported influence of developmental culture on external integration (suppliers and customers) of the firms. The findings are in line with the results of Braunscheidel, Suresh, and Boisnier (2010); Cao, Huo, and Zhao (2015) and Porter (2019) which all found a positive influence of developmental culture on external integration. The results of this research, therefore, strengthen extant literature's position on the relationship between the two. Munir et al. (2020) claimed that the complexity associated with the changing environment and gaining competitive advantage requires a strong collaboration between the partners in the supply chain. Therefore, to thrive in the environment, firms with developmental culture require a strong working relationship with customers and suppliers accounting for the positive relationship between developmental culture and external integration. Yang et al. (2020) suggested that developmental culture pushes firms to extract and consistently acquire information about the current products, market, opportunities and technologies which are made possible through the integration with customers and suppliers. This, therefore, suggests that through developmental culture, firms are able to coordinate and accumulate the necessary information, skills and resources from external supply chain partners thereby increasing the performance as well as also validating the RBV theory.

Braunscheidel, Suresh, and Boisnier (2010) highlighted that integrative practices such as joint decision-making, joint development of new product and services and constant sharing of information with customers and suppliers can be highly effective when developmental culture is in place. Cao, Huo, and Zhao (2015) also argued that adopting developmental culture enable firms to easily obtain market and other relevant information and share risks through effective collaboration with customers and suppliers. When asked about the main impact of developmental culture, the managers indicated that the main developmental culture values cherished in the firms include continuous improvement, openness, safety, career development and sustainability culture, and such values help instil a collaborative relationship in the firms and also provide avenue to work collaboratively with customers and suppliers. Maintaining a culture of development, training and consistent learning lays the foundation for the firms to pursue joint innovations and jointly develop desired products and services with supply chain partners.

6.2.1.1 Theoretical Contribution of the Relationship between Developmental Culture and Supply Chain Integration

This study argued for a positive relationship between developmental culture and SCI which was confirmed by the results in this study. The findings contradict the results of Braunscheidel, Suresh, and Boisnier (2010) which found an inverse relationship between developmental culture and SCI. Additionally, the results in the study contradict the findings of Zu, Robbins, and Fredenhall (2010) which confirmed an inverse relationship between developmental culture and SCI. The positive relationship between developmental culture and external integration confirmed in this study is consistent with the results of Cao, Huo, and Zhao (2015) and Porter (2019). Therefore, the results use RBV theory to introduce new findings by confirming that maintaining a culture characterised by developmental culture values is very significant for forging stronger internal and external integration. Also, the results strengthen extant literature's position on the positive relationship between developmental culture and external integration.

6.2.2 Group Culture and Supply Chain Integration

With the values associated with group culture, it was envisaged to have a stronger and positive relationship with the dimensions of SCI in this study. The results in this research confirmed a positive relationship between group culture and internal and external integration. The results clearly indicate that the values associated with group culture provide a strong foundation for internal collaboration inside an organisation confirming the assertion of the RBV theory. The results of this study contradict the findings of Braunscheidel, Suresh, and Boisnier (2010) but consistent with that of Cao, Huo, and Zhao (2015) and Porter (2019) which found a strong influence of group culture on internal integration. As indicated, group culture is flexible, and it is focused on maintaining a strong integration and performance within the internal structures of a firm. The results in this study, therefore, contribute immensely to the literature of OC and SCI.

Braunscheidel, Suresh, and Boisnier (2010) and Porter (2019) expressed that firms with a culture focused on employees develop and improve internal processes and systems. Solving organisational and supply chain issues in teams helps in coordinating the efforts of skilled individuals and experts from different parts of the organisation, hence, improving the internal integration in the firms. Additionally, teamwork assists supervisors in easily training and educating operatives in the organisation, which also improves the coordination required in strengthening the internal integration of the firm. This creates an atmosphere for firms to achieve stated organisational objectives using internal integration. Cao, Huo, and Zhao (2015)

also highlighted that group culture intensifies brainstorming, creates a mutual understanding among the departments and members in the organisation and at the same time creates an avenue for the members of the firm to quickly relate with customers and suppliers. Yang et al. (2020) highlighted that an effective group culture encourages members in an organisation to share knowledge achieving a strong working relationship.

Again, group culture was found to exert a positive influence on the external integration (customer and supplier integration) of the food manufacturing firms. The findings correspond to the results of Cao, Huo, and Zhao (2015) and Porter (2019) which found a strong influence of clan (group) culture on external integration. On the other hand, the results of the study contradict the findings of Braunscheidel, Suresh, and Boisnier (2010) which found a negative relationship between group culture on customer and supplier integration. The results of this research, therefore, contribute to the literature on group culture and external integration and reveal the positive effect group culture could have on the customer and supplier integration of the firms. The results indicate that using teamwork to win and building efficiency through teamwork establish a solid foundation for the collaboration between the firms and their supply chain partners. The teamwork and communal spirit created in group culture intensive firms encourage the employees to adopt a team working attitude and other values necessary to form a strong collaboration with customers and suppliers.

Customers and suppliers have become indispensable members in the supply chain (Kang et al. 2018), therefore, forming a collaboration with them is highly essential for the attainment of a better organisational performance. The values associated with group culture position the members in the firms to form a strong link with the customers and suppliers to effectively share ideas, information, resources and other relevant materials needed to achieve an excellent supply chain performance. Yang et al. (2020) highlighted that firms with high levels of group culture are likely to seek resources or information from customers and suppliers. In the supply chain of the food manufacturing firms, customers who are the retailers play a crucial role in making pertinent decisions and help the focal manufacturing firms to maintain the competitive advantage both in the local and international markets. Most of the firms indicated that, customers (retailers) have an established team, therefore, creating a team spirit within the firms have helped in forming a strong collaboration with the teams from the customers, who meet regularly to share relevant information, ideas and resources to improve the performance of the firm and eventually the supply chain. Again, the responses and the positive influence of group culture on SCI prove that the availability of teamwork allows firms to strengthen their internal and external integration enabling the firms to gain access to rare information, resources and values for increased performance and competitive advantage validating the RBV theory.

The suppliers in the industry are very crucial in the supply chain but not as strong as the customers, however, the parties from the suppliers are supposed to be included in the collaboration along the supply chain. Therefore, group culture values from the firms can be extended to the relationship between customers and suppliers to achieve stated supply chain objectives. As indicated, group culture is highly relevant for a successful internal, customer and supplier integration.

6.2.2.1 Theoretical Contribution of the Relationship between Group Culture and Supply Chain Integration

Group culture was argued to have a positive influence on SCI, and this was supported by the findings of the study. Whereas Braunscheidel, Suresh, and Boisnier (2010) found no relationship between group culture and SCI (both internal and external integration), this research found results to the contrary by revealing a positive influence of group culture on both internal and external integration using the RBV theory. The results in this research are consistent with the findings of Naor et al. (2008), Cao, Huo, and Zhao (2015) and Porter (2019) which all found a strong relationship between group culture and the individual dimensions of SCI. The findings of this study therefore strengthen the literature on OC and SCI by emphasising the relevance of teamwork on the internal, customer and supplier integration of food manufacturing firms.

6.2.3 Rational Culture and Supply Chain Integration

Again, rational culture was argued to have a strong and positive effect on the SCI of the food manufacturing firms. The research confirmed a positive relationship between rational culture and internal integration and external integration of the food manufacturing firms validating the RBV theory. The findings contradict the results of Braunscheidel, Suresh, and Boisnier (2010) and Porter (2019) which all found a negative relationship between rational culture and internal integration. The findings correspond to the results of Cao, Huo, and Zhao (2015) which also found a positive relationship between rational culture and internal integration. Therefore, this research constitutes one of the few studies which reveal the positive impact of rational culture on internal integration. The results suggest that the use of incentives and rewards in encouraging employees to achieve the stated objectives is conducive for a strong collaboration among the internal departments and functions.

Porter (2019) found only developmental and group culture as the only cultural dimensions necessary for a strong integration with customers and suppliers. However, in this research, even though, rational culture was not a crucial element in determining the sustainability performance of the firms, it was considered as an important element used by the food manufacturing firms in influencing the cross-functional, departmental and employee

collaboration in the firms. Braunscheidel, Suresh, and Boisnier (2010) claims that firms with a high level of rational culture are likely to pursue integration practices to maintain and improve their competitiveness and performance in the market. Hong et al. (2020) stated that the values of rational culture encourage members to work at achieving functional coordination and improve their willingness to work towards attaining the stated objectives and improve their competitive advantage. This research, therefore, confirms that maintaining a strong incentive system in an organisation is effective in encouraging supervisor-employee, cross-functional and inter-departmental collaboration within the internal boundaries inside the organisation.

Again, the research argued for a positive impact of rational culture on external integration which was strongly confirmed by the results in this study. The findings contradict the results of Cao, Huo, and Zhao (2015) and Porter (2019) who empirically found a negative relationship between rational culture and external integration. Braunscheidel, Suresh, and Boisnier (2010) also found a weak relationship between rational culture and external integration. This suggests that the findings of this research introduce a new perspective into the literature of OC and external integration by confirming a strong and positive impact of rational culture on customer and supplier integration. The results in this study indicate the significant role the provision of incentive packages could play in influencing a strong collaboration between suppliers and customers. The focus of rational culture is to maintain a strong external position and due to the strong competition in the food manufacturing industry, it is highly relevant for firms to adopt numerous approaches to improve the firms' current position in the market. Cadden et al. (2020) highlighted that firms with market orientation (rational culture) continually use information from customers and suppliers in establishing good manufacturing strategies. Additionally, maintaining a good competitive advantage in the market requires a strong coordination and sharing of resources, creative ideas and skills with customers and suppliers. The study confirms that encouraging employees with incentive packages is an effective approach for maintaining a strong collaboration within a firm, and with customers and suppliers.

The usage of incentives encourages employees to follow the established integration policies in the firm accounting for an increased SCI. Through this, firms are able to obtain crucial information, skills, resources and ideas needed to improve performance (RBV theory). In the qualitative interviews, the firms indicated a weak influence of rational culture on SCI. This was mainly due to the dominance of SMEs who do not use incentives to influence the behaviour of employees. The number of representations of large-scale manufacturers in the survey could account for the positive relationship between rational culture and SCI.

6.2.3.1 Theoretical Contribution of the Relationship between Rational Culture and Supply Chain Integration

The research postulated and argued for a positive relationship between rational culture and SCI. The argument was supported by the findings of the study. There are diverse findings in extant literature on the actual impact of rational culture on the dimensions of SCI. The results of this research fortify that of Braunscheidel, Suresh, and Boisnier (2010) which found a weaker relationship between rational culture and external integration. Additionally, the results of this study contradict the findings of both Cao, Huo, and Zhao (2015) and Porter (2019) which found a negative impact of rational culture on SCI (both internal and external integration). The findings in this research, therefore, introduce a new perspective into the literature of rational culture and SCI by using the RBV theory to confirm that a culture dominated by rational cultural values encourage employees and organisational members to pursue SCI. This is achieved through building a strong bond inside the firm and extending it to customers and suppliers across the supply chain.

6.2.4 Hierarchical Culture and Supply Chain Integration

In this research, hierarchical culture was postulated to have an impact on SCI. The study found a positive relationship between hierarchical culture and SCI. The results also revealed that hierarchical culture is a strong influencer of internal integration of the food manufacturing firms. The findings in this study contradict research (e.g., Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Porter 2019) which found a negative influence of hierarchical culture on internal integration. The results in this study are therefore unique and introduce a new perspective into the literature of OC and SCI. Hierarchical culture focuses on maintaining a strict internal control using centralisation, maintaining strict order and control. The positive impact suggests that firms encouraging high levels of hierarchical cultural values can achieve strong cross-functional and interdepartmental coordination within the firms which could lead to improved performance highlighting the view of the RVB theory.

