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National culture differences in implementation and performance measurement of Green Supply Chain Management Practices

A comparative study in Iran and Austria

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Dedication

To my wife, Mona, who has enriched my life with love and sacrifice.

Abstract

National culture differences in implementation and performance measurement of Green Supply Chain Management Practices

Due to the growing interest of stakeholders as well as the need to reduce operational costs, Green Supply Chain is becoming an essential source of a competitive advantage eventually, leading to higher efficiency and differentiation. The previous research studies have investigated the relationship between cultural values and environmental adoption of firms in different regions of the world, but the concept of Green Supply Chain Management (GSCM) has been overlooked. This research aims to consider the missing aspects of Environmental Management Performance (EMP), as the broad level, by laying out a complete theoretical framework of Green Supply Chain Management as the subset of Environmental Management Performance. It empirically tests the effects of national culture on GSCM implementation and performance measurement. The analysis uses data collected by the random survey from target groups in Austria and Iran, GLOBE cultural framework will be adopted for national cultural values recognition, and two sets of factors for implementation and performance measurement of GSCM practices will be used from the Zhu et al. (2012) measurement model. Hypothesis testing and statistical analysis likewise independent-sample T-test and Analysis of Variance (ANOVA) are employed to examine the implementation and GSCM performance differences in our populations. This research finds out that some cultural values positively influence the GSCM implementation in these two countries, although others have adverse effects in this process. The study provides meaningful insights into the role of national culture in GSCM practices. The findings will be useful for multinational organizations which plan to implement their GSCM practices in their subsidiaries in a foreign country and alleviate the cultural setbacks caused by national culture differences.

Kurzreferat

Nationale kulturelle Unterschiede bei der Umsetzung und Leistung Messung von Green Supply Chain Management Practices

Aufgrund des wachsenden Interesses der Interessengruppen sowie der Notwendigkeit, die Betriebskosten zu senken, wird Green Supply Chain schließlich zu einer wesentlichen Quelle für einen Wettbewerbsvorteil, der zu höherer Effizienz und Differenzierung führt. Die früheren Forschungsstudien haben die Beziehung zwischen kulturellen Werten und der Umweltakzeptanz von Unternehmen in verschiedenen Regionen der Welt untersucht, aber das Konzept des Green Supply Chain Management (GSCM) wurde übersehen. Diese Forschung zielt darauf ab, die fehlenden Aspekte der Umweltmanagementleistung (EMP) auf der breiten Ebene zu berücksichtigen, indem ein vollständiger theoretischer Rahmen des Green Supply Chain Managements als Teilmenge der Umweltmanagementleistung entworfen wird. Es testet empirisch die Auswirkungen der nationalen Kultur auf die GSCM-Implementierung und Leistungsmessung. Die Analyse verwendet Daten, die durch die Zufallsbefragung von Zielgruppen in Österreich und dem Iran gesammelt wurden, der kulturelle Rahmen von GLOBE wird für die Anerkennung nationaler kultureller Werte übernommen und zwei Faktorengruppen zur Umsetzung und Leistungsmessung von GSCM-Praktiken werden aus dem Zhu et al. (2012) Messmodell. Hypothesentests und statistische Analysen werden ebenso wie T-Test bei unabhängigen Stichproben und Varianzanalyse (ANOVA) verwendet, um die Implementierungs- und GSCM-Leistungsunterschiede in unseren Populationen zu untersuchen. Diese Untersuchung stellt fest, dass einige kulturelle Werte die GSCM-Implementierung in diesen beiden Ländern positiv beeinflussen, während andere in diesem Prozess negative Auswirkungen haben. Die Studie bietet aussagekräftige Einblicke in die Rolle der nationalen Kultur in GSCM-Praktiken. Die Ergebnisse werden für multinationale Organisationen nützlich sein, die planen, ihre GSCM-Praktiken in ihren Tochtergesellschaften im Ausland umzusetzen und die kulturellen Rückschläge, die durch nationale Kulturunterschiede verursacht werden, zu mildern.

Table of Contents

List of Figures

List of Tables

List of Abbreviations and Symbols

GSCM: Green Supply Chain Management

ISO: International Standards Organization

EMP: Environmental Management Practice

SSCM: Sustainable Supply Chain Management

IEM: Internal Environment Management

GP: Green Purchasing

CC: Customer Cooperation

IR: Investment Recovery

ED: Eco-design

CSR: Corporate Social Responsibility

EPI: Environmental Performance Index

SCI: Supply Chain Integration

SPSS: Statistical Package for Social Sciences

TBL: Triple Bottom Line

List of Appendices

1. Introduction

There is a great interest among researchers in business and management practices over the topics related to environment during these years that leads to the engagement of researchers from different fields of academics such as management, engineering, physics, and social sciences in integration of their projects to this topic. From another point of view, external stakeholders and organizational found that they have a same key role in implementing activities and practices regarding the environment protection inside and outside of their organizations. Hence, a strategic vision towards the decision-making process for the practices which are more related to the environment is undeniable and, in many cases, complex. These decisions can influence the management of an organization in both internal and external perspective. According to a study by Sarkis (2003), green supply chain management decisions are the most critical issues for organization which have strong ties to internal and external organizational activities (Sarkis, 2003).

As more businesses are concerned about the environment, the “environment” has become a valuable component in their operations. In their organizations, they follow environmentally friendly practices. Before environmental protection became a concerning issue for industries, the main focus was on improving the technical side of internal and external processes to achieve a competitive advantage. Step by step, firms have concluded that improving technology is not the only factor for development. Companies have been considering the ecological of their manufacturing processes to protect the environment since the concepts of social responsibility and human rights have emerged.

A meaningful connection between environment and industrial activities have gained popularity among researchers and business leaders as industrial ecology in order to harmonize the industrial activities to environment protection. Lowe described industrial ecology as the management of environment using a systematic organizing framework. This view interprets the industrial world as a natural system composed of local ecosystems along with the global biosphere. To achieve sustainable environmental performance, industrial ecology suggests a foundational perception of the importance of modeling the industrial system on ecosystems (Lowe, 1990).

There is a huge number of research projects in many different countries to study the effects of green supply chain management practices on organizational performance and its relationship to the environment. These studies indicate the same results and propose that organization should analyze the GSCM and organizational performance by considering the cultural aspects (country) in combination with economical factors. Sarkis (2012) also

confirmed this statement in his study and suggested that strategies, managers, policies, and organizations should pay a great attention to cultural and political factors to create an important foundation for identifying the GSCM process and its impacts on organizational systems (Sarkis, 2012).

Due to the growing interest of stakeholders and the need to lessen operational costs, Green Supply Chain is converting to the critical source of competitive advantage, driving to higher efficiency and differentiation. On practical levels, this research intends to study the effectiveness of national culture values on GSCM practices. When managers are conscious of the cultural barriers towards implementation and performance measurement of GSCM practices, they can alleviate the constraints of culture within their organization. The research findings will be helpful for organizations that are planning to implement their GSCM practices in a foreign country with different cultural values and guide them to attenuate the cultural setbacks during the process.

This study investigates the effects of national culture on the implementation and performance of Green Supply Chain Management practices. Cultural values are different among countries that shape the unique approaches for business decision-makers to confront business cases and challenges. Previous studies have shown a great significance between national culture and stakeholders' behavior using different cultural frameworks for modeling and analysis. Hofstede and the GLOBE cultural framework were the most popular frameworks among researchers, and they conducted many studies according to these two cultural foundations.

In this study, we use the GLOBE model as the cultural framework to analyze the effects of national culture on GSCM practices implementation and performance. The GLOBE is a global project which has studied the cultural values among different countries and consists of nine different cultural values. The GLOBE project consists of cultural and leadership aspects, and scores are in two ranges of "Practice" and "Value." Each country has a unique score for every cultural value. We have selected the four cultural values from project GLOBE, which are the most relevant factors to GSCM practices among companies in different industries.

As mentioned above, cultural values are different among countries. We guide this study by evaluating the effects of national culture on GSCM practices implementation and performance in Austria and Iran. These two countries are unique due to some reasons which make them good nominees as our samples. First of all, according to the GLOBE project, not only these two countries are different in cultural values, but also there are some connections between them. Second, Austria and Iran are located in two distinct

geographical regions where a tremendous difference in climate and weather can be detected, which may influence the practical implementation of GSCM. Third, Iran is a country that has many air polluting industries, likewise petrochemical, oil and gas refinery, and metal industries that nominate this country as a good place for performing this research. Consequently, this research uses the data collected from professionals working in different industries in Austria and Iran.

Since we use GLOBE project cultural foundation for analysis of cultural values, we use different variables for GSCM practices implementation and performance. These variables examine how internal managerial processes and external cooperation with business partners support GSCM practices in organizations and measure if the GSCM practice's performance is a reasonable extent.

As our objective is to obtain a significant relationship between cultural values and the implementation and performance of GSCM practices, we defined two sets of hypotheses. These hypotheses indicated if cultural values influenced the GSCM practices, and we assigned them according to previous research studies. Each hypothesis is composed of a cultural value that measures the degree of its effects on GSCM practices. The hypotheses are composed of two sets that measure the GSCM implementation and performance.

1.2. Research Question

Since this research aims to investigate the differences in national culture in GSCM practices implementation and performance measurement, the following research questions will guide the present study:

- Is power distance (PD) a facilitator or disruptor in the process of implementation and performance measurement of GSCM practices?
- Is uncertainty avoidance (UA) a facilitator or disruptor in the process of implementation and performance measurement of GSCM practices?
- Is performance orientation (PO) a facilitator or disruptor in the process of implementation and performance measurement of GSCM practices?
- Is future orientation (FO) a facilitator or disruptor in the process of implementation and performance measurement of GSCM practices?

We will discuss the research questions and answer them in chapter 5 in detail.

This research uses quantitative methods for data collection and analysis. We developed a questionnaire consisting of GSCM variables for data collection and distributed it to our population in Austria and Iran. Due to COVID-19 restrictions at the time of this research, we encountered hardship in collecting data from the population, and we sent the questionnaire

to our target group randomly. We also added two other variables of the firm's date of establishment and industry sector during the data collection phase.