This provides an indication that maintaining strict rules, procedures, formality and centralisation in a firm push employees and members in the firms to follow the policies of interdepartmental coordination and collaboration to achieve the stated objectives in the firm. In other words, firms with strong rules and policies on internal collaboration and cross-functional/interdepartmental collaboration through meetings could influence the behaviour of employees to collaborate internally. Maintaining a strict hierarchical culture also provide an avenue for the firms to harness the skills of employees to ensure the achievement of the stated objectives of the organisation.

The study also confirmed a positive relationship between hierarchical culture and external integration (customer and supplier integration). The findings also contradict the results of Braunscheidel, Suresh, and Boisnier (2010), Cao, Huo, and Zhao (2015) and Porter (2019) which all found a negative impact of hierarchical culture on customer and supplier integration. The findings in this research also introduce new findings into extant literature of OC and SCI. In a hierarchical culture intensive firms, employees' behaviours are constantly checked and controlled (Cadden et al. 2020), making such environment very complicated and unfavourable to employees' training and development. However, the high level of strict authority and formality in such type of environment makes it imperative for employees to follow any rules and regulations regarding the collaboration and coordination with customers and suppliers. Since the firms aim at making profit and maintaining a good competitive advantage in the market, obtaining information, resources and working closely with customers and suppliers are key. Therefore, employees are required to follow the strict rules and regulations about working and collaborating with customers and suppliers to ensure firms obtain the stated objectives validating the RBV theory. Since the food manufacturing industry is fast moving and require agile manufacturing capabilities, organisational members especially those in large manufacturing firms are required to follow the laid-down manufacturing procedures and rules to avoid wastage of resources which would have occurred when the employees made decisions regarding manufacturing and production.

6.2.4.1 Theoretical Contribution of the Relationship between Hierarchical Culture and Supply Chain Integration

Using the RBV theory, the research argued for a positive relationship between hierarchical culture and SCI. The findings in this study indicated a strong and positive influence of hierarchical culture on both internal and external integration which contradict the findings of (Braunscheidel, Suresh, and Boisnier 2010; Zu, Robbins, and Fredenhall 2010; Cao, Huo, and Zhao 2015; Porter 2019). Since hierarchical culture is characterised by strict rules and authority, other studies have also found its negative influence on strategies. This is due to the strictness, rigidity and strong authority associated with such kind of culture. The results, therefore, highlight the uniqueness and the new insight introduced by this research regarding the impact of hierarchical culture. The findings contribute immensely to the literature of OC and SCI by confirming that hierarchical culture is highly conducive for achieving a strong internal and external integration.

6.2.4.2 Summary of the theoretical Contribution of the Relationship between Organisational Culture and Supply Chain Integration

This study argued for a positive relationship between OC and SCI. The findings in this current study further contribute to the literature on OC and SCI in different ways. Research (e.g., Naor et al. 2008; Braunscheidel, Suresh, and Boisnier 2010; Zu, Robbins, and Fredenhall 2010; Cao, Huo and Zhao 2015; Porter 2019) have either directly or indirectly studied the relationship between OC and SCI using the dimensions of CVF, nonetheless, there is lack of consensus in their findings. For instance, Zu, Robbins, and Fredenhall (2010) revealed an inverse relationship between developmental culture and SCI while Braunscheidel, Suresh, and Boisnier (2010), Cao, Huo, and Zhao (2015) and Porter (2019) highlighted results to the contrary. This current study contributes and strengthens extant literature by divulging a positive influence of development, group, rational and hierarchical cultures on both internal and external integration of the firms. The findings also confirm the assertion of the RBV theory as the infusion of culture improves the SCI which serves as an enabler for increased competitive advantage, resources and firm performance.

6.3 Supply Chain Integration and Sustainable Supply Chain Performance

The third aim of this research was to assess the relationship between the dimensions of the SCI and SSCP based on the RVT. So far, only Blome, Schoenherr, and Eckstein (2014), Weingarten and Longoni (2015) and Kang et al. (2018) have either partly or fully looked into the relationship between the dimensions of SCI and SSCP. The section begins with the discussion on the results of the impact of internal integration on SSCP, followed by the discussion on the impact of customer and supplier integration on SSCP. The theoretical implications of each of the results are then presented.

6.3.1 Internal Integration and Sustainable Supply Chain Performance

Since internal integration fosters close working coordination between experts in the firms, it was postulated to have a strong influence on SSCP. This study confirmed a positive relationship between internal integration and SSCP. Previous studies (e.g., Blome, Schoenherr, and Eckstein 2014; Weingarten and Longoni 2015; Kang et al. 2018) did not focus on establishing the relationship between internal integration and SSCP. This makes the findings in this study unique and highly significant to the literature on internal integration and SSCP. The findings signify that the food manufacturing firms encouraging; the share of official information internally, the usage inter-departmental and cross-functional teams in new product development, real-time integration and connection among internal departments, the usage of

general information and communication technology in coordinating the affairs in the firm and share of valuable information (sales forecasts, production plans and progress, stock levels) between departments can encourage the implementation and improvement of the environmental, social and economic performance of the firms and their supply chains confirming RVT.

A strong internal coordination implies a progressive and good working relationship between supervisors and employees where sustainability practices and its implications for manufacturing are shared. The cross-functional and inter-departmental meetings used by the firms ensure coordination, sharing of creative ideas and information between members from different areas in the organisation to ensure optimum performance of sustainability. That is, creative and skilled employees from different parts of the firm are able to work collaboratively and share the needed information and expertise. These simultaneously ensure and increase the social performance while at the same time firms obtain accumulated knowledge and ideas about improving environmental performance. Sehnem et al. (2019) indicated that firms with top management support and management with a sustainable orientation/education plays a crucial role in ensuring the firm achieves the required sustainability performance in the supply chains. That is, top management and supervisors with in-depth knowledge and education of sustainability are able to impart the needed sustainability knowledge and skills to employees through internal integration. Internal integration also provides a foundation to establish sustainability teams to collaborate with the supply chain partners.

Another major factor that accounts for the positive impact of internal coordination and collaboration on a sustainability performance of firms is the need to collaborate with customers of the firms. The respondents indicated that since customers make all the important sustainability decisions in the supply chain, there is a need to work effectively with them to obtain the needed sustainability performance in the supply chain. In other words, the sustainability goals and decisions made by customers can only be achieved when a collaborative working relationship is established, therefore, the firms are obliged to work with the teams from customers. This suggests that a strong internal integration in the firms provide a strong foundation for the firms to form a successful and collaborative working relationship with the customers and suppliers. This signifies the significant relationship of internal integration on the supply chain and sustainability performance across the supply chain. The strength of internal integration in coordinating skills, ideas and knowledge in the firms re-affirms the importance of the RVT.

6.3.1.1 Theoretical Contribution of the Relationship between Internal Integration and Sustainable Supply Chain Performance

The research argued for a positive relationship between internal integration and SSCP which was strongly confirmed by the findings. The relationship between the two dimensions have rarely been studied in extant literature. Blome, Schoenherr, and Eckstein (2014), Weingarten and Longoni (2015) and Kang et al. (2018) all downplayed the impact of internal integration on sustainability performance in their study. This research argued that internal integration is pertinent to SSCP of the food manufacturing firms. Moreover, while the listed literature did not focus on the real impact of internal integration on external integration, thus, customer and supplier integration, the results in this study justified the vitality of internal integration as an antecedent for customer and supplier integration. This research introduces a new insight into the literature of SCI and SSCP by utilising the RVT to justify the relevance of internal integration to SSCP and also acts as an enabler to a successful customer and supplier integration.

6.3.2 Customer Integration and Sustainable Supply Chain Performance

This study argued for a strong and positive relationship between customer integration and SSCP which was confirmed by the findings of this research. The results are consistent with the results of Blome, Schoenherr, and Eckstein (2014), Weingarten and Longoni (2014) and Kang et al. (2018) which found a positive impact of customer integration on sustainability performance of firms. This research, therefore, contributes to the literature on customer integration and sustainability performance by empirically confirming a positive impact on sustainability performance in the supply chain of the food manufacturing firms. Firms with a strong customer integration are considered to; consistently share production plans and points of sales information with customers, regularly involve customers in making product and process design decisions, survey customers' needs, use system coupling with customers, consult customers when making pertinent decisions and supply-chain related sustainability decisions. This confirms the RVT by establishing that the sharing of pertinent information among supply chain partners results in improved SSCP.

The positive relationship implies that the firms which are very consistent and greatly implements the customer integration practices are at a strong position to achieve a better sustainability performance in the supply chain. Blome, Schoenherr, and Eckstein (2014) confirmed that the consistent sharing of information, creativity, skills and resources between firms and their customers in the supply chain are highly essential for achieving a higher sustainability performance. Gelhard and Von Delft (2016) also indicated that customer

integration serves as a channel through which firms obtain the direct information to serve customers need. Kang et al. (2018) recognised the criticality of integration to SSCP by indicating that customer integration enables stringent information flow and exchange of information in the supply chain to obtain enough profitability and subsequently respond to the environmental and social needs of the customers. Customers have become very relevant in the achievement of environmental performance by suggesting ideas on green packaging and other environmental enhancing measures in the supply chain (Yu et al. 2014; Han and Huo 2020).

In the food manufacturing industry, since the customers are the main initiators of the sustainability pressure and make all the relevant sustainability-related decisions in the supply chain, the focal firms are obliged to form a strong bond with the customers. The customers, who are the major retailers, have sustainability and development team who work closely with the manufacturing firms. This means, firms obtain the direct information about the needs of the customers in order to generate innovative products that meet customers' needs and wants, which consequently ensures profitability. The teams from customers also meet with the team from the manufacturing firms to share ideas, skills and resources to address the various environmental and social issues and also adopt practices that could help improve the sustainability performance of the supply chain validating the RVT.

Since the customers possess the decision-making power in the supply chain, they suggest the necessary standards and all the environmental and social needs to be implemented. The results from the interviews confirmed that customers perform regular audit checks on the manufacturing firms' compliance with the sustainability policies in the supply chain. The customers also provide regular feedback on the sustainability performance of the supply chain and ensure actions or practices do not at any point in time contradict the stipulated environmental and social practices and standards. However, it should be noted that internal integration acts as a precursor to the strong collaboration with customers. In other words, a firm with a strong internal integration are able to extend such collaboration to customers.

6.3.3 Supplier Integration and Sustainable Supply Chain Performance

Suppliers have also been identified as key partners in the supply chain so far as SSCP is concerned (Kang et al. 2018; Adesenya et al. 2020). It was argued that supplier integration would have a positive influence on SSCP. This research found a strong and positive relationship between supplier integration and SSCP. Research (e.g., Blome, Schoenherr, and Eckstein 2014; Weingarten and Longoni 2015; Kang et al. 2018) all confirmed the crucial role of supplier integration on the sustainability performance of firms. This implies that, an

effective and strong collaboration with suppliers along the chain is very crucial to improving and achieving a higher sustainability performance. Therefore, these findings strengthen extant literature's position on the effect of supplier integration on SSCP. In this study, firms with a stronger supplier integration are considered as; maintaining a close cooperative relationship with suppliers about quality considerations and design changes; consulting suppliers when making sustainability decisions; involving suppliers actively in the product design process; exercising stable procurement through a network with major suppliers; benchmarking best practices/processes and sharing results with suppliers; sharing demand forecasts with major suppliers; establishing quick ordering systems with suppliers and maintaining constant sharing of information with suppliers through information and technology.

Blome, Schoenherr, and Eckstein (2014) and Weingarten et al. (2019) indicated that a strong SCI provides room for the sharing of complementary information and resources for competitive advantage and increased performance in the supply chain. In this current era, higher sustainability and market performance can be enhanced through the constant sharing of tacit knowledge among the supply chain partners (Blome, Schoenherr, and Eckstein 2014; Li et al. 2019). Kang et al. (2018) highlighted that suppliers are currently playing active role in the achievement of advanced levels of sustainability performance through the collaboration of skills, resources and information. In the supply chains of the food manufacturing firms, suppliers collaborate with the manufacturing firms to improve the sustainability performance in each other's firm.

Vachon and Klassen (2008) and Kang et al. (2018) found that environmental activity such as reduction of pollution and other environmental goals are possible due to supplier collaboration. According to Blome, Schoenherr, and Eckstein (2014), collaborative approaches with suppliers provide solid grounds for the implementation of several environmental management strategies such as product stewardship. Suppliers provide the needed raw materials and resources for manufacturing, therefore, using sustainable means to obtain the needed raw materials could be critical to the improvement of the sustainability performance of the supply chain proving the crucial role of suppliers to the sustainability performance of the supply chain. Adesenya et al. (2020) highlighted that suppliers makes the supply chain react proactively to environmental and social issues through the implementation and adaptation of sustainable sourcing standards.

In the supply chain of the food manufacturing firms, even though, customers make the necessary sustainability decisions and puts pressure on the firms to comply with it, the traditional supply chain originates from the upstream customers making them highly relevant

to the SSCP. However, in their supply chain, the suppliers bear the pressure as most of the sustainability requirements are passed onto the suppliers by the manufacturing firms. This means, the suppliers are expected to adopt sustainable measures in obtaining and transporting the raw materials to the manufacturing firms. Moreover, improving sustainability performance across the supply chain is a collective effort of the partners in the supply chain, therefore, the implementation of sustainability practices by the suppliers in the supply chain is critical to the SSCP. Again, the firms and customers (retailers) form a team that provides sustainability solutions in the supply chain, since the suppliers are very crucial to the chain, they all work as a team to share ideas, information, resources and skills to solve all the sustainability issues, thus, the environmental, social and economic issues in the supply chain justifying the assertion of the RVT. Since the supply chains of the food manufacturing firms are mostly global, it requires the close monitoring and coordination of data from the suppliers in determining environmental assessments like LCA and in the design of environmentally friendly products.

The customer pressure and sustainability demands are jointly solved by the manufacturing firms and the customers. They jointly set environmental goals, take reasonable steps to reduce the impact of the supply chain on the society and the employees. An active involvement of suppliers results in quicker response to customers' demands and needs which makes the supply chain agile resulting in increased competitive advantage of the firm and profitability. In effect, a strong collaboration with suppliers is very crucial to the implementation of sustainability practices and achievement of higher sustainability performance in the supply chain.

6.3.3.1 Theoretical Contribution of the Relationship between External Integration (Supplier and Customer integration) and Sustainable Supply Chain Performance

This research argued for a positive relationship between external integration and SSCP which was confirmed by the findings of the study. Blome, Schoenherr, and Eckstein (2014), Weingarten and Longoni (2015) and Kang et al. (2018) all confirmed the significance of customer and supplier integration to sustainability performance. This research strengthens extant literature by also confirming a strong and positive impact of customer and supplier integration on SSCP from the lens of RVT. The results in this research also introduces a new twist into extant literature by establishing a strong link between customer and supplier integration especially in the food manufacturing industry. Customer integration was found as a strong driver for a successful supplier integration and SSCP. This could be due to the relevance of customers in making sustainability decisions in the supply chain of the food manufacturing firms.

6.4 The Mediation Role of Supply Chain Integration

As part of the objectives of this research, the individual and collective indirect effect of SCI was tested on the relationship between OC and SSCP. Though, a plethora of studies have expounded on the impact of SCI on the implementation of supply chain strategies, the mediation role of SCI between the relationship of OC and the achievement of higher SSCP is very rare. In this section, in the order of discussion, the mediation role of individual and collective indirect effects of the dimensions of SCI in the relationship between developmental, group, rational and hierarchical culture and SSCP are discussed. The collective theoretical contribution (s) are then presented.

6.4.1 The Mediation Role of SCI on the Relationship between Developmental Culture and Sustainable Supply Chain Performance

In this study, internal integration was considered to mediate the relationship between developmental culture and SSCP. The flexibility, creativity, resource expansion and positivity associated with the culture are expected to create internal collaboration to enable the attainment of higher SSCP (Linnenluecke and Griffiths 2010). The results of this research indicate that in the presence of internal integration, the firms practicing developmental culture experienced a higher SSCP. This means the presence of development culture creates a course of action for firms to obtain the needed information, knowledge and skills from creative employees in the organisation leading to a higher environmental, social and economic performance. As indicated earlier, the flexibility and outward orientation of the cultural values encourage, train and educate employees thereby leading to higher social performance, and the collaborative sharing of creativity and skills among the employees create a sense of integration and enable firms obtain first-hand information and ideas for managing the environmental demands and increasing profitability. In other words, internal integration promotes developmental culture through the constant sharing of ideas and tacit knowledge and such actions eventually lead to an increased SSCP.

Customer and supplier integrations were also expected to mediate the relationship between developmental culture and SSCP. The results revealed the mediating role customer and supplier integration on the relationship between developmental culture and SSCP. Developmental culture has already been found as a key enabler for customer and supplier integration (Cao, Huo, and Zhao 2015; Porter 2019). The values present in the culture motivate and ensure employees in the firms are positioned to share their ideas with customers and suppliers. Customers constitute the important partners in the supply chain so far as making and pushing of sustainability decision is concerned, therefore, firms are required to collaborate

with the customers in the manufacturing of products and comply with sustainability standards. Even though, developmental culture can enable a higher SSCP, the values present in the culture create an atmosphere for firms in the supply chain to collaborate the ideas and skills with that of customers to improve SSCP.

This suggests that the values of developmental culture practiced in a firm create a room for a team of customers, suppliers and the firms to freely share ideas, skills and knowledge for managing for implementation of the environmental and social practices. Firms and suppliers can quickly react to the changing needs and demands of customers, resulting in an increased economic performance. In a nutshell, developmental culture is highly good for SSCP, however, it also requires the collaboration of the skills, ideas, information and knowledge from customers and suppliers to achieve a higher SSCP, signifying the mediation role external integration plays on the relationship between developmental culture and SSCP. Kang et al. (2018) found the relevance of suppliers in pushing firms to obtain a higher SSCP. The results indicate that SCI individually and collectively mediate the relationship between developmental culture and SSCP.

6.4.2 The Mediation Role of SCI on the Relationship between Group Culture and Sustainable Supply Chain Performance

The study further asserted a mediation effect of SCI on the relationship between group culture and SSCP. The results confirmed the mediation effect of SCI on the relationship between group culture and SSCP. Among the dimensions of culture, group culture was found to possess a higher impact on SSCP. However, the mediation role of SCI suggests that SSCP can be increased further when SCI is effective in a group culture dominant environment. With regards to the role of internal integration, the values of group culture predominantly and spontaneously generate a sense of teamwork inside a particular organisation. Therefore, sustainability standards and practices are enhanced through the collaboration inside the organisation. The internal integration ensures members across functions and departments meet to coordinate skills, ideas and creative knowledge (Han and Huo 2020) towards the achievement of a higher SSCP. This means the values present in a group culture enables a strong internal integration which results in the achievement of higher SSCP of the firms. In such an environment, the engagement of employees in the day-to-day decisions and activities and the consistent training on sustainable production, manufacturing and other sustainable practices in the firm result in employee satisfaction and ensure employees work towards the attainment of the environmental and social standards in the firm (Wijethilake, Upadhaya, and Lama 2021).

Due to the crucial role of customers and suppliers, customer and supplier integrations were expected to mediate the relationship between group culture and SSCP. The results confirmed that customer and supplier integration individually mediate the relationship between group culture and SSCP. Group culture enables employees to develop teamwork spirit and ensure they form a working relationship with the customers. Since customers in the chain propose the sustainability practices and standards to be implemented, forming a working relationship with them creates a channel for coordination of ideas, information and relevant knowledge needed for the implementation and achievement of the desired SSCP. The customers are the originators of the sustainability decisions and proposes the practices to be implemented, therefore, it is assumed they possess the relevant knowledge and ideas such as green packaging and environmental needs of the other stakeholders required to achieve the sustainability performance. This makes it highly necessary for the focal firms to forge a close working relationship with the customers across the chain. Therefore, even though, the flexibility and teamwork associated with the group culture is an enabler of SSCP, the results suggest that forging a close working relationship with the customers is also great channel for achieving even a higher SSCP.

The mediation effect of supplier integration reveals the crucial role suppliers could play in elevating the performance of sustainability in the supply chain. As indicated, suppliers in the chain are responsible for the supply of sustainable materials and are highly required to adopt sustainable practices on the verge of supplying the materials to the manufacturing firms. The focal manufacturing firms and suppliers must work together to ensure suppliers employ sustainable means in the extraction and transportation of raw materials and compliance to sustainability standards. This makes the supply chain highly responsive to the sustainability demands of relevant stakeholders. Measuring sustainability across the supply chain would require the inputs and data of suppliers. Kang et al. (2018) highlighted that since sustainability performance must be achieved across the chain, it is important for firms to work with their suppliers.

Therefore, a strong collaboration is needed between the firms and suppliers to ensure the sustainability demands and practices from the customers are effectively communicated to the suppliers. Similarly, customers and the manufacturing firms alone cannot achieve the required sustainability performance, therefore, a strong involvement of suppliers is key to acquiring the required information, skills, knowledge, resources, creativity and the relevant ideas to obtain the needed the SSCP. This is a strong indication that, even though, group culture provides the needed values necessary for SSCP, it provides a good basis for strong collaboration internally and externally in order to achieve a higher SSCP. Additionally, the

results prove that SCI individually and collectively mediate the relationship between group culture and SSCP.

6.4.3 The Mediation Role of SCI on the Relationship between Rational Culture and Sustainable Supply Chain Performance

The dimensions of SCI were projected to individually or collectively mediate the relationship between rational culture and SSCP. The results confirmed a full mediating effect of SCI on the relationship between rational culture and SSCP although the effect of rational culture on SSCP was weak and unsupported. The individual dimensions of SCI were also found to possess a full indirect effect on the relationship between rational culture and SSCP. In this research, rational culture characterised by the usage of incentives and rewards had a strong impact on the internal integration of firms, which means, influencing employees' productivity through rewards and incentives encouraged them to work together, thereby, strengthening the internal integration in such culture (Cao, Huo, and Zhao 2015). The full mediation role of internal integration highly suggests that, even though, rational culture does not help in the attainment of the desired SSCP, when employees are encouraged to work collaboratively, SSCP is likely to be increased. In other words, pursuing rational culture does not trigger the achievement of higher SSCP unless organisational members are encouraged to work collaboratively towards achieving unified sustainability objectives.