Similar to other quantitative research studies, there might be a risk of not reaching a reliable sample size due to the COVID-19 hygiene measurement because reaching a significant number of participants is relatively complicated in this new condition. Due to conducting this research in two specific regions of both countries, in Austria at the State of Vorarlberg, and in Iran only in the capital city of Tehran, there would be the risk of poor generalization of findings to other regions of the countries. Although national cultural values are equal among all members of the society, institutional factors may influence the business practices in some specific regions.

2. Literature Review

In this section, we are presenting the literature review for green supply chain management as well as other related topics likewise sustainable supply chain, corporate social responsibility, national culture, and supply chain management.

Firstly, we describe the theoretical framework behind green supply chain management and sustainable management practices to develop the research hypothesis and review the academic background during these years.

Second, we critically analyze the relationship between national culture and green supply chain management, sustainable supply chain, and environmental practices to reach an overall understanding of different national culture elements and how they influence the GSCM implementation and performance measurement. In addition, we will evaluate the drivers and barriers which influence the GSCM implementation and investigate different aspects of GSCM performance measurement.

2.1 Theoretical Framework and Hypotheses Development

This section describes a theoretical framework of previous academic research on green supply chain management, sustainable supply chain management, and corporate social responsibility. We also briefly explain GSCM drivers and barriers that are crucial factors in successfully implementing GSCM practices. As this research investigates the role of national culture as a critical differentiator in GSCM implementation and performance measurement by different cultures, the relationship between national culture and GSCM practices and sustainable supply chain management follows the rest of this section.

Green Supply Chain Management (GSCM) is a sustainable strategy for enterprises, which by diminishing risks and negative impacts to the environment, they can simultaneously achieve environmental and financial advantages. It is becoming more and more popular as a new innovative approach in today's competitive marketplace (Van Hoek, 1999). By considering the related activities to green purchasing, the first phase in GSCM implementation was introduced in 1994. Later, corporations expanded the green strategies and standards to their entire supply chain, since the sustainability and green practices were common among different industries (Hajikhani et al., 2012) (Khaksar et al., 2016). In 1994, Webb, L. examined the effects of different parts of the production chain, such as the purchasing phase as a first step, on the environment. He also suggested that the purchasing

part should choose raw materials that are in compliance with environmental standards (Hajikhani et al., 2012).

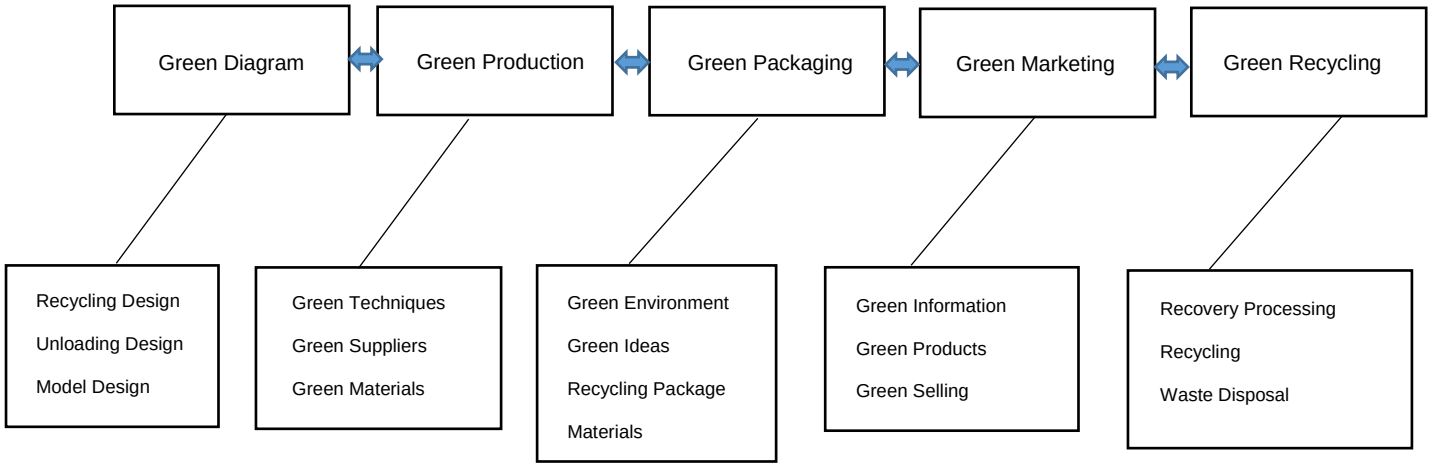

Fig 1. The flow of Green Supply Chain Management (Wen 2003)

In order to enhance environmental performance, the researchers suggest GSCM as a possible solution. Though GSCM was widely recognized in the early 1990s, the development of publications suggests the concept has become more popular since 2000 (Fahimnia et al., 2015) (Seuring and Müller, 2008).

Furthermore, Sarkis et al. (2011) asserted that “the notion of Green Supply Chain Management can be tracked back to the 1960s in the same way as environmental management movement” (Sarkis at al., 2011). According to a study by Seuring and Müller (2008), green supply chain management has been shaped as a new academic area of research after 1990s (Seuring and Müller, 2008).

For many years, academic researchers have expanded the green supply chain management principles. Using environmental management disciplines through the entire cycle of customer order fulfillment was referred to by Handfield et al. (1997). Sarkis et. al (2011) outlined green supply chain management “as incorporating issues related to the environment into the organizational practices of sustainable supply chain management, including reverse logistics” (Sarkis et al., 2011). Generally, it is supposed that GSCM theory is expansive, and it has no unambiguous, universal definition accessible for explaining its true meaning. The idea has been expressed in a different way by researchers, and it makes it hard to find a definition for GSCM, that is globally accepted (Ahi and Searcy, 2013). Despite that there are a lot of GSCM definitions, there are several different common terms

that can be used clearly (Sarkis et al., 2011) . Finally, we summarized some of different definitions by previous researchers who have worked on GSCM literature in Table 1.

Table 1. Green Supply Chain Management Definitions (Ahi and Searcy, 2013)

Sources	Definition
Handfield et al (1997)	Ecological principles should be applied to all stages of a customer's ordering cycle, which should include purchasing, designing, production, assembling and packing, transportation, and distribution.
Zhu et al (2005)	By reducing their environmental risks and impacts and increasing their ecological efficiency, enterprises can achieve profitability and market share objectives.
Hevani et al (2005)	Adding different operational elements such as Reverse logistics, green distribution/marketing, green procurement, green production/materials planning into the enterprise daily processes
Sheu et al (2005)	Incorporating the production supply chain and the reverse logistics chain for returned goods
Sirvastava (2007)	The integration of issues related to the environment into SCM, likewise sourcing and supplier selection, production processes, designing, and final products delivery
H'Mida and Lakhal (2007)	The process of supervising and enhancing the SCM environmental performance alongside the life cycle of a product
Sirvastava (2008)	Environmentally sound choices are integrated into the decision-making process to convert the raw materials to the final products
Lee and Klassen (2008)	Environmentally friendly plans and activities undertaken by buying organizations to improve supplier and customer environmental performance.
Albino et al (2009)	To extend environmental measures to the entire supply chain, a strategic approach is needed
Gavronski et al (2011)	An assessment or improvement of the environmental performance of a supplier base that is implemented at the corporate and plant levels.

Lorentz et al (2011)	A closed-loop approach to supply chain management that incorporates environmental considerations.
El Saadany et al (2011)	To increase the use of recycled raw materials, reducing energy consumption and waste generation. Forward supply chain operators including manufacturing, procurement, materials management, warehouse management, inventory planning, distribution, logistics, and transportation are considered in supply chain greening.
Guiffrida et al (2011)	In a supply chain context, sustainability has an environmental dimension.
Wu and Pagell (2011)	A method for integrating environmental considerations into the process of product design, material sourcing, manufacturing, and end-of-life management.
Yeh and Chuang (2011)	An environment protection principle is built into suppliers' management systems as a way of managing suppliers, their products, and the environment. This principle aims to add environmental awareness to manufactured products in order to enhance the competitiveness of the market

The ‘green’ idea is mentioned as taking reliable actions to incorporate concerns about the environment and human ecologies. The SCM can be considered as an essential parts of enterprise operations which makes a major influence on company’s actions towards its environment. Firms can reduce their impacts on the environment if only they endeavor to integrate concerns to the environment into their SCM operations. According to Sarkis 2012, “the incorporation of environmental interests into supply chain management would be described as green supply chain management (GSCM)” (Sarkis, 2012).

Additionally, Zhu et al (2008) emphasized that the supply chain loop can only be ended when a network of GSCM activities which is comprised of customers and suppliers is supported by logistic partners, that they also receive the support from the customer’s side. The role of GSCM suppliers is undeniable in the supply chain network and they are considered as the most important players in the upstream levels. Furthermore, customer can similarly play a significant role in the downstream levels of GSCM integration and companies can work with their customers to reduce the toxic impacts to the environment (Zhu et al., 2008).

The green supply chain management can fulfill its goal by minimizing the raw materials utilization and expenditures, better market share and improving the organization's brand image. Also, GSCM can reduce the environmental pollution via green manufacturing, and it can improve the economic operation by enhancing the environmental performance (Dawei et al., 2015). Organizations endeavor to develop sustainability which contains balancing the environmental, economic, and social performance and it is considered as a corporate objective in their long-planning processes (Lee et al., 2009) (Srivastava and Srivastava, 2007). One of the aims of GSCM is to improve environmental and financial performance and it can fulfill this goal when extensive aspects from environmental management to green design is considered (Zhu & Sarkis, 2004).

2.1.1. The concept of corporate sustainability and social responsibility

Lo (2010) argues that corporate social responsibility (CSR) and corporate sustainability (CS) are both some business activities that are taken by corporations on voluntary bases and CSR is an essential component of CS, providing a transitional stage for firms on their way to getting to CS (Lo, 2010). A literature review conducted by Montiel (2008) offers an exciting view on developments in academic research regarding CSR (corporate social responsibility), CSP (corporate social performance), EM (environmental management), and CS (corporate sustainability) during last decades. He analyzed several different journal papers which had been published in accredited management and business academic journal and he meticulously demonstrated that CSR was focused a lot on sustainability literature. In 1990, the focus broadened to include several areas such as corporate social performance (CSP) (that is concerned with how a firm interacts with its operative environment); corporate sustainability (CS), and environmental management (EM) (Montiel, 2008).