In light of the above, it could be inferred that due to the ineffectiveness of rational culture in directly improving the SSCP of the firms, a strong customer and supplier integration is needed for achieving a higher SSCP. The provision of incentives and rewards in such kind of culture only encourages the employees to pursue the stated objectives of the firms, the mediation effect of customer integration implies firms ensure a strong collaboration within the internal walls of the firms and such gesture extended to the customers. As indicated earlier, since customers make and push the sustainability decisions in the supply chain, it is highly essential they are involved in decisions and activities focused on increasing the SSCP. The ideas, suggestions, knowledge and skills of customers are needed to achieve a higher SSCP (Blome, Schoenherr, and Eckstein 2014; Wijethilake, Upadhaya, and Lama 2021).

Suppliers, also play a major role in the achievement of the required SSCP, suggesting that, encouraging incentives and rewards alone does not promote increased SSCP in the food manufacturing industry. In such an environment, encouraging collaboration with suppliers could result in an increased SSCP of the firms. The results indicate that rational culture alone is not conducive for achieving a higher SSCP, integrating internally and with customers and suppliers are highly needed for a higher SSCP in a culture dominated by rational values. The

results indicate that SCI also individually and collectively fully mediate the relationship between rational culture and SSCP.

6.4.4 The Mediation Role of SCI on the Relationship between Hierarchical Culture and Sustainable Supply Chain Performance

The research argued that dimensions of SCI individually and collectively play a mediation role in the relationship between hierarchical culture and SSCP. The results revealed a positive and strong mediation effect of SCI on the hierarchical culture and SSCP relationship. Regardless of this, the results confirm that, though, hierarchical culture could influence SSCP, a strong internal, customer and supplier integration is also needed to increase the SSCP. Hierarchical culture encourages employees to follow the laid-down rules and regulations and further encourage a decentralised system of making decisions in a firm (Cameron and Quinn 2011; Cao, Huo, and Zhao 2015). The results confirm that hierarchical culture intensive firms could intensify the improvement of sustainability performance when internal integration is highly encouraged in the firms. A firm inclined on hierarchical culture need to maintain strict rules about departmental collaboration and intra-functional meetings and integration to improve social, environmental and economic performance in the supply chain. Even though, hierarchical culture is conducive for SSCP, internal integration enables the accumulation of skills, valuable information and knowledge to further improve SSCP.

The mediation impact of SCI indicates that in a hierarchical culture dominated organisational environment, the sustainability performance can be improved when firms encourage the sharing of ideas, information and resources from the customers. Meaning, when strict rules about customer integration is maintained in an organisation, it provides an avenue for the food manufacturing firms to obtain the ideas, knowledge, information and resources from customers resulting in an increased social, environmental and economic performance of the firms. Yu et al. (2014) and Wijethilake, Upadhaya, and Lama (2021) highlighted that customers provide valuable information such as green packaging, environmental assessments and jointly engage in environmental planning. This signifies that maintaining strict rules about customer integration enables the accumulation of information relevant for improving social, environmental and economic performance. Sustainability has eventually become a requirement, therefore, maintaining a strict working environment still requires firms to adopt factors such as customer integration that could help in improving the SSCP. Suppliers have also been found to play a significant role in the supply chain of the food manufacturing firms. Therefore, the mediating effect of supplier integration suggests that firms with a strong hierarchical culture still need a strong working relationship with their suppliers to achieve an

improved SSCP. Impliedly, hierarchical culture intensive firms could achieve a higher SSCP when employees are encouraged to maintain and follow the strict rules about supplier collaboration.

The results show that in a hierarchical culture intensive firms, maintaining strict rules about internal, customer and supplier integration and at the same time encouraging employees to follow them enable a higher SSCP. In other words, the dimensions of SCI individually and collectively mediate the relationship between hierarchical culture and SSCP. This study has established the individual and the collective mediation role of SCI on the relationship between OC and SSCP. Strong and sustainability supportive culture such as group, development and hierarchical culture still need internal, customer and supplier integration to attain a higher SSCP.

6.4.5 Theoretical Contributions of the Mediation Role of Supply Chain Integration on the Relationship between Organisational culture and Sustainable Supply Chain Performance

The research argues that SCI is likely to mediate the relationship between the dimensions of OC and SSCP in the food manufacturing firms and their supply chains. The findings suggest the crucial role of SCI in linking OC to SSCP contributing to the literature on OC, SCI and SSCP. First, the mediation role of SCI in OC and SSCP relationship has rarely been studied regardless of extant literature's position on the crucial role of SCI in the implementation of many supply chain strategies. Braunscheidel, Suresh, and Boisnier (2010) found the mediation effect of SCI on the relationship between OC and delivery performance. Jajja, Chatha, and Farooq (2018) found SCI acting as a mediator between supply chain risk and agility. Kumar et al. (2020) also analysed the mediation role of SCI on learning orientation and innovation performance. Evidently, research assessing the mediation role of SCI on the relationship between OC and SSCP is not forthcoming. This makes this research highly essential to the literature of OC and SSCP, by revealing the mediating effect of SCI.

Second, the findings of this research also contribute to literature on CVF and SSCP by revealing the mediation role of the individual and collective dimensions of SCI on the relationship between the OC and SSCP. The research confirmed a partial mediation of SCI on the relationship between developmental, group and hierarchical culture and SSCP but a full mediation effect of SCI on the relationship between rational culture and SSCP. Also, as confirmed from the interview, the dimensions of OC enable firms to form a strong integration internally which enhances the firms' ability to form a strong bond with customers and suppliers

and through this share the relevant resources, ideas, knowledge and information to improve the environmental, economic and social performance of the supply chain. The findings, therefore, makes very significant contribution to the literature of OC, SCI, SSCP by confirming that OC does not guarantee a higher SSCP, strong levels of SCI is needed to intensify and achieve higher levels of SSCP. Similarly, the findings of this research confirms that internal integration is highly necessary for both external integration and SSCP.

Table 6.1 Summary of the Findings and Their Respective Theoretical Contributions

Research Questions	Empirical Findings	Theoretical Contributions
1. **To what extent do the dimensions of OC influence SSCP?**	DC --> SSCP (+, supported) GC --> SSCP (+, supported) RC --> SSCP (+, unsupported) HC --> SSCP (+, supported)	Based on the institutional theory. • Only three types of OC can help increase SSCP empirically confirming the theoretical suggestion of Linnenluecke and Griffiths (2010) and both institutional and Resource based View theories. • Rational culture is not conducive for SSCP contradicting the prediction of Linnenluecke and Griffiths (2010).
2. **To what extent do the dimensions of OC influence SCI?**	DC --> II, CI, SI (+, supported) GC --> II, CI, SI (+, supported) RC --> II, CI, SI (+, supported) HC --> II, CI, SI (+, supported)	Based on the RBV theory. • Developmental and group culture greatly influences SCI • Rational and Hierarchical culture also increases SCI contradicting findings in extant literature.
3. **To what extent does SCI influence SSCP?**	II --> SSCP (+, supported) CI --> SSCP (+, supported) SI --> SSCP (+, supported)	Based on the relational view theory. • Internal integration was found to have a stronger relationship with SSCP • Customer and supplier integration has a stronger influence on SSCP.
4. **Does SCI mediate the relationship between OC and SSCP?**	DC-->SCI-->SSCP GC-->SCI-->SSCP RC-->SCI-->SSCP HC-->SCI-->SSCP	• The dimensions of SCI individually and collectively mediate the relationship between the dimensions of OC and SSCP from the perspective of the CVF.

CI-customer integration; II-internal integration; SI-supplier integration; SSCP=Sustainable Supply Chain Performance; DC-developmental culture; GC-group culture; HC-hierarchical culture; RC-rational culture. OC-Organisational Culture; SCI-Supply Chain Integration; Positive (+).

6.5 Practical Implications

The study provides enough implications and suggestions for current supply chain managers or sustainability managers regarding the various ways through which sustainability performance can be enhanced. This section provides information on the implications on the type(s) of cultural values, SCI and the various sustainability practices that could be adopted to enhance SSCP. The practical implications of the findings on the relationship between OC, SCI and SSCP and the mediation role of SCI on the relationship between OC and SSCP for policymakers, decision makers and sustainability managers are also presented.

6.5.1 Organisational Values

In terms of OC, it is highly required of managers to adopt integrated competing values, which are developmental, group and hierarchical culture. Developmental and group culture emphasises on ensuring flexibility at the workplace and also encouraging employees to achieve the stated objectives in the organisation. In terms of developmental culture, managers should encourage employees to take part in the active development of new products, maintain and develop employees' entrepreneurial skills, encourage risk-taking, train and develop employees to be innovative and creative, insistent on the acquisition of resources and growth and should always pursue long-term range of objectives and adopt programs that enhances manufacturing capabilities. Additionally, top managers should encourage continuous improvement, quality and safety, recognition, career development, employee sensitisation, excellence, key performance indicators and openness. Regarding group culture, managers should make use of teamwork in outcompeting other businesses and promote honesty, integrity, trust, employee engagement while at the same time maintaining high levels of group support. Hierarchical culture also helps in achieving the stated supply chain objectives and based on this, even though, this culture is characterised by rigidity and increased controlled levels in organisation. Managers could achieve and implement supply chain strategies through establishing formal structures, maintaining a controlled and structured procedures at the workplace and making sure lower-level employees comply with supply chain and sustainability policies, decisions and practices.

6.5.2 Implications of Supply Chain Integration

Management should encourage high levels of internal, customer and supplier integration in the organisation and in the supply chain. SCI has been considered as the contemporary strategy for maximum supply chain performance (Munir et al. 2019). In achieving stronger levels of internal integration, effective usage of communication systems, teamwork and regular meetings should be encouraged. Communication systems like communique, staff news,

business opportunity news and other communication bulletins should be used within the organisation. In developing new products, innovative and creative ideas, managers should strongly make use of effective forms of teamwork. Rampersad (2020) argued that effective communication and teamwork are factors that could drive innovative activities in this era of sustainability. Additionally, managers in the small-scale manufacturing firms should encourage frequent briefings, supervisor-employee meetings and inter-departmental meetings on the verge of achieving strong levels of internal integration. These are cost-effective and easy to adopt.

Customers and suppliers play a crucial role in the supply chain; therefore, their needs must be met, and strong levels of integration must be encouraged. In pursuing customer and supplier integration in the supply chain, managers should encourage and practice effective communication and information sharing both within the firm and across the supply chain. On the verge of ensuring effective levels of communication with customers, both large- and small-scale food manufacturing firms could use business portals, electronic data interchanges, telephone conversations, regular meetings and other sophisticated communication systems and databases. Both customers and suppliers should be involved in the enactment of production strategies, collaborative management, NPD, co-creation of business ideas, pricing decisions, joint audit programs, sustainability measurement and collaborative sustainability projects.

6.5.3 Implications of the Impact of the Cultural Dimensions on Sustainable Supply Chain Performance

The findings in this research suggests that managers should adopt integrated competing values comprising developmental, group, hierarchical culture to drive high levels of SSCP. Flexible culture has been found as highly effective for implementing and achieving higher levels of sustainability performance (Linnenluecke and Griffiths 2010; Wijethilake, Upadhaya, and Lama 2021). The findings confirmed group culture, characterised by higher levels of teamwork was found to exert high level of sustainability performance. This suggests that managers should encourage effective usage of teamwork. This is highly recommended if firms aim at maintaining and achieving higher levels of SSCP. In a group cultural environment, employees can work effectively, share ideas, skills and knowledge needed to preserve the environment, enhance society and increase profitability. Wijethilake, Upadhaya, and Lama (2021) found that group culture instils leadership, empowerment and sense of organisational learning in an organisation. It also creates a foundation for firms to establish teams for a successful integration in the supply chain. Another form of flexible culture in which managers

should be keen on is developmental culture which encourages employees to be creative, consistently trains and develops employees and has long-term orientation element (Cao, Huo, and Zhao 2015).

Creative, skilled and highly trained employees in sustainability can enact creative ideas and suggest innovative solutions for the achievement of higher environmental, social and economic performance. Additionally, top management can maintain strict sustainability control levels and ensure employees compulsorily follow the stipulated guidelines for attaining the sustainable manufacturing objectives and sustainable standards which could trigger the attainment of higher sustainability performance levels across the supply chain. In other words, managers should encourage training and developing employees on sustainability issues and practices, promote organisational learning in sustainability and ensure there is coordination of skills and knowledge within the firm for smooth implementation, measurement and achievement of higher SSCP. Moreover, top managers and especially supervisors must ensure employees maintain and work according to the sustainability procedures established in the firms to enhance the SSCP.

6.5.5 Implications of the Impact of Supply Chain Integration on Sustainable Supply Chain Performance

The strong and positive impact on internal and external integration on the SSCP provides an insight for managers, policymakers and decision-makers to focus on achieving higher levels of SCI. The strong influence of internal integration suggests that the collaboration and inter-departmental coordination is effective for improving sustainability performance as the members from different parts of the firm and the supply chain share creative and insightful ideas for improving the various dimensions of SSCP (Kang et al. 2018). As Sehnem et al. (2019) suggested, top managers with high levels of sustainability education can aid their firms to easily ingrain sustainability practices into their operations for the purpose of achieving higher levels of SSCP. This means, managers must encourage collective organisational learning to change the general employee attitude towards sustainability. In pursuing this, internal integration must be prioritised as it creates a formidable foundation for the food manufacturing firms to form a strong integration with the customers and suppliers across the supply chain (Han and Huo 2020). Internal integration enables the formation a strong sustainable team to meet regularly with customers and suppliers to share relevant information for sustainability performance enhancement.

Customers are regarded as very important in the supply chain especially the food manufacturing supply chains, therefore, managers should strive to forge a close working

relationship with the customers. Since customers initiate the sustainability pressure and dictate the sustainability needs, it is highly recommended for the managers to work collaboratively through the sharing of relevant information, ideas, knowledge and skills to achieve higher sustainability performance. Suppliers also constitute important partners across the supply chain; therefore, on the verge of implementing and achieving higher SSCP, it is highly imperative for managers to work closely with suppliers. Adesanya et al. (2020) opined that suppliers' activities are mostly detrimental to the supply chain. Therefore, an integrative effort with the members of the focal firm would ensure suppliers employ sustainable means in sourcing and transporting raw materials, conforming to the sustainable standards and collaboratively designing sustainable products. Managers, decision-makers and policymakers should encourage the focal food manufacturing firms and employees to provide all the necessary support to enhance the sustainability performance of their suppliers as sustainability performance is now measured across the supply chain and unsustainable activities of suppliers negatively impacts the SSCP of the firms.

6.5.4 Implications of the Impact of Organisational Culture and Supply Chain Integration

Since SCI has already been suggested as an appropriate approach for the implementation of strategies (Porter 2019), it is equally effective for the application and achievement of higher levels of SSCP. In achieving higher levels of integration both within the firm and in the supply chain, managers or decision makers, should encourage the implementation of both flexible and internal control cultural values. Group and developmental culture create an avenue for teamwork, training and education of employees and sharing of creative ideas between skilled and creative employees from different functions in the organisation which practically enhance internal integration. Working together as a team enable expertise from other parts of the firm to meet and share relevant ideas and information thereby promoting internal integration (Cao, Huo, and Zhao 2015; Porter 2019). Similarly, since developmental cultural values aims at expanding the resource base in the environment, managers should give maximum attention to this culture as it creates an opportunity for firms to establish a strong customer and supplier integration. Promoting teamwork culture in the firms also generates and provides the sets the foundation for members in the firm to form a successful collaboration with the customers and suppliers in the supply chain.

Managers and decision-makers should also encourage the use of internal control culture, thus, rational and hierarchical culture in pursuing internal and external integration. Rational culture makes use of incentives to motivate employees to achieve stated objectives (Cao, Huo,

and Zhao 2015). Impliedly, instituting incentives and internal integration measures motivate workers to pursue and achieve the internal integration practices. Workers are likely to achieve any stated objectives in the firm when they are motivated. In the same vein, motivating employees through incentives could be a source of encouragement for them to adopt measures which helps in forging and strengthening working relationship with customers and suppliers. Hierarchical culture characterised by strict rules was also found to influence customer and supplier integration. This implies that, managers can easily implement strategies more efficiently when strict controls and rigidity are enacted in the firms. Establishing strict rules and regulations on integration would sensitise employees towards ensuring that a strong bond is formed with customers and suppliers. In a nutshell, top managers in the food manufacturing firms can adopt the competing values available in both flexible and internal control (rational and hierarchical cultures) due to their suitability for achieving strong levels of internal, customer and supplier integration.

6.5.6 Implications of the Mediation Role of Supply Chain Integration

Even though, it has been suggested that sustainable supportive culture such as development, group and hierarchical cultures are very significant for SSCP, stronger levels of internal, customer and supplier integration are still needed to achieve better and higher levels of SSCP. In other words, development, group and hierarchical culture can stimulate SSCP, however, instituting those cultures along with stronger levels of internal and external integration can escalate the SSCP of the food manufacturing firms. Ensuring the attainment of SSCP require the implementation of integrated competing values (developmental, group and hierarchical cultures), however, a strong collaboration within the internal boundaries, and with customers and suppliers are needed to achieve higher levels of SSCP. These cultures contain values that enable an easy forging of integration both internally and externally, thereby, triggering the attainment of higher levels of SSCP.

Summary of the Chapter

This chapter combined the results from both the qualitative and quantitative methods to discuss the relationships between OC, SCI and SSCP. The discussions were made in line with the research questions of the study. With regards to the impact of OC on SSCP, only three cultures, namely, group, developmental and hierarchical were found to have a positive impact on SSCP. Out of the three cultures, group culture was found to possess the highest impact. Regarding the impact of OC on SCI, all the four dimensions of OC had a positive impact on SCI while all the dimensions of SCI were also found to possess a positive impact on SSCP. All the dimensions of OC required higher levels of SCI to achieve higher SSCP. The

theoretical contributions and the implications for managers, policy makers and decision-makers were also identified and discussed. The next chapter provides a general summary of all the chapters, identifies the limitations and through this suggests the possible areas of research for future studies.

CHAPTER SEVEN: CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

Introduction

This section provides a conclusion on the various chapters of the study. The chapter begins with the summary of the research and the findings obtained. The theoretical and managerial implications of the findings are also presented. Finally, the chapter concludes on the limitations of the study and further provides directions for future studies.

7.1 Summary

Due to the difficulties associated with the achievement of SSCP, supply chain researchers have been urged to identify various factors that could enable the implementation of sustainability practices into their supply chain. With sustainability becoming a requirement for manufacturing firms, studies such as (Pagell and Wu 2009; 2017) have suggested that the inability of most manufacturing firms to implement and eventually achieve a higher sustainability performance is due to the failure to assess the factors affecting the SSCP. Adopting a suitable culture or sustainability-supportive and maintaining high levels of SCI have been identified as factors that could help in the implementation of sustainability practices and the subsequent achievement of higher sustainability performance (Miska, Szocs, and Schiffinger 2018; Kucharska and Kowalzyk 2019). Yet empirical research assessing the impact of these factors on SSCP is not forthcoming. In this study, it was argued that OC and SCI would have a positive impact on SSCP, and that SCI mediates the relationship between OC and SSCP of food manufacturing firms in the UK and Greece.

Even though, many frameworks have been identified and used by researchers in assessing OC, the flexibility-control dichotomy of the CVF was used in operationalising OC. The CVF was selected due to its ability to identify supply chain strategy supportive values and enable easy comparison of values (Dubey et al. 2019). In terms of the impact of OC on SSCP, only Linnenluecke and Griffiths (2010) has theoretically examined the direct impact of OC on SSCP using the dimensions of the CVF. This study, therefore, takes their research further by empirically testing the influence of OC on SSCP and argued that the dimensions of the CVF would have a positive impact on SSCP. Wijethilake, Upadhaya, and Lama (2021) have also assessed the impact of OC on the implementation of sustainability practices and concluded

that all the dimensions of the CVF are suitable for shifting the behaviour of organisational members towards the implementation of sustainability practices. This study differs by directing assessing the link between OC and SSCP using the CVF. Additionally, due to the dissension and lack of consensus on the findings of extant studies (e.g., Braunscheidel, Suresh, and Boisnier 2010; Cao, Huo, and Zhao 2015; Porter 2019) on the impact of OC on SCI, the study sought to explore the impact of OC and SCI and argued that the dimensions of OC would have a positive impact on SCI.

Moreover, Blome, Schoenherr, and Eckstein (2014), Weingarten and Longoni (2015) and Kang et al. (2018) did not comprehensively test all the dimensions of SCI on sustainability performance. This study also sought to examine the impact of SCI on SSCP, and therefore, argued that all the dimensions of SCI would have a positive impact on SSCP. Lastly, with the inadequacy of research on the mediation role of SCI within the context of sustainability performance, this study sought to assess whether the individual and the collective dimensions of SCI would have a mediating effect on SSCP. Specifically, the study sought to assess whether a strong SCI is needed even after adopting a sustainability-supportive culture. Based on the objectives and gaps identified, the study sought to answer the four main questions; (1) to what extent does OC influence SSCP (2) to what extent does OC influence SCI (3) to what extent does SCI influence SSCP (4) does SCI mediate the relationship between OC and SSCP. Due to the significance of OC, it was argued that the OC and SCI would have a positive impact on SSCP, and the dimensions of SCI were also argued to mediate the relationship between OC and SSCP in the food manufacturing supply chains.

In terms of the philosophical assumptions, critical realism employing the individual assumptions of the interpretivists and the positivists were employed. Epistemologically, both qualitative (interviews) and quantitative (survey) methods were used in conducting the study. Even though, the constructs for assessing the various dimensions of the CVF have been rigorously developed in extant literature, the presence of sub-cultures (Braunscheidel, Suresh, and Boisnier 2010) has made it inherently difficult to study OC in firms, therefore, it was worthwhile to seek the direct opinions, perspectives and views of managers in firms (Miles, Huberman, and Saldana 2014) through interviews. Furthermore, as part of the objectives, the study aimed at obtaining the direct opinions, views and perceptions of managers (Miles, Huberman, and Saldana 2014; Silverman 2014) on the impact of OC on SCI and SSCP. The information from the interview was also used in improving and updating the constructs for developing the questionnaire for the study as this study intends to develop industry-specific constructs. The lists of firms in the UK and Greece were obtained from the FAME database and personal contacts respectively. Using stratified sampling method, 1535 firms were selected

and out of which thirty-five (35) firms were randomly selected for the interview. The selected firms were initially contacted to obtain the contact number or address of the top managers as they are perceived to be highly knowledgeable of the OC, SCI and sustainability practices in their respective firms. Only eleven interviews were conducted with top managers from the food manufacturing industry in the UK, manual coding was employed, and the analyses were performed based on the suggestions of (Miles, Huberman, and Saldana 2014; Yin 2014).