A triple bottom line approach to CS also addresses the concerns that link a corporation to its environment – social sustainability, environmental sustainability, and economic sustainability. In addition, Elkington claims that sustainability's three dimensions are interrelated and interdependent in numerous ways. Thus, a corporation's economic sustainability cannot be separated from its social and environmental sustainability (Eklington, 1998).

The Triple Bottom Line is one of the sustainability practices that has achieved popularity among research practitioners during these years. Corresponding to the TBL framework, corporate sustainability achieves its purposes regarding the environment, finance and society through a means which is perfectly supported and integrated (Orlitzky and Erakovic, 2012). According to these considerations, we can defie corporate sustainability practices as

“a set of organizational measures which are subjected to the different spheres of corporate sustainability such as environment, economics, and social concerns, through a process which considers different current needs of stakeholders as well as future-related apprehensions (Carroll and Buchholtz, 2014).

These three aspects are explained and defined in the following ways: by the economic aspect, we can refer to the financial bottom-line with respect to establishing the long-lasting economic success by efficient incorporation of sources and the fruitful organizational capability. The social aspect is described as the corporate’s impact on social justice which explains different elements of employee’s nature such as incentives, skillfulness, loyalty, and expertise, and it indicates the trust on organizational associates and administrational settings as an entire society. The environmental sphere is the implication of company’s ecological veracity and how the organization endeavors to minimize the scope of its impression on its surrounding environment (Bansal, 2005).

It has been criticized for being difficult to implement the triple bottom line approach to sustainability. While in practice, however, the concept has generated mixed results, there is a significant degree of recognition within the corporate context. In spite of this, several corporations, especially those in North America, contemplate that they are more focused on sustainability in terms of social and environmental and they will more suffer from economic aspect of sustainability (Gray, 2006).

The interaction between the triple bottom line dimensions has been extended in an important way by Lozano (2008), by which he suggests a Two-Tiered Sustainability Equilibria (TTSE). This method incorporates the interaction among the dimensions of triple bottom line concept and its dynamics on timely basis. The TTSE incorporates economic, social, and environmental concerns and short and long-term perspectives by adding a temporal dimension—an alternative approach to viewing a corporation (Lozano, 2008).

We can refer the whole nature of sustainability to social, economic, and environmental concerns on different stages: individual, organizational, and systematic. Thus, managers can influence the corporate sustainability by their organizational embeddedness and performance via a broader systematic environment (Granovetter, 1985). The consolidative outlook on sustainability proposes that organizations and their managers are able to adopt conflicts between different sustainability facets without eradicating them or focusing on only one special aspect (Hahn et al., 2015).

2.1.2. GSCM Drivers and Barriers

In several studies of GSCM, a broad range of factors were found to persuade companies to incorporate environmental management initiatives and practices into their supply chains. Firms may be compelled by stakeholder demands, induced by a desire to comply with environmental regulations, or even influenced by their internal strategic motivations to gain a competitive advantage in the market. Based on the literature review, we can classify the key factors of GSCM adoption as follows:

- **"External factors"** which are mainly in relation to "stakeholders' pressures" and "environmental regulation".
- **"Internal factors"** which are related to corporate strategic motivations (Hajikhani et al, 2012).

There is a possibility to stem the drivers and pressures from GSCM practices implementation, for instance regulatory and stakeholder's forces. Contrary, barriers are the issues that hinders the implementation of GSCM practices likewise high cost, risk, complexities and many more. The influence of driving forces comprising market force and regulatory pressure is undeniable for organizations that embrace GSCM in quest of environmental performance (Zhu and Sarkis, 2007).

Academic researchers mainly assess the environmental performance based on different elements. Some of these elements are the utilization of sources, regulatory compliance, processes, products, and services of the organization that affects its environment. Environmental performance has two main indicators: operative and management performance. The former involves utilization of materials and energy consumption, waste making and emission, and the evaluation of how company's activities influence the environment. The latter connects with the corporate policies and strategies towards the environment and improving the organizational publicity and image (Papadopoulos and Giama, 2007).

According to Srivastava (2007), the absence of support from the authorities has no impact on firm's inclination in adopting GSCM (Srivastava, 2007). In addition, another research by Walker et al (2008) showed that several internal and external obstacles are impeding the GSCM implementation. Although external fences involve lack of supplier loyalty, control, and obstacles which are specific to different industries, the internal obstacles consist of cost and lack of authority, (Walker et al., 2008).

2.1.3. National culture and supply chain management

Since the operations of current supply chains are globally expanding with various partners in different regions of the world, the development of Supply Chain Integration to facilitate synchronization of business activities across firms because it is critical to surviving in the competition in the globalized economy. Supply Chain Integration (SCI) is stated as the cooperative attempts of supply chain partners by incorporating management systems, information exchange, planning, and other supply chain tasks with the objective to smooth the trading by empowering the unified interactions across with partners (Wong et al., 2011).

To determine the success of a partnership when partners from multiple countries have joined forces to cooperate, firms should control the operations covered by the SCI and perceive the position of a collaborative culture within the partnership fully. The contingency theory validates this view, which supports that performance outcomes of organizational efforts rely on the contextual environment of their operations (Drazin and Van de Ven, 1985).

A unique culture is a composition of social phenomena that displays different behaviors and practices of people, showing the “mental programs” of several notions (Hofstede, 1980). Culture is defined as “…patterns, explicit and implicit, of and for behavior acquired and transmitted by symbols, constituting the distinctive achievement of human groups (Kroeber and Kluckhohn, 1952). National cultures are varied in the set of values, beliefs, ideas, attitudes, and morals, which can be used as guidelines for behaviors of individuals (Vitell et al., 1993). Culture is different across nations because the background and incentives encompassing people in various nations are unique. Such variation in national culture spans to the organizational culture, influencing the management operations of everyday processes that are executed and managed by local people (Hofstede, 1985). According to the contingency theory of operations, national culture carries out a contextual difference that can affect the effectiveness of supply chain management efforts (Sousa and Voss, 2008).

2.1.4. The Hofstede national culture framework

Hofstede (1980), in his groundbreaking study on national culture, recognized four main elements by which cultural values were analyzed: power distance, uncertainty avoidance, individualism/collectivism, and masculinity/femininity. Two other elements were added to the original framework in 2010: long-term orientation/short/term orientation and indulgence/restraint (Hofstede, 1980) (Minkov and Hofstede, 2011).

A number of criticisms of Hofstede's cultural data have been done by different researchers. Nonetheless, Hofstede's cultural framework successfully acquired national cultural differences at the same time as concentrating on the generalization of each culture that links society. The framework is straightforward and concise to use in the academic environment, which is why many researchers considered it a paradigm for delineating the effects of national culture on different research topics and approved its robustness. (Song et al., 2018).

2.1.5. National culture and sustainable management practices

National culture plays a critical role in the strategic decisions of executives. In Particular, the quality of their adaptation and implementation of environmental programs and standards is dependent on the national culture they are working in (Husted, 2005). The environmental policies that are implemented in a country are also substantially affected by national culture and government policies in sequence influence firm decisions with regard to the adoption of EMP's (Zhu et al., 2013). As a result, the linkage of EMP implementation to the national culture is undeniable.

Hackert et al. (2012) and Vachon (2010) analyzed the relationship between national culture and environmental practices or investments in organizational procedures. Vachon (2010) evaluated the association between national culture and corporate sustainable development practices in 50 countries and their results recommended that "two of Hofstede's national culture elements (individualism and uncertainty avoidance) are related to a greater degree of sustainable practices by organizations (Vachon, 2010). Hackert et al. (2010) discovered that "the firms' investments in implementing the corporate social responsibility were affected by the cultural elements of individualism, uncertainty avoidance, and long-term orientation" (Hackert et al., 2010).

2.2. Critical Analysis of previous research

In this section, we are critically analyzing the previous academic research on national culture and how it influences the sustainable supply chain management practices. Since green supply chain management is a subset of sustainable supply chain and it contains business processes in which different stakeholders are involved, national culture is considered as a differentiator of how people react in different situations. Thus, academic researchers have considered the critical role of national culture in shaping different business practices globally.

First of all, we will describe the cultural framework that we used in our research project and review the literature from other academic researchers. Second, we discuss about the GSCM practices implementation and performance measurement and describe the academic background behind it. At the end, we investigate the previous academic literature to explain the relationship between national culture values and environmental practices and green supply chain management.

2.2.1. Culture framework: project GLOBE

A study by House et al (2004) described nine elements of cultural practices in their GLOBE study. These dimensions are, respectively, assertiveness (ASI), institutional collectivism (INS), in-group collectivism (ING), future orientation (FOI), gender egalitarianism (GEI), human orientation (HOI), performance orientation (POI), power distance (PDI), and uncertainty avoidance (UAI). The GLOBE project is an expansion study of the Hofstede national culture framework and is one of the latest studies on organizational values and cultures which investigates, among others, the impacts of national culture in organizational efficacy (House et al., 2004).

According to the study by Javidan and House (2001) about the national culture, assertiveness is mainly described as the degree to which individuals in societies are urged to be tough and have the tendency for competition. They similarly implied that “individuals in communities with high assertiveness have a propensity of “can-do” attitude and are inclined to sympathize with the strong” (Javidan and House, 2001).

Another study by House et al. (2002) explains the institutional collectivism (IC) as the degree to which societal institutions support collective dissemination of resources and actions (House et al., 2002). Organizations working in high institutional collectivist societies have the tendency to highly consider employee welfare (Javidan and House, 2001).

In-group collectivism reflects the degree to which the members of a society are motivated to join groups and communities in smaller size such as their family and friends. (Javidan and House, 2001). Another cultural value is that is described by House et al. 2002 is gender egalitarianism (GE) that is the extent to which a community reduces gender role variations (House et al., 2002). Javidan and House (2001) proposed that “countries in high gender egalitarianism are inclined to obtain a higher degree of women participation in the society (Javidan and House, 2001). Human orientation (HO) implies the degree to which each individual in a community is inspired for being fair, altruistic, generous, caring, and kind to other members of the community (Javidan and House, 2001). From another point of view, individuals in high human orientation countries are anticipated to take care of other people’s

needs, especially the people who are weak and in special circumstances (Javidan and House, 2001).