The results from the interview confirmed the powerful force of customers in enforcing the sustainability decisions in the food manufacturing firms and the supply chains. The findings revealed the impact of only three types of culture: developmental, group and hierarchical culture. Due to values such as creativity, training and development of employees, education, risk-taking and the innovativeness inherent in developmental culture, it was found to have an influence in improving the environmental, social and economic performance of the firms. Firms obtain the knowledge and skills of creative, skilled, innovative and educated employees in enhancing the sustainability performance of the firms, thereby, confirming the assertion of the positive influence of developmental culture on sustainability performance postulated in the study. Group culture characterised by teamwork was also found to greatly influence the sustainability performance of the firms, thereby, confirming the assertion that group culture has a positive impact on SSCP (Linnenluecke and Griffiths 2010). Group culture instils the spirit of synergy within and enables firms to form sustainability teams. Hierarchical culture also characterised by strict authority and high levels of control was also found to influence SSCP. However, rational culture which uses rewards and incentives had no influence on SSCP of the firms. All the results except that of the influence of rational culture on SSCP were confirmed by the findings from the interview.

Among the cultural elements, group culture had a great influence on the internal integration as it allows inter-departmental coordination of skilled human resource to improve SSCP. Since the customers have sustainability teams, group culture provides an avenue for the firms to form a team that meet regularly with the team from the customers and suppliers to share knowledge, skills and ideas about improving the sustainability performance. In effect, the internal integration helps in improving the SSCP and at the same time acts a precursor for forming a strong collaboration with customers and suppliers. The sustainability team comprising the firms, customers and suppliers share knowledge, skills and creativity and information in improving and achieving a higher SSCP. This also confirms the strong influence of the developmental, hierarchical and group culture on SSCP, internal, customer and supplier integration. The results also confirmed the strong influence of internal, customer and supplier integration on SSCP of the firms. The interview also revealed the various OC

values, SCI and sustainability practices and the factors affecting the sustainability and SCI decisions of the firms interviewed. The original CVF framework was improved to include the various developmental, group, rational and hierarchical values found and practiced in the firms used in the interviews. A new framework linking the competing values, SCI and SSCP was therefore developed for managers and future studies.

A questionnaire with four different sections each containing constructs on the various dimensions of SSCP, OC, SCI and questions assessing the profile information was developed. Based on this, a questionnaire each for the respondents in the UK and Greece was developed on Qualtrics and the various respondents were invited to respond. After a period of 6 months, 315 responses were received, PLS-SEM was applied in analysing the data and the various relationships between the variables together with the differing significant levels were computed and obtained. Like the findings from the interview, three OC dimensions namely, developmental, group and hierarchical cultures had a positive and significant relationship with the various dimensions of SSCP whereas rational culture had a positive albeit an unsupported relationship with SSCP. This implies that, all the hypotheses in H1, thus H1a-H1d, except H1c were supported. In terms of OC and SCI, the results confirmed a positive, strong and significant relationship between all the dimensions of OC and both internal and external integration confirming hypothesis H2 (H2a-H2c). Similarly, the research confirmed a positive relationship between SCI (internal, customer and supplier integration) and the dimensions of SSCP, confirming all the hypotheses in H3. Lastly, the dimensions of SCI individually and collectively mediated the relationship between all the dimensions of OC and SSCP, confirming hypothesis 4 and its sub-hypotheses.

The findings of this study further confirmed the various theoretical lenses (RBV, relational view and institutional theories) employed to examine the possible relationship between the variables. The institutional theory states that social structures either within or outside a firm exert a pressure on the firm for the adoption of strategies with the prime motive of gaining legitimacy, profitability and survival in the society (Scott 2008; Iarossi et al. 2013; Miska, Szocs, and Schiffinger 2018). The institutional theory could account for the adoption of the sustainability-supportive culture in the food manufacturing industry and therefore, confirms the positive relationship between the dimensions of culture and SSCP. Employing the theory, it could be concluded that by adopting the developmental, group and hierarchical cultures, firms are likely to introduce, implement and achieve higher sustainability performance in the supply chain. The RVT stresses the importance of sharing of information, coordination of efforts and joint decision-making in a network or dyads to achieve competitive advantage (Dyer et al. 2018). The theory can be linked to the positive relationship between

the dimensions of SCI and SSCP. Applying the theory, the consistent sharing of information, tacit knowledge, skills, creativity between the firms, customers and suppliers resulted in the achievement of higher sustainability performance. In other words, according to the RVT, relating the information, views, knowledge across a supply chain (internal and external integration) is viable for the achievement of higher SSCP.

Additionally, the RBV theory was applicable in examining the relationships between OC and SCI. Wernerfelt (1984) claims that the possession of heterogeneous resources could create an enabling environment for firms to maintain and increase their competitive advantage. Since current competition is based on supply chains, adopting a culture that enable the training of employees and access to large pool of resources, knowledge, information and skills could increase firm performance. Adopting cultures such as developmental and group cultures empower firms to train, educate and develop employees, maintain creativity and innovativeness, obtain knowledge from experts inside the organisation and serves as a precursor for forging a strong integration with external partners. These lead to the creation and attainment of valuable and inimitable human and non-human resources in the firm for the achievement of strong SCI and SSCP. The positive relationship between developmental and group culture and SCI, therefore, confirms the assertion of the RBV theory. Pagell and Wu (2017) highlighted that creativity and innovativeness as benefits associated with the implementation of sustainability practices. Implementing sustainability practices through a sustainability-supportive culture in the firm and across the supply chain enable the production and development of innovative products and services. The inclusion of sustainability practices generates value in the organisation which eventually leads to increased SSCP and the overall organisational performance as confirmed by the RBV theory.

Based on the findings, it can be concluded that integrated competing values comprising three types of cultural dimensions; developmental, group and hierarchical cultural values are relevant for enhancing SSCP levels in a firm. Developmental and group culture create an atmosphere for collaboration and coordination of skills, information and knowledge for developing and improving the environmental, social and economic performance of the firms and their supply chains. Hierarchical culture enables the employees and the members of the supply chain to follow and adhere to the accepted sustainability practices which eventually lead to increased SSCP. Group and developmental culture also generate a sense of working and interpersonal relationship among employees creating a strong internal integration. The internal integration leads to sharing of creative ideas and knowledge for an increased SSCP. This also enables firms to create a team of experts to regularly meet with customers and suppliers to also share expertise, tacit knowledge and ideas for a better SSCP. These highlight

the impact of OC on internal and external integration and further indicate how integration with customers and suppliers helps in increasing the SSCP. The results also show the role internal integration plays in fusing a strong customer and supplier integration. Customer and supplier integration provide access to essential ideas and information for sustainability management, green packaging, LCA and inter-firm sustainability implementation projects.

7.2 Theoretical Contributions

The findings in this study introduce new insights and contribute immensely to the literature of OC (CVF), SCI and SSCP from the perspective of institutional, RBV theory and RVT. First, this study empirically tested the impact of all the dimensions of OC on SSCP using the CVF, and contrary to the predictions of Linnenluecke and Griffiths (2010), this research confirmed a positive impact of only developmental, group and hierarchical culture on SSCP. The findings in this study constitute one of the few research which confirmed integrated competing values (developmental, group, rational) are suitable for achieving higher levels of SSCP.

Second, this study argued and found a positive relationship between OC and SCI. The findings contradict the results of Zu, Robbins, and Fredenhall (2010) which found a negative relationship between developmental culture and SCI. Whereas this research found a strong and positive relationship between group culture and SCI, Braunscheidel, Suresh, and Boisnier (2010) indicated no relationship between the two. Regarding rational culture which utilises incentives and rewards to influence employees' behaviour, Braunscheidel, Suresh, and Boisnier (2010) reported a weaker relationship with external integration (customer and supplier integration) while Cao, Huo, and Zhao (2015) and Porter (2019) found a negative relationship between the two. Contrarily, this research found a positive relationship between rational culture and SCI (internal, customer and supplier integration). With regards to hierarchical culture, whereas this research confirmed its strong impact on internal and external integration, studies such as (Braunscheidel, Suresh, and Boisnier 2010; Zu, Robbins, and Fredenhall 2010; Cao, Huo, and Zhao 2015; Porter, 2019) all found an inverse relationship. The findings in this research therefore ignite extant studies and strengthens the debate on the relationship between OC and SCI by confirming a positive influence of all the dimensions of OC on SCI.

Third, the studies confirmed a positive influence of SCI on SSCP from the perspective of RVT. Extant literature (e.g., Blome, Schoenherr, and Eckstein 2014; Weingarten and Longoni 2015; Kang et al. 2018) assessed the impact of SCI on sustainability performance and downplayed the essence of internal integration to SSCP. For instance, Blome, Schoenherr, and Eckstein (2014) and Weingarten and Longoni (2015) ignored the empirical impact of

internal integration on sustainability performance in their respective research. This current research, on the other hand, confirmed the significance of internal integration by confirming its positive influence on SSCP (environmental, social, economic performance) and external integration. Additionally, the research found internal integration as a precursor to external integration (Han and Huo 2020) especially in the food manufacturing industry and within the context of SSCP. The findings further strengthen extant literature by also confirming a strong and positive impact of customer and supplier integration on SSCP.

Fourth, the study confirmed the mediation role of SCI on the OC and SSCP relationship. These findings have not been reported in extant literature highlighting the significance of this study. This study, therefore, introduces a new insight into the supply chain literature specifically, OC, SCI and SSCP by confirming that higher level of SCI is still needed after adopting a sustainability supportive culture to attain higher SSCP. Last, the research presents a framework highlighting the relationship between OC, SCI and SSCP for future researchers and managers.

7.2 Practical Implications

Practically, managers are admonished to adopt flexible and hierarchical cultures to achieve maximum integration both within and across the supply chain to improve their SSCP. Implementing integrated competing values or sustainability-supportive cultures (hierarchical, developmental and group) into the firm and supply chain is conducive for achieving high environmental, social and economic performance. Developmental and group cultures encourage creativity, sharing of knowledge, pooling of resources, strictness, skills and teamwork among experts in the firms and partners across the supply chain. These qualities from the cultures strengthen the ability of the firms to achieve high levels of SSCP. To a greater extent, the flexible cultures which constitute developmental and group cultures are good for internal integration and at the same time, crucial for establishing expertise teams within the firms. This prepares the teams to meet constantly with customers and suppliers to share the relevant knowledge and ideas needed to improve SSCP while at the same time fortifying the external integration of the firms. In other words, internal integration is highly significant for external integration and both contribute to the improvement in the SSCP of the food manufacturing firms. Additionally, managers should adopt control cultures (rational and hierarchical cultures) especially hierarchical culture to induce higher SSCP as maintaining a strict environmental management policy and ensuring employees follow the outlined sustainability practices are conducive for maintaining higher SSCP. Rational culture is also

suitable for instilling a culture of SCI into firm. Top management should ensure and build strong ties with supply chain partners to intensify the achievement of higher SSCP.

7.4 Limitations and Future Research Directions

Regardless of the contributions in this research, factors inherent in the sampling size, research context, the analytical method and the variables limit the study in several ways. Firstly, compared to other studies, the sample size used in the conducting both the qualitative and quantitative methods could have been many to strengthen generalisability. With regards to the interviews, only firms in the UK were involved, the results exclude firms from Greece, making the interview results more contextualised. This potentially affect the generalisability of the results. Future researchers could explore the relationship between the variables by using a larger sample size and firms with different sizes as it may provide a nuanced view of the relationship between the variables. Furthermore, the results in this research are applicable to only the food manufacturing industry in two countries. This potentially reduces the generalisability of the findings to other industries. Future research should replicate this research with firms. Comparing the results to this study would contribute enormously to literature.

Secondly, the results in this research could have been rigorous and its generalisability improved if several other industries were used in the research. Using several industries could provide an in-depth insight into the different cultural values practiced in several firms and their impact on SCI and SSCP. The difference in results from that of extant literature could emanate from the single industry employed in this research. Future studies could replicate this research by employing several other industries or firms in ascertaining the holistic impact of OC on SCI and SSCP.

Third, the study failed to assess the impact of the national culture on the adoption of firm specific culture and their subsequent effect on sustainability performance. Miska, Szocs, and Schiffinger (2018) used the GLOBE factors in examining the impact of national culture on the adoption sustainability in firms. The rigidity of a national culture is expected to reflect in the types of cultural values adopted in a firm which can have repercussions on the impact on the adoption and implementation of strategies. In the same vein, a country which encourages flexibility is expected to encourage firms to adopt more flexible values which in turn can influence the adoption and implementation of supply chain strategies. This makes it highly crucial to understand the values in a particular country as it may have a significant impact on the firm specific culture. In addition to testing the model in different industries, future studies can examine how national culture influence SSCP and explore the crucial role

of OC in their relationship. Specifically, the culture of emerging economies would be of much interest as these countries may have a more rigid and different kinds of values practiced.

Just a few context-specific or industry-specific scales developed through interviews and from extant literature were used in measuring OC, SCI and SSCP. In terms of culture, other firm-specific indicators and framework such as the dichotomous scales by Verbeke (Cadden et al. 2020) could be applied to comprehensively assess the culture of the firms. Future studies could adopt other frameworks and revamp the scales used in this study. Different and many other scales can effect a change in the output, measurement and structural models. For example, conceptualising OC using employee vs job; results vs process; open vs closed; loose vs tight; normative vs pragmatic and market vs internal by Verbeke (2000) could also reveal other insights into other cultural values that can stimulate a better SSCP. With the current increase in the sustainability practices, other constructs or practices could be employed in operationalising SSCP.

Targeting responses from group of people in surveys has been criticised as it poses a risk for common method bias (Flynn, Pagell, and Fugate 2018). Their research confirmed that supply chain strategies or elements like integration, culture and relationship are all *polyadic* constructs and a single person's response cannot be adequate. For example, culture is collective in nature and therefore requires responses from multiple people in a single organisation in assessing the OC of a firm. Similarly, integration should be assessed from all the partners across the supply chain (Flynn, Pagell, and Fugate 2018). Therefore, future research is needed to measure OC and SCI from other members in the firms (employees) and across the supply chain (i.e., customers and suppliers). This would enable the development of comprehensive constructs for measuring OC and SCI.

The outbreak of the pandemic, COVID-19, caused an intensive transformation in the supply chain strategies of various firms. This implies that most food manufacturing firms temporarily abandoned existing strategies for more effective ones that matched the increased in demand especially during the lockdown. Evidently, most cultural values in various firms were disrupted while others were compromised. It is, therefore, essential for the effectiveness of values to be examined during unprecedented times such as the pandemic. Future research should investigate the effectiveness of the various dimensions of the CVF on sustainability performance or other supply chain strategies during the pandemic. Results from this research could be very significant for supply chain researchers and practitioners as it may reveal effective values for supply chain strategy implementation during turbulent or unexpected outbreaks.

Cadden et al. (2020) prompted the relevance of ensuring the culture in every firm is supportive of the strategies to be implemented. Many firms struggling to successfully implement lean practices had no supportive culture (Cadden et al. 2020). Due to this, research revealing the impact of OC on the implementation of the emerging strategies and manufacturing technologies should be the core aim of supply chain researchers. The impact of the dimensions of CVF could be examined on strategies such as lean management and agile manufacturing. Several firms are gradually adopting advanced automations in their manufacturing systems, it is worthwhile to research into the values that warrant adoption of these strategies such as industry 4.0 and the usage of internet of things. The impact of the CVF and other cultural frameworks could also be examined on other sustainability-oriented strategies such as circular economy.

The usage of PLS-SEM also presented several limitations in the data analysis. The model fit indices used in this study are not sufficient due to the limited parameters presented by the PLS software. Other parameters such as goodness of fit, confirmatory factor index, root mean square error of approximation (RMSEA) which are robust in assessing model fit are all missing. Additionally, the PLS software do not provide robust measures to assess endogeneity in the data. Future studies using a large sample size can use CB-SEM to analyse the data to improve robustness and employ other measures in assessing the model fit and endogeneity.

APPENDICES

APPENDIX I: Items in the Questionnaire together with their reliability tests Obtained from Pilot Test (Cronbach Alpha)

Variables	Constructs	Sources
Sustainable Supply Chain Performance		
Environmental Performance	1. Environmental Innovation/Project Implementation **(0.60)** **2.** Compliance with environmental standards* **(0.78)** **3.** Sustainable Raw material extraction* **(0.85)** 4. Water reduction **(0.80)** 5. Energy consumption **(0.78)** 6. Carbon Footprint Reduction **(0.90)** 7. Waste Recycling **(0.85)**	Hassini et al. (2012); Sarkis (2006); Vachon and Mao (2008); Kang et al. (2018)
Economic Performance	**1.** Manufacturing cost **(0.76)** **2.** Operational Cost **(0.86)** 3. Investment **(0.75)** 4. Lead time **(0.83)** 5. Delivery time and Flexibility **(0.93)** 6. Sales Revenue * **(0.85)**	Hassini et al. (2012); Vachon and Klassen (2006); Kang et al. (2018)
Social Performance	**1.** Societal developmental projects **(0.77)** 2. Health and safety **(0.85)**	Hassini et al. (2012); Abdul-Rashid et al. (2017); Kang et al. (2018

	3. Equal opportunity for advancement for all employees* **(0.82)** **4.** Improvement in work environment **(0.86)** 5. Employment of local people **(0.80)** 6. Motivation and satisfaction **(0.78)**	
Supply Chain Integration		
Internal Integration	1. Data Integration among internal functions through information network **(0.75)** **2.** Cross-functional teams in NPD **(0.72)** **3.** System-wide information system integration **(0.70)** **4.** Real-time integration and connection **(0.75)** 5. Cross-functional teams in process improvement **(0.79)** 6. Utilization of periodic interdepartmental meetings **(0.69)**	Narasimhan and Kim (2002); Flynn, Huo, and Zhao (2010)
Customer Integration	1. Sharing Production plans with our major customers **(0.64)** 2. Receiving orders through computerization systems **(0.77)** 3. Sharing POS with customers **(0.90)** **4.** Customers involved in the product and process plans **(0.86)** 5. Customer surveys **(0.78)** 6. The use of system coupling **(0.85)** **7.** Customers involved in the making of sustainability decisions * **(0.79)** **8.** Close linkage with customers through information networks **(0.75)**	Narasimhan and Kim (2002); Flynn, Huo, and Zhao (2010); Cao, Huo and Zhao (2015)

Supplier Integration	**1.** Maintain close cooperative relationship on quality and design **(0.77)** **2.** Suppliers' involvement in sustainability decisions * **(0.65)** 3. Suppliers' involvement in product design process **(0.69)** **4.** Stable procurement through suppliers **(0.75)** **5.** Benchmarking best practices and sharing results with suppliers **(0.75)** **6.** We share our demand forecasts with suppliers **(0.70)** **7.** Quick ordering systems established with suppliers **(0.78)** 8. Constant sharing of information via IT **(0.76)**	Stank, Keller, and Daugherty (2001); Narasimhan and Kim (2002); Braunscheidel, Suresh and Boisnier (2010); Cao, Huo and Zhao (2015)
Organisational Culture		
Development Culture	**1.** The firm emphasizes growth through developing **(0.75)** **2.** The firm is a very dynamic and entrepreneurial place always encouraging people to take risk **(0.77)** 3. My organisation emphasizes growth and acquisition of new resources (Readiness to meet new challenges is important) **(0.65)** **4.** The glue that holds our organisation together is commitment to innovation and development **(0.68)**	Naor et al. (2000); Liu et al. (2010); Cao, Huo and Zhao (2015); Yunus et al. (2016);

	5. The firm pursues long-range programs for manufacturing capabilities in advance of needs **(0.80)**	
Growth Culture	**1.** The firm is focused on developing human resource, employee commitment and concern for people **(0.80)** 2. Winning in the marketplace, outpacing competition and acquiring resources through teamwork is key **(0.70)** 3. Much Emphasis is placed on task and goal accomplishment **(0.80)** **4.** The supervisors focus on empowering employees to use teamwork to attain firm objectives **(0.75)** 5. The firm expects utmost achievement of productivity and efficiency through teamwork **(0.76)**	Liu et al. (2010); Naor et al. (2008); Yunus et al. (2016);
Rational Culture	1. The firm's incentive system scheme encourages people in the firm to pursue the company's laid-down objectives **(0.85)** 2. The incentive scheme is fair in rewarding people who contribute the most of our objectives **(0.55)** **3.** The incentive scheme enables the firm to maintain full internal control **(0.60)** 4. The incentive scheme creates a strong competition among the employees to achieve the objectives of the firm **(0.65)** 5. The incentive system encourages employees to pursue quality **(0.75)**	Naor et al. (2000); Naor et al. (2008); Cao, Huo and Zhao (2015); Yunus et al. (2016)

Hierarchical Culture	1. The firm is a controlled and structured place and formal procedures generally governs what we do **(0.68)** **2.** Every small matter has to be referred to someone higher up in the organisational structure **(0.79)** **3.** Every decision needs the CEO's and /or board's approval **(0.85)** 4. Little action is taken until a supervisor approves a decision **(0.81)**	Naor et al. (2008); Liu et al. (2010); Cao, Huo and Zhao (2015)

*New constructs adopted, NPD-New product development

APPENDIX II: Interview Guide

1. In your firm or generally in the industry what factors do you consider to have a huge impact on the supply chain sustainability performance?
2. Is sustainability performance measured across the supply chain or firm level?
3. Has the supply chain established any environmentally-friendly projects? Can you specify some of the projects carried out by the company?
4. What measures have the supply chain put in place to ensure sustainable;
    - Water consumption
    - Energy consumption
5. What is/are being done by the supply chain to ensure the control of carbon footprint, waste recycling and sustainable raw material extraction?
6. Has the firm experienced an improvement in the economic performance of the supply chain after instituting sustainability measures?
7. Can you comment on how the firm performs in terms of unit manufacturing cost, ordering cost, manufacturing lead time, delivery time, investment, operational cost and the profitability level of the firm?
8. What particular actions are taken by the firm to improve health and safety of employees, establish societal developmental projects, equal opportunity for advancement, employ locally motivate and satisfy employees?
9. What factors do you consider as affecting the supply chain integration efforts of the firm?
10. What measures/systems have been put in place to ensure the internal departments collaborate effectively?
11. How does the firm collaborate with customers? Does the firm have a fixed system for exchanging information with customers?
12. What factors can be considered as impeding the integration activities of the firm?
13. Do the customers of the firm play a major in achieving higher sustainability? How does this happen?
14. How does the firm collaborate with suppliers? Does the firm have a fixed system (s) for exchanging information with the suppliers?
15. Do the suppliers of the firm play a major role in achieving higher sustainability in the supply chain? How does this happen?

16. Can you describe the kind of culture practiced in your organisation? What values are considered as very important in the organization? 17. Which part of the organizational values affect the sustainability performance of the supply chain performance? 18. Which values in the organization greatly influence the firms decision to integrate internally and integrate with customers and suppliers?
19. What is your position in the firm?