Performance orientation (PO) is another cultural value which is the reflection of the degree to which a community supports group members for performance enhancements and excellence (Javidan and House, 2001). This is similar to assertiveness, to which people in high performance orientated countries also have a “can-do” approach (House et al., 2004). This cultural dimension is referred to the degree to which a society supports and promotes innovation, high-level standards, excellence, and performance progress. Performance oriented countries are result-oriented and reward competitive activities and materialism, whereas countries with low-performance oriented scores mostly concentrate on synchronization with environment (House et al., 2004).

Future orientation (FO) indicates the degree to which people in countries with high score in this cultural value are inspired to consider the consequences of their activities on future (Javidan and House, 2001). Being in control on one’s own destiny is better than depending on other people to assist one (Chui and Kwok, 2009). House et al. (2004) described the future orientation as the degree to which a group encourages and rewards future-oriented behaviors such as planning and delaying gratification (House et al., 2004). The distinctive features of societies that care more about future include the tendency to have more saving at present for their future needs and concentrate more on long-term objective over the immediate gratification (Javidan and House, 2001; Chui and Kwok, 2009).

The power distance (PD) indicates how much individuals in a country expect and accept unequal power distribution (Javidan and House, 2001). As described by House et al. (2004) the power distance is a cultural element to which a community admits higher levels of power and authority, differences in level of power in administration and respect the status of people at different power level (House, et al., 2004). Chui and Kwok (2008) claimed that “the subordinates expect that their superiors will protect and safeguard them more when they surrender more authority to them” (Chui and Kwok, 2008).

Uncertainty avoidance (UA) is delineated as “social norms and procedures are relied upon by a country to alleviate the uncertainty of future events” (Javidan and House, 2001). The dimension of uncertainty avoidance is different from the one concerned with risk aversion. This cultural element simply refers to how far people in a country search for orderliness, structure, rules, and laws (Javidan and House, 2001). Within this dimension, the GLOBE project asked this question that “Most people manage their lives with little or no unexpected events” (House et al., 2002).

A vital aspect of the GLOBE project relevant to our objectives is distinguishing cultural values from practices. Unlike the former, the latter refers to the methods. As a foundational culture framework, project GLOBE benefits significantly from this distinction. We can state that although prior research studies have discovered a close correlation between mindsets and behaviors linked to sustainability practices (Cordano and Frieze, 2000).

2.2.2. GSCM Practices Implementation and Performance

We can take both quantitative and qualitative methods to measure GSCM performance. Some firms measure profitability, market share, revenues, return on investment and customer service levels; others track the performance of inventory management and customer service. Depending on the main goals and the environment, performance measurement may vary depending on the organization or unit within the organization (Kazancoglu et al., 2018).

Olsthoorn et al. (2001) maintained that "in order to measure green performance, companies and the environment should interact" (Olsthoom et al. 2001), while in a different study by Wagner and Schaltegger (2004), corporations can measure the performance in many ways, including the reduction of water consumption, energy consumption, non-renewable resources, hazardous materials, solid waste, solid contamination, air and water emissions, noise, odors, landscape destruction, and accident risks (Wagner and Schaltegger, 2004).

Wagner and Schaltegger (2004) described green performance as "cooperation and collaboration can provide environmental and business benefits, thereby enhancing corporate image and marketing, thus enhancing competitive advantage" (Wagner and Schaltegger, 2004). Vachon and Klassen (2008) argued that "manufacturing and environmental performance may be enhanced by environmental alignment and cooperation in supply chains" (Vachon and Klassen, 2008).

As a part of continuous improvement process, the implementation of GSCM and benchmarking is measured using different scales. Zhu et al. (2008) revealed that economic performance and environmental measures are related. Additionally, Zhu et al. (2013) emphasized that since GSCM activities should be integrated internally and externally to maximize performance potential, mediation effects indicate that producers must integrate internal and external GSCM activities (Zhu et al., 2013).

Prescriptive models have been developed to measure GP and GSCM practices implementation (Zhu et al., 2008). Using a multi-attribute utility theory approach, Handfield et al. (2002) formed a decision model to measure suppliers' environmental practices. Sarkis (2003) developed a set of criteria to evaluate the options made by firms to implement GSCM in order to analyze the impact of those options on their external relationships with clients and suppliers. According to Sheu et al. (2005), a linear multi-objective programming model

was developed to optimize the forward and reverse logistics operations in a green supply chain. According to Zhu et al. (2008), the five factors contributing to GSCM practices implementation are internal environment management (IEM), green purchasing (GP), cooperating with customers on environmental demands (CC), eco-design (ECO), and investment recovery (IR).

According to Zhu et al. (2008), we can define three factors for GSCM performance: environmental performance (EP), economic performance (ECP), and operational performance (OP). In a similar research study, Kazancoglu et al. (2018) recognized environmental, economic, logistics, operational, organizational, and marketing performance as the core criteria for GSCM performance measurement which have high importance to implement successful GSCM.

Environmental performance

Environmental performance and supply chain management are significantly correlated in the literature, and their correlation is significantly linked to organizational capability (Judge and Elenkov, 1995). By implementing GSCM, the organization and its suppliers who adhere to environmental regulations can improve their environmental performance (Laari et al., 2016).

A study by Hervani et al. (2005) confirms that to determine the environmental performance in terms of corporate efforts, processes, products, and services, we should consider the environmental performance indicators. Firms must enhance their performance evaluation capabilities in response to environmental demands. Companies can measure environmental performance with balanced scores by using green products, cutting waste disposal costs, renewable resources, and cooperating with accredited suppliers (Hervani et al., 2005).

Economic performance

A firm's economic performance is considered essential for implementing environmental management activities, and the level of environmental risk management and control and capacity and capability for continuous improvement are considered essential factors. (Hervani et al., 2005; Zhu et al., 2008).

In some studies, researchers measured the economic performance by the reduction in costs and expenses as a consequence of internal and external green programs (Diab et al., 2015), though other research studies would rather consider key economic indicators, likewise profit or sales (Rao, 2002). The results of previous studies demonstrate that environmental management and economic performance are connected (Laari et al., 2016).

Operational Performance

Developing the operational performance capability will allow the organization to increase its environmental awareness level. In order to enhance operational performance, organizations must employ GSCM internal practices likewise environmental management systems involving staff in operations and tasks including recycling processes. (Yu et al., 2017).

There is probably an excellent chance to create a higher quality level and a greater scrap value by creating an environmentally friendly product and a safer and less costly one (Sarkis, 2001).

Organizational Performance

Measures of organizational performance are used to determine how successfully an organization is at achieving its objectives. The performance of organizations and the environment is integrated into GSCM activities (Zhu et al., 2008).

To implement robust GSCM practices, it is required to implement the internal environmental management to convert different organizational processes and activities to be 'green' (Kazancoglu et al., 2018). Geng et al. (2017) stated that top management support is required for organizational performance assessment; thus, top management should concentrate on maximizing shareholder wealth, and preparing its operational workforce for implementation of the performance assessment system by collecting and analyzing data.

2.2.3. The relationship between national culture values and environmental practices

The literature on international business holds that national cultures are fundamental determinants of not only individual differences but also variations among organizations from different countries (Hofstede, 1980, 2001). Culture has influenced Ethical studies and people's perceptions and responses to corporate social responsibility and performance, which reflect their values and interests (Ho et al., 2012).

The cultural frameworks of GLOBE and Hofstede (1980) are commonly cited in research on environmental and sustainability management. Ringov and Zollo (2007) referred to both models and stated that the home country's culture strongly influences social and environmental performance. In their study, they firstly considered Hofstede's cultural framework, and they found the negative effects of power distance and masculinity. Four of the nine dimensions of the GLOBE cultural framework related to Hofstede are reviewed. They finally found that a firm's social and environmental performance is adversely affected by power distance. (Ringov and Zollo, 2007).

While a few studies have examined the correlation between power distance and sustainability related concepts and found negative results, other studies found positive relationships. Husted (2005) maintains that “due to high level of power distance and respect for authority, there is a limited capacity for debate and a limited response to sustainability issues”. Alternatively, Ioannou and Serafeim (2012) examined how those in power may feel an obligation to make a positive contribution to corporate sustainability practices when faced with power distance. Katz, Swanson, and Nelson (2001) claimed that there may be a weaker business response to environmental problems when there is a high distance between power and authority. It could be also result from less capacity for debate and less respect for authority.

Taking a broader point of view, a study by Peng et al. (2012) explores the relationship between national culture – according to Hofstede’s cultural elements – and CSR commitment on a sample of 1,189 firms. Their research demonstrated that cultural elements likewise individualism and uncertainty avoidance play a positive role on corporations’ CSR commitment, while power distance and masculinity had negative impacts (Peng et al., 2012). Their findings are the opposite of the preceding investigation by Hill et al. (2007) and Maignan and Ferrell (2003) who discovered a positive correlation between uncertainty avoidance, masculinity, power distance, and organizational social performance.

While some prior research studies acknowledged the positive impacts of uncertainty avoidance on sustainability, other studies have noticed somewhat combined effects, with disparate interpretations of the main mechanisms. Ringov and Zollo (2007) argued that "societies that strive to avoid uncertainty tried to be more routine-driven and have more difficulty adapting to social and environmental changes." However, this is also true that "to minimize uncertainty," the need for stricter regulations and rules should be tied to the high level of uncertainty avoidance (Ringov and Zollo, 2007). Parboteeah et al. (2012) clarify that in societies that avoid high levels of uncertainty, people are more enthusiastic to maintain procedures and systems by decreasing or eliminating uncertainty to make sure that the environmental sustainability is performed (Parboteeah, et al. ,2012).

Those firms that have practices that minimize uncertainty tend to build mechanisms and processes to rest assured that environmental sustainability is carried out, and to mitigate environmental degradation and ambiguity (Parboteeah at al., 2012). Moreover, Peng et al. (2014) recommend that companies can reduce environmental uncertainty by implementing sustainability practices. Therefore, firms with more prevalent uncertainty avoidance cultures are more have the tendency to adopt more environmental sustainability practices. (Peng et al., 2014).

As Javidan (2004) mentioned, the performance orientation is the national culture attribute to which members of the society promotes and extent to which a community promote improvements in performance, implementing high standards in their activities, and encourage innovation and technology (Javidan, 2004). Correspondingly, a study by Parboteeah et al. (2012) showed that cultures with high-performance orientations believe that they are able to conquer the outside environment, and the attitude of individuals toward sustainability initiatives is negatively influenced by performance orientation (Parboteeah et al., 2012).

Because high-performance orientation cultures emphasize materialism and competitiveness more than they focus on means to achieve the ends, economic sustainability practices focus on the ends and more minor on means to achieve them (Parbooteeah, Bonson and Cullen, 2005). According to some studies, individuals with higher performance levels may believe that they are superior to others and can exploit the environment, thereby threatening environmental sustainability (Cullen et al., 2004). In a parallel point of view, Husted (2005) hinted that “in pursuit of growth, companies adopt more expensive environmental technologies less rapidly, impeding their ability to respond to environmental impacts.”

This section aimed to broadly narrate the literature background over the works of other academicians on the topic of green supply chain management, sustainable supply chain management, and the role of national culture in implementing GSCM practices. There are several counterarguments about the role of national culture in sustainable supply chain management and environmental practices, which makes it hard to distinguish if the national culture elements have positive, negative, or neutral effects on GSCM practices implementation in different cultures.

3. Design and Methodology

In this chapter, we discuss the research design and methodology to perform the research in our population. We start the chapter by describing the research design and methodology, which is the foundation of further steps. It is essential to use the method that corresponds with our hypotheses and sample perfectly to reach the best outcome. Following the chapter, we discuss the research methodology, describe the assumptions in great detail, delineate the variables and measurement methods, and explain the statistical population and sample. At the end of this chapter, we will discuss the research tools and data collection steps and examine the validity and reliability of the research tool. A brief introduction of data analysis techniques will end this chapter.

3.1. Research Design

It is essential to create a logical and analytical structure for this academic research to be able to reach its objectives. For the investigation of correlation between the research variables, we took the following research structure.

1. Development of conceptual frameworks of GSCM practices implementation and measurement
    i. Literature review
    ii. Perceive different GSCM practices implementation and performance measurement in different countries to obtain the practical inputs
2. Development of conceptual framework of GLOBE national culture
    i. Literature review
    ii. Understand different aspects of GLOBE model and how to study them
3. Development of measurement factors for evaluating GSCM practices implementation and performance
    i. Analyze, review and revise, if necessary, the measurement factors
    ii. Design survey questionnaires for measurement factors
    iii. Perform field research in target groups
4. Data Collection
    i. Random surveys (questionnaire)
5. Model testing and analysis
    i. Validity and reliability test of questionnaire by Cronbach Alpha
    ii. Hypotheses testing and Statistical Analysis by SPSS

iii. Data analysis and comparing GLOBE country culture scores with scores on GSCM practices factors
iv. Present a comparative sketch of different target regions.

3.2. Methodology

We used quantitative methodology for this research study. Using a deductive approach, we emphasized collecting data in the target groups to test the theories and hypotheses. We used numbers and charts to analyze the quantitative data and statistical methods to approve or reject our assumptions. We developed a closed questionnaire with a ranking scale to produce quantitative data and interpret the associations between our research variables.

Our research study is practical, and it aims to use the outcomes for improving and reaching the perfection of behaviors, methods, tools, and processes of organizations and societies. We endeavored to develop a practical knowledge of the implementation and performance of GSCM practices in our target societies. We conserved not only abstract and general but also in a specific context to investigate the correlations between the variables in great details.

3.3. Population and Sample

The research's population is professionals working in different industries in Austria and Iran. We have selected these two countries for analysis because of several reasons and criteria. The main factor for considering Austria and Iran is the country's Environmental Performance Index (EPI). The EPI is an index offered by Yale University and consists of 32 performance indicators across 11 issue categories. According to Table 2, the average EPI score of Austria from 2012 to 2020 is 78,94, and it is 53,25 for Iran, which ranks Austria as one of the leading countries in protecting the environment. There are also significant differences in cultural values of power distance and uncertainty avoidance between Iran and Austria. However, the scores of future orientation and performance orientation of the two countries are very close (Tables 3 and 4). Based on this assessment, Austria and Iran will be good examples to determine which cultural value causes the difference in implementation and performance measurement of GSCM practices and present a final comparison sketch.

Table 2. Historical EPI Results for Austria and Iran

Country	2012	2014	2016	2018	2020
Austria	68.92	78.32	86.64	78.97	79.60
Iran	42.73	51.08	66.32	58.16	48

Source: https://epi.yale.edu

For sampling, we collected our data from professional people working in the State of Vorarlberg in Austria and Tehran, Iran's capital city. We used the "nationality" of the respondents to filter the original culture during the data collection process.

The research sample is composed of 70 respondents, which indicates 35 respondents for each country. We provided the target group with a questionnaire, and it has been sent to them to participate in the random survey.

3.4. Research Variables and Measurement Methods

This research has investigated the relationship between national culture and GSCM practices implementation and performance measurement in Austria and Iran. We adapted the GLOBE cultural framework for analysis. The culture variables are Power Distance (PD), Uncertainty Avoidance (UA), Performance Orientation (PO), and Future Orientation (FO). These four dimensions have been selected as culture variables because they are more practical to the research topic as Green Supply Chain Management Practices implementation and performance.

The GLOBE cultural framework considers national culture as a country's shared practices and values. Values are recognized as "should be" scores, indicating how should do things within a specific culture. We use "should be" scores because they refer to the future, people's inclinations, and wishes which are more beneficial to examine the correlation between national culture and GSCM practices implementation and performance. Organizations implement GSCM practices in their internal processes, including people with different motivations and inclination and its performance is influenced by their decisions and reactions. Therefore, "should be" scores are an appropriate indicator to measure the national culture values for GSCM implementation and performance.

This study examines cultural values between Austria and Iran, and we obtained country scores directly from project GLOBE. Table 3 and 4 show the scores for four cultural values of Austria and Iran. According to Table 3 and 4, there is a significant difference between the scores for Uncertainty Avoidance (UA) and Future Orientation (FO) between Austria and Iran. In contrast, the scores for the other two cultural values are almost close.

Table 3. Cultural value scores for Austria

Cultural Value	Score	
Power Distance (PD)	4.95	Relatively high
Uncertainty Avoidance (UA)	5.16	High
Performance Orientation (PO)	4.44	Relatively high
Future Orientation (FO)	4.46	Relatively high

Table 4. Cultural value scores for Iran

Cultural Value	Score	
Power Distance (PD)	5.43	High
Uncertainty Avoidance (UA)	3.67	Medium
Performance Orientation (PO)	4.58	Relatively high
Future Orientation (FO)	3.7	Medium

We divided the GSCM practices variables into two parts. The first set of variables measure the implementation of GSCM practices and consists of five different variables, namely internal environment management (IEM), green purchasing (GP), cooperation with customers (CC), eco-design (ECO), and investment recovery (IR). The second set corresponds to the performance of GSCM practices and consists of three different variables, namely environmental performance (EP), economic performance (ECP), and operational performance (OP). We adapted all GSCM variables from Zhu et al. (2008).

The GSCM practices implementation variables primarily measure the top and mid-level managers' support, cross-functional cooperation, total quality environmental management, environmental compliance and auditing, and ISO14001 implementation as internal environment management (IEM), eco-labeling systems, cooperation with suppliers, second-tier suppliers considerations, suppliers' internal management auditing as green purchasing (GP), cooperation with customers for eco-design, cleaner production and green packaging as cooperation with customers (CC), using design of products for the reduction of hazardous materials, recovery of materials and components parts, and consumption of materials and energy as eco-design (ECO) sub-variables, and sales of excess inventory, scrap and used materials and capital equipment as investment recovery (IR).

The variables for GSCM performance mainly measure the reduction of air emission, wastewater, solid waste, toxic materials, and improving firm's environmental situation as environmental performance (EP). Additionally, they evaluate the reduction of materials purchasing's costs, energy consumption, fee for waste treatment, waste discharge and fine for environmental accidents as economic performance (ECP). Consequently, these

variables assess an increased number of on-time deliveries, decreasing the inventory levels, promoting product quality, increasing product line, and improving capacity utilization as sub-variables for operational performance (OP). Tables 5 and 6 show the variables and sub-variables of GSCM implementation and performance in more detail.

Table 5. List of variables and measurement items for GSCM implementation (Zhu et al., 2008)

Factors	***Measurement Item***
Internal Environmental Management (IEM)	1. Commitment of GSCM from senior manager (IEM1)
	2. Support for GSCM from mid-level managers (IEM2)
	3. Cross-functional cooperation for environmental improvements (IEM3)
	4. Total quality environmental management (IEM4)
	5. Environmental compliance and auditing programs (IEM5)
	6. ISO 14001 certification (IEM6)
	7. Environmental Management Systems exist (IEM7)
Green Purchasing (GP)	8. Eco labeling of products (GP1)
	9. Cooperation with suppliers for environmental objectives (GP2)
	10. Environmental audit for suppliers' internal management (GP3)
	11. Suppliers' ISO14000 certification (GP4)
	12. Second-tier supplier environmentally friendly practice evaluation (GP5)
Cooperation with customers	13. Cooperation with customers for eco design (CC1)
	14. Cooperation with customers for cleaner production (CC2)
	15. Cooperation with customers for green packaging (CC3)
Eco-design	16. Design of products for reduced consumption of material/energy (ECO1)
	17. Design of products for reuse, recycle, recovery of material, component parts (ECO2)
	18. Design of products to avoid or reduce use of hazardous products and/or their manufacturing (ECO3)
Investment Recovery	19. Investment recovery (sale) of excess inventories/materials (IR1)
	20. Sale of scrap and used materials (IR2)

	21. Sale of excess capital equipment (IR3)

Table 6. List of variables and measurement items for GSCM performance (Zhu et al., 2008)

Factors	***Measurement Item***
Environmental Performance	1. Reduction of air emission (EP1)
	2. Reduction of wastewater (EP2)
	3. Reduction of solid wastes (EP3)
	4. Decrease of consumption for hazardous/harmful/toxic materials (EP4)
	5. Decrease of frequency for environmental accidents (EP5)
	6. Improvement of an enterprise's environmental situation (EP6)
Economic Performance (ECP)	1. Decrease of cost for materials purchasing (ECP1)
	2. Decrease of cost for energy consumption (ECP2)
	3. Decrease of fee for waste treatment (ECP3)
	4. Decrease of fee for waste discharge (ECP4)
	5. Decrease of fine for environmental accidents (ECP5)
Operational performance (OP)	1. Increase amount of goods delivered on time (OP1)
	2. Decrease inventory levels (OP2)
	3. Decrease scrap rate (OP3)
	4. Promote products' quality (OP4)
	5. Increase product line (OP5)
	6. Improve capacity utilization (OP6)

Two other variables are also considered "control variables" as the firm's longevity and industrial sector. The former is indicated by LONG and the latter by INS in our analysis. The firm's longevity is the number of years since the company's foundation, and industrial sector is a dummy variable which takes 1 in case the firm belongs to the carbon-intensive industry and 0 otherwise. We considered the firm's longevity a control variable because companies should adopt more environmental protection programs at their maturity level. Given that most newly established firms are striving to persist in a competitive market by decreasing operational costs and products price, they may adopt fewer environmental protection programs. We crave to explore if the firm's longevity is an intervening variable in GSCM practices implementation and performance in our sample and demonstrate causal links between other variables.