APPENDIX III: Questionnaire

RESEARCH TITLE

Sustainable supply chain performance: do organizational culture and supply chain integration serve as enabling or constraining factors?

AIM OF RESEARCH

This research is part of a PhD research and the main purpose of this research is to examine the relationship between the various types of organizational culture and sustainable supply chain performance of the food and drink manufacturing industry in the United Kingdom. Sustainability in the food and drink manufacturing has become an issue of interest to practitioners and academics due to the importance of the industry to the economy and society. This research is expected to help managers or decision-makers in the industry determine some factors that can improve sustainability performance and make important decisions regarding the type of culture and the extent of collaboration with customers and suppliers needed to attain higher sustainability performance. The findings of this research can be made available on request.

STATEMENT OF PARTICIPATION AND ANONYMITY

This research is part of a PhD research at the University of Kent, participants who feel intimidated or offended by the research or any word in the questionnaire can refuse to respond, participation of the research is strictly voluntary. Respondents are not required to state their names or the name (s) of their company. All information obtained will be treated with high confidentiality and only for research purposes only. This survey should take approximately 9 minutes to complete.

RESEARCHER INFORMATION

For any comments or questions about this research you can contact us on the address, e-mail and phone number provided below.

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SECTION I: SUPPLY CHAIN SUSTAINABILITY PERFORMANCE

In this section, we explore your perception about the sustainability activities of the firm's supply chain. For each of the items below, please evaluate the environmental, economic and social performance of your firm over the past 5-10 years.

ENVIRONMENTAL PERFORMANCE

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1. Project Implementation **(ENV1)**: The firm's supply chain enables the implementation of environmental-friendly projects	1	2	3	4	5	6	7
2. Sustainable Raw Material Extraction **(ENV2):** The supply chain obtains raw materials from sustainable sources	1	2	3	4	5	6	7
3. Water Reduction **(ENV3):** The supply chain has reduced the level of water consumption	1	2	3	4	5	6	7
4. Energy Reduction **(ENV4):** The supply chain has reduced the level of energy consumption	1	2	3	4	5	6	7
5. Carbon Footprint Reduction **(ENV5):** The supply chain controls, tracks and reduces the emission of carbon dioxide into the atmosphere	1	2	3	4	5	6	7

6. Waste Recycling **(ENV6):** The supply chain has the ability to recycle waste products into usable materials	1	2	3	4	5	6	7
7. Compliance to Environmental Standards **(ENV7):** Products are produced according to the existing environmental standards.	1	2	3	4	5	6	7

ECONOMIC PERFORMANCE

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1. Cost of manufacturing **(EP1):** There has been a reduction in the cost incurred in manufacturing products	1	2	3	4	5	6	7
2. Distribution Cost **(EP2):** There has been a reduction in the cost associated with distribution	1	2	3	4	5	6	7
3. Lead time **(EP3):** The major suppliers are able to meet the demand for restock of materials in time.	1	2	3	4	5	6	7
4. Delivery Time **(EP4):** The firm's ability to meet the order of customers and deliver them on time.	1	2	3	4	5	6	7
5. Investment **(EP5):** There has been investment in profitable and	1	2	3	4	5	6	7

sustainability related projects							
6. Operational Cost **(EP6):** There has been a reduction in the overall cost incurred in maintaining the supply chain/the plant.	1	2	3	4	5	6	7
7. Sales Revenue **(EP7):** There has been an increase in the total income obtained from selling the products	1	2	3	4	5	6	7

SOCIAL PERFORMANCE

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1. The supply chain has established societal developmental projects **(SP1)**	1	2	3	4	5	6	7
2. There is improvement in health and safety conditions of employees **(SP2)**	1	2	3	4	5	6	7
3. There is consistent training and development of employees **(SP3)**	1	2	3	4	5	6	7
4. There is equal opportunity for advancement for all employees **(SP4)**	1	2	3	4	5	6	7
5. Employees are always motivated and highly satisfied **(SP5)**							
6. There is continuous employment of people living in the local community **(SP6)**	1	2	3	4	5	6	7

SECTION II: INTERNAL, CUSTOMER AND SUPPLIER INTEGRATION

In this section, we explore your perception about the supply chain integration activities of the firm's supply chain. The first part contains questions relating to the internal integration of the firm while the last two parts contain questions about integration with both customers and suppliers respectively.

PART I: INTERNAL INTEGRATION

	Strongly Disagree	Somewhat Disagree	Disagree	Neither Agree or Disagree	Agree	Somewhat Agree	Strongly Agree
1. There is data integration among internal functions through information network **(II1)**	1	2	3	4	5	6	7
2. My firm uses cross-functional teams in new product development **(II2)**	1	2	3	4	5	6	7
3. There is a system-wide information system integration among internal functions **(II3)**	1	2	3	4	5	6	7
4. There is a real-time integration and connection among all internal departments **(II4)**	1	2	3	4	5	6	7
5. My firm uses cross-functional teams in new process improvement **(II5)**	1	2	3	4	5	6	7
5. There is utilization of periodic inter-departmental meetings among internal functions **(II6)**	1	2	3	4	5	6	7

PART II: CUSTOMER INTEGRATION

	Strongly Disagree	Somewhat Disagree	Disagree	Neither Agree or Disagree	Agree	Somewhat Agree	Strongly Agree
1. We consistently share our production plans with our major customers **(CI1)**	1	2	3	4	5	6	7
2. We receive customers' orders through a computerization system **(CI2)**	1	2	3	4	5	6	7
3. Our customers share Point Of Sales (POS) information with us **(CI3)**	1	2	3	4	5	6	7
4. We regularly involve customers in the product and process design decisions **(CI4)**	1	2	3	4	5	6	7
5. We regularly survey our customers' needs **(CI5)**	1	2	3	4	5	6	7
6. We use system coupling with key customers (e.g vendor managed inventory, JIT, continuous replenishment) **(CI6)**	1	2	3	4	5	6	7
7. Major customers are involved in making sustainability decisions **(CI7)**	1	2	3	4	5	6	7

PART III: SUPPLIER INTEGRATION

	Strongly Disagree	Somewhat Disagree	Disagree	Neither Agree or Disagree	Agree	Somewhat Agree	Strongly Agree
1. We maintain close cooperative relationship with suppliers about quality considerations and design changes **(SI1)**	1	2	3	4	5	6	7
2. Suppliers are consulted when making sustainability decisions in the firm **(SI2)**	1	2	3	4	5	6	7
3. Suppliers are actively involved in the product design process **(SI3)**	1	2	3	4	5	6	7
4. We exercise stable procurement through a network with our major suppliers **(SI4)**	1	2	3	4	5	6	7
5. My firm benchmarks best practices/processes and shares results with suppliers **(SI5)**	1	2	3	4	5	6	7
6. We share our demand forecasts with our major suppliers **(SI6)**	1	2	3	4	5	6	7
7. There is constant sharing of information with suppliers through information technology **(SI7)**	1	2	3	4	5	6	7
8. Quick ordering systems are established with our suppliers **(SI8)**	1	2	3	4	5	6	7

SECTION III: ORGANIZATIONAL CULTURE

In this section, we explore the organizational culture(s) of the firm. For each of the items below, please select the option that best describes the culture practiced in your firm.

	Strongly Disagree	Somewhat Disagree	Disagree	Neither Agree or Disagree	Agree	Somewhat Agree	Strongly Agree
1. Our organization emphasizes growth through developing new ideas **(DC1).**	1	2	3	4	5	6	7
2. The firm is a very dynamic and entrepreneurial place always encouraging people to take risk **(DC2)**	1	2	3	4	5	6	7
3. The glue that holds our organization together is commitment to innovation and development **(DC3)**	1	2	3	4	5	6	7
4. My organisation consistently emphasizes growth and acquisition of new resources **(DC4)**	1	2	3	4	5	6	7
5. The firm pursues long-range programs for manufacturing capabilities in advance of needs **(DC5)**	1	2	3	4	5	6	7
6. The firm is focused on developing human resource, employee commitment and concern for people **(GC1)**	1	2	3	4	5	6	7
7. Winning in the marketplace, outpacing competition, and acquiring resources through teamwork is key **(GC2)**	1	2	3	4	5	6	7

8. Much emphasis is placed on task and goal accomplishment **(GC3)**	1	2	3	4	5	6	7
9. The supervisors focus on empowering employees to use teamwork to attain firm objectives **(GC4)**	1	2	3	4	5	6	7
10. The firm expects utmost achievement of productivity and efficiency through teamwork **(GC5)**	1	2	3	4	5	6	7
11. The firm's incentive system scheme encourages people in the firm to pursue the company's laid-down objectives **(RC1)**	1	2	3	4	5	6	7
12. The firm's incentives encourage strong competitions among employees in the firm **(RC2)**	1	2	3	4	5	6	7
13. The incentive scheme is fair in rewarding people who contribute the most of our objectives **(RC3)**	1	2	3	4	5	6	7
14. The incentive scheme enables the firm to maintain full internal control **(RC4)**	1	2	3	4	5	6	7
17. The incentive system encourages employees to pursue quality **(RC5)**	1	2	3	4	5	6	7
18. The firm is a controlled and structured place and formal procedures generally governs what we do **(HC1)**	1	2	3	4	5	6	7
19. Every small matter has to be referred to someone higher up in the organizational	1	2	3	4	5	6	7

culture for a final answer **(HC2)**							
20. Every decision needs the CEO's approval **(HC3)**	1	2	3	4	5	6	7
21. Little action is taken until a line manager or divisional supervisor approves a decision **(HC4)**	1	2	3	4	5	6	7

SECTION IV: DEMOGRAPHIC INFORMATION

This section contains questions about the basic information about the respondent and the firm. Please, select from the option, the answer (s) that best suits or describes the respondent and the company.

1. What is your position in the company?
   - C.E.O ☐
   - Supply Chain Manager ☐
   - Marketing/Sales Manager ☐
   - Finance Manager/Accountant ☐
   - Line Manager/Supervisor ☐
   - General Manager ☐
   - Other ☐

   ……...

2. Estimated years of working relationship with major customers?
   - Less than 1 year ☐
   - 1 to less than 5 years ☐
   - 5 to less than 10 years ☐
   - 10 to less than 15 years ☐
   - 15 years or more ☐

3. What is your highest educational level?
   - Graduate from high school/equivalent ☐
   - Graduate from college/equivalent ☐
   - Bachelor's Degree ☐
   - Masters or PhD ☐

4. What is the Number of Employees available at the company?
   - Less than 100 employees ☐
   - 100-249 employees ☐
   - 250-499 employees ☐
   - 500 or more employees ☐

5. What kind of products does your company manufacture?
   - Cereal products ☐
   - Dairy Products ☐

Meat/Poultry Processing ☐
Confectionery ☐
Drinks/Beverages ☐
Others ☐

6. In which part of the United Kingdom is the firm located?
   England ☐
   Wales ☐
   Northern Ireland ☐
   Scotland ☐

7. In which year was the company established? …….

8. What is the estimated sales revenue of the firm for the past accounting year?

   Less than £ 1 Billion ☐
   Between £ 1 and 5 Billion ☐
   Between £ 6 and 10 Billion ☐
   Between £ 10 and 15 Billion ☐
   20 Billion and above ☐

9. Estimated years of working relationship with major suppliers?
   Less than 1 year ☐
   1 to less than 5 years ☐
   5 to less than 10 years ☐
   10 to less than 15 years ☐
   15 years or more ☐

10. Firms Ownership?
    Private ☐
    Public ☐
    State-Owned ☐

THANK YOU FOR PARTICIPATING!

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