The Industrial sector (INS) is another control variable that we aimed to test its intervening effect to the analysis. Carbon-intensive industries are contributing more greenhouse gases

by utilizing and combusting fossil fuels in their manufacturing and industrial processes, and they are more toxic than other industries for the environment. We consider the industrial sector an intervening variable to investigate if belonging to a specific industrial sector influences the implementation and performance of GSCM practices in Austria and Iran. We selected this variable because governments restrict regulations to control the greenhouse gases emissions by carbon-intensive industries in different countries, forcing them to adopt more environmental protection programs in their operational processes. We used this variable to assess if there is a significant difference in GSCM practices implementation and performance between carbon-intensive and non-carbon intensive industries.

We use a five-point Likert scale for scoring the measurement factors. The Likert scale for GSCM practices implementation is as 1) not considering it; 2) planning to consider it; 3) considering it currently; 4) initiating implementations, and 5) implementing successfully. The scale for GSCM practices performance starts with 1) not at all; 2) a little bit; 3) to some degree; 4) relatively significant, and 5) significant.

3.5. Research Hypotheses

For this research, we developed two sets of hypotheses for GSCM main variables. The first set corresponds to the effect of national culture on GSCM implementation and the other to the GSCM performance. The former is signed with “a” and the latter with “b”. The research hypotheses are as follows:

H1a: Companies in cultures considered as high-power distance implement fewer GSCM practices.

H1b: GSCM practices performance will be more effectively measured in high power distance countries.

H2a: Companies in cultures considered as high uncertainty avoidance implement more GSCM practices.

H2b: GSCM practices performance will be more effectively measured in high uncertainty avoidance countries.

H3a: Companies in cultures considered as greater performance orientation implement fewer GSCM practices.

H3b: GSCM practices performance will be less effectively measured in countries with greater performance orientation.

H4a: Companies in cultures considered as greater future orientation implement more GSCM practices.

H4b: GSCM practices performance will be more effectively measured in countries with greater future orientation.

3.6. Research Tools and Data Collection

We applied the quantitative methodology for this research study, and we used a questionnaire based on different variables of green supply chain management practices. The questionnaire is composed of 38 main questions, which are according to the GSCM variables. In addition, since the respondents' original culture is an analysis factor, the first question asks the respondents' nationality and has two options of Austrian and Iranian following the population. As two other control variables, namely Longevity (firm's date of establishment) and industry sector, were also considered in the analysis, the second and third questions collected this data.

The questionnaire consists of two sections with a total of 38 questions. The first section is about implementing green supply chain management practices, and the second section evaluates the green supply chain management practices performance. The questionnaire is designed according to the GSCM variables by Zhu et al. (2008). We correspond each question to a GSCM sub-variable to assess the implementation and performance.

The first seven questions analyze the internal environment management (IEM) in organizations in Austria and Iran. This section investigates if the internal processes and management's commitment supports the environmental and GSCM practices in organizations.

Questions eight to twelve evaluate green purchasing (GP) activities in organizations. Cooperation with suppliers and business partners is one of the main criteria for successful implementation and performance measurement of green supply chain management practices in organizations. This section aims to study the relationship between suppliers and other business partners' cooperation's in the implementation and performance of GSCM practices in Austria and Iran.

Questions 13 to 15 are analyzing the cooperation with customers (CC). Customers constitute a vital pillar of the supply chain, and collaboration with them plays a crucial role in the implementation and performance of GSCM practices. This section examines the cooperation with customers from three perspectives: eco-design, cleaner production, and green packaging.

The following questions of 16 to 18 assess the eco-design variable. Eco-design is an imperative factor that measures the company's efforts to use products to stimulate

environmental and GSCM practices in organizations. The rest of the first section is about the investment recovery (IR) variables, including questions 19 to 21.

The second part of the questionnaire measures the performance of green supply chain management practices in organizations in Austria and Iran. In this section, we measure three different variables, namely environmental performance (EP), economic performance (ECP), and operational performance (OP), from questions 22 to 38.

3.6.1. Reliability Analysis

We measure the research tool's reliability (questionnaire) by two different methods. The first method is Cronbach's Alpha which is the most common method to measure the reliability of the questionnaires and the second method is the Split-half analysis. We use SPSS software to perform both methods. First of all, we perform the pre-test of the reliability for the initial 30 respondent's dataset to confirm the questionnaire's reliability. Thereupon the further steps of the data collection will be taken.

Cronbach's Alpha Method

We measure the reliability of the first 30 respondent's dataset by using Cronbach's Alpha in SPSS software. This method considers all questions with an analogous response range for analysis. So, we measured the reliability of the questionnaire using the primary research variables with Likert scale measurement. According to our calculation, the Cronbach's Alpha for the first 30 respondents' sample is 0.935, which shows significant reliability for the pre-test questionnaire. Tables 8 and 9 show the reliability analysis by SPSS.

Table 7. Reliability pre-test - Cronbach's Alpha method

		N	%
Cases	Valid	30	100,0
	Excluded[a]	0	,0
	Total	30	100,0

a. Likewise deletion based on all variables in the procedure.

Table 8. Cronbach's Alpha - Statistics

Cronbach's Alpha	N of items
,935	38

Split-half Method

This method splits the questionnaire into two separate parts and estimates the correlation between them. We use this method to measure the reliability because our questionnaire

consists of two parts, and the correlation between responses in both sections is essential for our analysis. According to our calculation, the Cronbach's Alpha for the first part (19 items) is 0.908 and for the second part is 0.902, which shows significant reliability. To calculate the reliability coefficient of the whole test, the formula-Spearman-Brown- is used for this case. The Spearman-Brown coefficient for this case is 0.741, which shows good reliability. Tables 10 and 11 show the reliability analysis by the Split-half method in SPSS.

Table 9. Reliability pre-test - Split-half method

		N	%
Cases	Valid	30	100,0
	Excluded[a]	0	,0
	Total	30	100,0

a. Likewise deletion based on all variables in the procedure.

Table 10. Split-half analysis - Statistics

Cronbach's Alpha	Part 1	Values	,908
		N of items	19
	Part 2	Value	,902
		N of items	19
	Total N of items		38
Correlation Between Forms			,589
Spearman-Brown Coefficient	Equal Length		,741
	Unequal Length		,741
Guttman Split-half Coefficient			,741

For the final sample of 70 respondents, we perform the reliability test with two methods mentioned earlier. The Cronbach's Alpha for the final questionnaire is 0.945, which shows a very high internal reliability. Table 12 and 13 shows the reliability test for the final questionnaire. Like the pre-test of reliability, the questionnaire also indicates very high reliability according to the Split-half method. The Cronbach's Alpha for the first part is 0.923 and for the second part is 0.908, which both indicate high reliability. There is also a perfect correlation between forms by the number of 0.797. The Spearman-Brown coefficient for the final questionnaire is 0.839, which shows significant reliability for the whole test. Table 14 and 15 shows the results for the reliability test by Split-half method.

Table 11. Reliability analysis for final questionnaire - Cronbach's Alpha method

		N	%
Cases	Valid	70	100,0
	Excluded[a]	0	,0
	Total	70	100,0

a. Likewise deletion based on all variables in the procedure.

Table 12. Cronbach's Alpha - Statistics

Cronbach's Alpha	N of items
,945	38

Table 13. Reliability analysis for final questionnaire - Split-half method

		N	%
Cases	Valid	70	100,0
	Excluded[a]	0	,0
	Total	70	100,0

a. Likewise deletion based on all variables in the procedure.

Table 14. Split-half method - Statistics

Cronbach's Alpha	Part 1	Values	,923
		N of items	19
	Part 2	Value	,908
		N of items	19
	Total N of items		38
Correlation Between Forms			,662
Spearman-Brown Coefficient	Equal Length		,797
	Unequal Length		,797
Guttman Split-half Coefficient			,794

3.7. Data Analysis and Statistical Tests

We studied two aspects of GSCM practices by recognizing the cultural values in this research study: implementation and performance. We performed separate analyses for each aspect.

First of all, we evaluated the implementation of GSCM practices in our samples. We took two approaches for our analysis. The first approach examined the implementation by measuring the GSCM variables in Austria and Iran. This approach considered GSCM factors as test variables to outline an abstract sketch for green supply chain management implementation to test our hypotheses.

Second, we measured the GSCM performance in Austria and Iran by analyzing the GSCM variables and the respondents' scores in our questionnaire. In the end, we analyzed the extent of GSCM performance in Austria and Iran and determined if there is a significant difference in our sample.

We used quantitative methods to test our hypotheses and, we performed data analysis in the SPSS environment. To test the Normality of our data, we used the skewness and kurtosis test for each variable. If the test result shows the Normality, we use the parametric methods; otherwise, we take non-parametric. Our research investigated the GSCM and cultural variables between two independent groups (Austria and Iran). Since the independent variable is qualitative with two groups and the dependent variables are quantitative (GSCM variables), we performed an independent sample T-test to examine our hypotheses. A Leven's test is performed to check the equality of variances. If the T-test p-value is less than 0.05, we reject the null hypothesis, and we explain a significant difference between our groups. We used scaling methods to compute new variables for analysis.

4. Data Analysis Methods

In this chapter, we aimed to use statistical methods to analyze our research data. As we mentioned in chapter 3, we collected our data using an adapted questionnaire in our target groups. First of all, we describe our data for each research's variables using Descriptive Statistics and Frequencies to draw an overview of our research data. Second, we test our hypotheses using statistical tests and present the outcomes. The evaluation of control variables and testing will end this chapter.

4.1. Data Description

This section describes the data for each GSCM variable that we collected from our target groups during the data collection phase. We aim to present an overview of our questionnaire using descriptive statistics and frequencies to perceive the data perfectly. We use a group of variables for each GSCM implementation and performance phase and show descriptive statistics for Longevity and industry sector variables. We performed all statistics and frequencies using SPSS software.

Longevity

We extracted the Longevity from the firm's date establishment and subtracted it from the research's current date. It shows how many years the firm has been working in this industry. As shown in Table 16, the Mean value for Longevity is 47,30 years, and the Median is 31. The Mode is 20 years, which means there are many firms whose Longevity is 20 years. The standard deviation for this variable shows a significant number of 39,994 years which means there is a significant difference between the firm's date of establishment in our target groups. This phenomenon can be explained by the Range value as well since it is 181 years. As we can see, the minimum date of establishment is eight, and the maximum is 189 that shows a great diversity of newly established firms versus highly matured organizations. Regarding the Mode value, as shown in Table 16, the smallest value is 20, but we also observed another mode value as 66 years in our sample.

Table 15. Longevity variable - Statistics

N	Valid	70
	Missing	0
Mean		47,30
Median		31,00
Mode		20[a]
Std. Deviation		39,994
Variance		1599,546
Range		181
Minimum		8
Maximum		189

a. Multiple modes exist. The smallest value is shown.

Industrial Sector

The industrial sector is a dummy variable. It corresponds to 1 if the firm belongs to a carbon-intensive industry and 0 if otherwise. Table 17 and 18 show the descriptive statistics and frequency for the industrial sector. Thirty-three firms belong to a carbon-intensive industry which constitutes 52,9% of our sample size, and the rest of the 37 do not (47,1%). Figure 2 shows the pie-chart for belonging to industry sectors in our sample.

Table 16. Industrial sector variable - Statistics

N	Valid	70
	Missing	0
Mean		0,47
Median		,00
Mode		0
Std. Deviation		,503
Variance		,253
Range		1
Minimum		0
Maximum		1

Table 17. Industrial sector - Frequency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	37	52,9	52,9	52,9
	Yes	33	47,1	47,1	100,0
	Total	70	100,0	100,00	

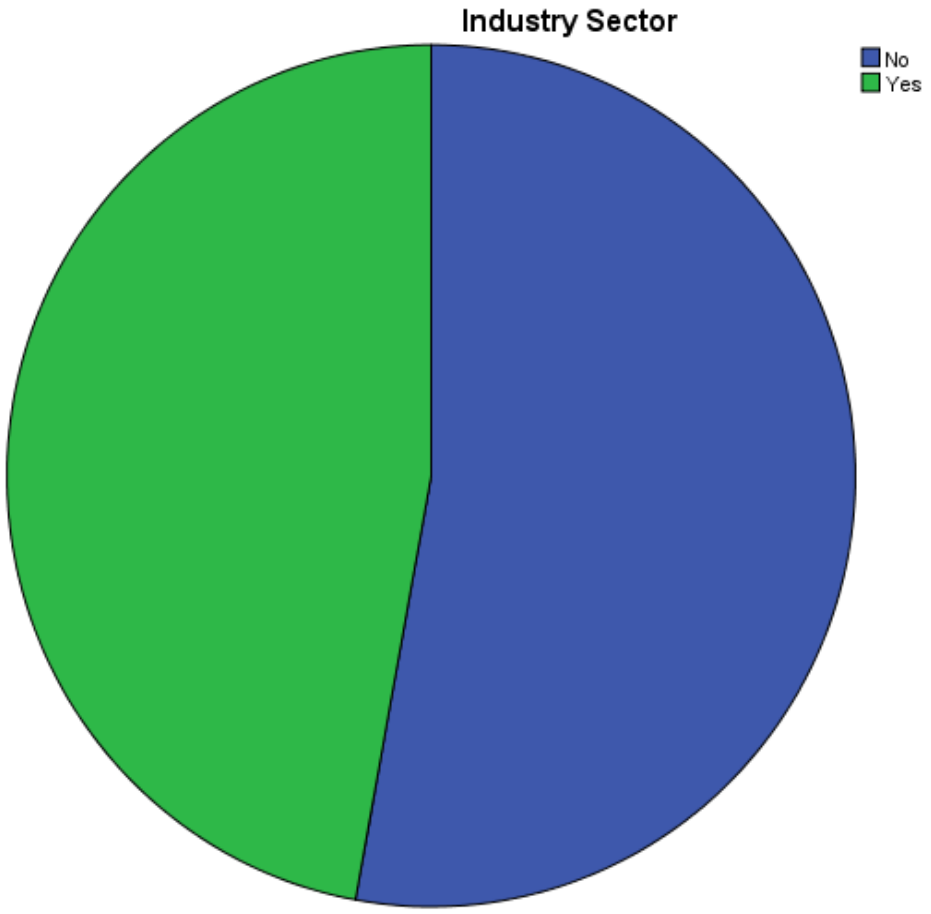

Figure 1. Industrial Sector - Frequencies

4.2. Computation of new Scale Variables

We used scaling methods to compute new variables based on GSCM variables in our research. We computed a scale to measure the implementation and performance of GSCM practices in our population. First of all, we computed new variables in SPSS called IEM_TOTAL, GP_TOTAL, CC_TOTAL, ECO_TOTAL, and IR_TOTAL by calculating the Mean values of each implementation's variable. Next, to compute the scale variable for GSCM implementation, we calculated the Mean values of the above-mentioned new variables and computed the scale variable called IMPL. The IMPL represents the measurement scale of GSCM practices implementation in firms from Austria and Iran, and we used it as our dependent variable to analyze GSCM practices implementation and

hypothesis testing. Here are the first computed variables for each GSCM main variable and they are according to the Mean values of their sub-variables:

IEM_TOTAL = Mean (IEM1, IEM2, IEM3, IEM4, IEM5, IEM6, IEM7, NAT)

GP_TOTAL = Mean (GP1, GP2, GP3, GP4, GP5, NAT)

CC_TOTAL = Mean (CC1, CC2, CC3, NAT)

ECO_TOTAL = Mean (ECO1, ECO2, ECO3, NAT)

IR_TOTAL = Mean (IR1, IR2, IR3, NAT)

Then, we computed IMPL variable according to the following equation:

IMPL = Mean (IEM_TOTAL, GP_TOTAL, CC_TOTAL, ECO_TOTAL, IR_TOTAL, NAT)

Second, we used the same method to compute a new scale variable for GSCM performance. By calculating the Mean values of each performance variable and defining new variables called EP_TOTAL, ECP_TOTAL, and OP_TOTAL, we computed the new scale variable called PERF to measure the performance of the GSCM practices in our population. Here is the computation function for new variables:

EP_TOTAL = Mean (EP1, EP2, EP3, EP4, EP5, EP6, NAT)

ECP_TOTAL = Mean (ECP1, ECP2, ECP3, ECP4, ECP5, NAT)

OP_TOTAL = Mean (OP1, OP2, OP3, OP4, OP5. OP6, NAT)

To calculate PERF, we have:

PERF = Mean (EP_TOTAL, ECP_TOTAL, OP_TOTAL, NAT)

In Appendix I, Section I and II, we used descriptive statistics to explain our data for GSCM implementation and performance variables.

4.3. Statistical Analysis

In this section, we use the independent-sample T-test for testing our research hypotheses. According to chapter 3, we used two steps for data analysis and hypotheses testing. Firstly, we analyze the GSCM implementation variables in Austria and Iran to examine any significant differences in our sample. By this method, we determine if our research hypotheses are approved or rejected. Next, we use statistical analysis for GSCM performance to examine any difference in Mean values in our population.

As discussed in chapter 3, we developed two sets of research hypotheses. The first set evaluates the GSCM implementation and the other GSCM performance. In this chapter, we use statistical analysis to test our hypotheses. We firstly start from hypotheses related to GSCM implementation, and then we continue our analysis by testing the GSCM performance hypotheses.

4.3.1. Statistical Analysis: GSCM practices implementation

We used the independent-sample T-test for hypotheses testing and we used new scale variables as dependent variables for analysis. First of all, we used descriptive statistics to have an overview of our data for IMPL variable. Table 18 shows the descriptive statistics for IMPL variable.

Table 18. IMPL - Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,2606
Median		2,2292
Mode		2,20
Std. Deviation		,40399
Variance		,163
Skewness		,712
Std. Error of Skewness		,287
Kurtosis		,838
Std. Error of Kurtosis		,566
Range		2,03
Minimum		1,61
Maximum		3,64
Percentiles	25	1,9601
	50	2,2292
	75	2,4913

Before performing the test, we must check the data requirements. One of the most critical requirements to perform the T-test is the Normal distribution of dependent variables in each category. As recommended by Keller (2015) and Levin et al., (2017), the skewness and kurtosis tests are more accurate to test the normal distribution of a random variable which is measured by Likert scale. Following this method, we used the Skewness and Kurtosis tests for IMPL. According to Table 18, the IMPL skewness is 0.712 and its kurtosis is 0.838. Since the values of skewness and kurtosis are less than 1, we can justify the normal distribution for IMPL variable.

As shown in Appendix III, Table 29, the p-value of the Independent Sample T-test is 0.001 and is less than 0.05, which means the test is significant. As a result, we can determine a significant difference in Mean values between Austria and Iran for GSCM practices implementation.

4.3.2. Statistical Analysis: GSCM practices performance

In this section, we test our hypotheses for GSCM practices performance in our population. Similar to the previous section, we used Independent-Sample T-test for our analysis. GSCM performance is composed of three different variables, namely environmental performance (EP), economic performance (ECP), and operational performance (OP). These variables also have different sub-variables. We computed a new variable called PERF to measure the GSCM performance and we used it as dependent variable in our data analysis and hypotheses testing for GSCM practices performance.

Table 19. PERF – Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,4908
Median		2,4643
Mode		2,89
Std. Deviation		,45522
Variance		,207
Skewness		,055
Std. Error of Skewness		,287
Kurtosis		-,253
Std. Error of Kurtosis		,566
Range		2,15
Minimum		1,45
Maximum		3,60
Percentiles	25	2,1949

	50	2,4643
	75	2,8110

As a data requirement for Independent-Sample T-test, all variables must have a normal distribution. Similar to the IMPL variable, we used skewness and kurtosis values to test the normality of PERF variable. As shown in Table 19, the PERF skewness is 0.055 and kurtosis is -0.253 that are low, and we can justify the normal distribution for this variable.

Since GSCM performance variable (PERF) has a normal distribution, we perform the independent-sample T-test to test our hypotheses for GSCM practices performance in our population. We perform this statistical test using PERF as dependent variable to compare the Mean values between our two samples.

According to Table 31 in Appendix III, the test shows no significant difference in GSCM performance in our population. Since the p-value is 0.193 and greater than 0.05, there is no significant difference in Mean values between Iran and Austria.

4.4. Testing control variables

As discussed in chapter 3, we examined the Longevity (LONG), the firm's date of establishment, and industry sector (INS) intervening effects in GSCM practices implementation and performance. First of all, we used statistical analysis to determine Longevity's effect on GSCM implementation and performance, and then we will examine if belonging to a specific industry sector is a critical factor in GSCM implementation and performance in our population.

4.4.1. Longevity

In this research study, we examined Longevity as the firm's date of establishment, and we denoted it with LONG. This variable's scale is the year, and we measured it by subtracting the year of establishment from the current year of 2021 when we performed this research.

To determine the effects of Longevity, we divided this variable into four different categories. The first quartile is 17.75 (25%), the second quartile is 31 (50%, the Median), and the third quartile is 66 (75%). According to its Quartiles, we formulated a new variable called Long_cat in SPSS and divided it into different categories. Since we have some respondents that their firms' Longevity was less than the first quartile (we rounded it to 18), we finalized the following categories for this variable:

Category 1: Long_cat < 18

Category 2: 18 < Long_cat < 36

Category 3: 36 < Long_cat < 70

Category 4: Long_cat > 70

Since our independent variable is now qualitative with four categories and our dependent variable is quantitative (GSCM variables), we used One-way Analysis of Variance (ANOVA) to explain the differences in implementation and performance of GSCM practices in firms with different Longevities.

First of all, we examined the relationship between Longevity (LONG_cat) and GSCM implementation (IMPL). As shown in Appendix III, Table 34, we examined the intervening effect of Longevity on GSCM implementation (IMPL) in Austria and Iran by performing One-way Analysis of Variance (ANOVA) in SPSS. Firstly, we checked the Homogeneity of Variances as the pre-assumption of ANOVA. Table 33 shows that the Homogeneity of Variances is confirmed since the p-value of Levene's test is greater than 0.05. Second, as shown by Table 34, the ANOVA test is significant because the p-value is 0.008 and is less than 0.05 which means there is a significant difference between our categories.

Second, we performed One-way ANOVA to determine the intervening effects of Longevity on GSCM performance. We used LONG_cat as an independent variable with four categories and PERF as the dependent variable for GSCM performance.

As shown by Table 36, the p-value of the Levene Test is 0,011, and it is less than 0.05, which means the test is not significant and the variances are not homogeneous. Since the Homogeneity of Variances is the pre-assumption of ANOVA and the Levene Test does not confirm it, we cannot use the ANOVA table for analysis.

To analyze the intervening effect of Longevity on GSCM performance, we used Welch statistic, the non-parametric form of ANOVA, to explain the differences between our categories. As shown in Table 38, the p-value is 0,052, and it is greater than 0,05, which means the test is not significant, and we cannot explain the Mean difference in GSCM performance between our categories.

After performing data analysis, we can now test our Longevity and GSCM implementation and performance hypotheses.

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4.4.2. Post-Hoc Tests

For multiple comparisons of Longevity's effect on GSCM implementation (IMPL) between different LONG categories, we used post-Hoc tests to analyze the results of our experimental data. Since the analysis of variance does not identify which individual differences between pairs of means are significant, post-Hoc tests are instrumental methods to determine the significant difference between the categories.

To perform the post-Hoc test, we used the Bonferroni correction. This method is used to compare paired means and is relatively moderate in analysis.

As shown in Table 39, the Bonferroni correction test is significant for categories 1 and 3 since the test p-value is 0.004 and is less than 0.05. The mean difference between these two categories is -0,46244 which is greater than other categories. There is no significant difference in mean values between other categories according to this post-Hoc test. Category 1 is the firms that their Longevity is less than 18 years and category 3 is the firms with the Longevity between 36 and 70. As a result, we can conclude that there is a significant difference in GSCM implementation between the firms with Longevity less than 18 and the firms with Longevity between 36 and 70.

The mean difference between LONG categories is also explained by Figure 3. The Means Plot shows the significant difference in mean values between categories 1 and 3, while there is a less significant among other categories.

4.4.3. Industrial Sector

As discussed in Chapter 3, the industrial sector is a dummy variable that takes 1 if the firm belongs to a carbon-intensive industry and 0 if otherwise. We denoted this variable by INS. We perform statistical analysis to test the effects of belonging to an industry sector on GSCM practices implementation and performance. Since the industrial sector is a qualitative variable with two categories and our GSCM variables, IMPL and PERF, are quantitative, we used Independent-Sample T-test to explain the differences in Mean values of our statistical population.

As shown in Appendix III, Tables 40 and 41, we performed Independent-Sample T-test to examine the Mean differences in two industrial sectors since the Levene test confirms the equality of variances (p-value < 0.05). According to Table 41, the T-test is not significant because the test p-value is 0,437 and is greater than 0.05, which means there is no significant difference in GSCM implementation between the two industrial sectors.

We performed the Independent-Sample T-test for the GSCM performance variable (PERF) and industrial sector (INS). As shown in Table 43, the test is not significant, and we cannot explain any difference in Mean values between the two industrial sectors.

4.4.4. Interaction Effect: Industrial Sector and Longevity

This section determined the interaction effect of the industrial sector and Longevity on GSCM implementation and performance in our population. We aim to describe a situation in which the effect of Longevity, as one causal variable, on GSCM implementation and performance depends on the industrial sector as the second causal variable. By this analysis, we can determine if Longevity and the industrial sector have an interaction effect.

To perform this analysis, we used the Univariate Analysis of Variance (ANOVA) by the "Univariate" function in SPSS. First of all, we examined the interaction effect on GSCM implementation, and then we will analyze it on GSCM performance.

Using the Univariate function, we considered GSCM implementation (IMPL) as dependent variable and industry sector (INS) and Longevity (Long_cat) as Fixed Factors. Tables 44 and 45 show the Univariate Analysis of Variance Test. To determine the interaction effect, we consider the p-value of INS*Long_cat in Table 45, which shows the p-value as 0,129. Since the p-value is greater than 0,05, the test is not significant, and we cannot explain any interaction effect between the industrial sector (INS) and Longevity (Long_cat) on GSCM implementation (IMPL).

We determined the interaction effect between the industrial sector and Longevity on GSCM performance by considering PERF as the dependent variable and INS and Long_cat as Fixed Factors. Tables 46 and 47 show the Univariate Analysis of Variance Test. Since the p-value of INS*Long_cat in Table 47 is greater than 0,05 (0,625), we conclude that there is no interaction effect between the industrial sector and Longevity on GSCM performance.

5. Conclusion and Discussion

In this chapter, we would discuss our research findings and answer the research questions. This research investigates the differences in implementation and performance of Green Supply Chain Management practices in Austria and Iran with different cultural settings. We guided this research by considering different variables and sub-variables for GSCM implementation and performance and the other two control variables. By setting twelve hypotheses, we executed our random survey in two culturally different populations, Austria and Iran, to determine any significant difference in GSCM implementation and performance among firms in these two countries.

For random survey, we formulated a questionnaire according to the GSCM variables adapted by Zhu et al. (2008) and distributed it in our research population. We used independent-sample T-test, Analysis of Variance (ANOVA) for statistical analysis and hypotheses testing and Univariate Analysis of Variance for determining the interaction effect between our control variables. We performed all statistical analysis in SPSS version 23.

First of all, we describe our research findings in detail and discuss our research hypotheses of GSCM implementation and performance measurement. Next, we explain our research constraints, which hindered our research, and it is worthy of recognizing them for future research projects. In the end, we will provide our readers with suggestions for further research.

5.1. Research Findings

Since this research aims to investigate the effects of national culture on GSCM practices implementation and performance, we set our hypotheses by incorporating the national culture value and GSCM implementation and performance. In this section, we expound our research hypotheses and interpret them by using the results from our statistical analysis in Chapter 4.

H_{1a}: *Companies in cultures considered as high-power distance implement fewer GSCM practices.*

Table 29 in Appendix III shows the results of independent-sample T-test between the Mean values of IMPL variable in two groups of our population. The results show that there is a significant difference in Mean values between our independent groups. In other words, the mean difference of GSCM practices implementation (IMPL) between our groups is 0.3454 which means that the first group (Austrian firms) implements more GSCM practices than second group (Iranian firms).

Since the score of power distance for Iran is 5.43 and for Austria is 4.95 according to the GLOBE project, we consider Iran as higher-power distance country comparing to Austria. According to the results from the statistical analysis, we reject the null hypothesis and approve our alternative hypothesis that “companies in cultures considered as high-power distance implement fewer GSCM practices”. Given that there are a few literatures examining the national culture effects on GSCM practices, we used similar research studies to compare our hypotheses.

This finding for the effects of power distance is consistent with several research studies such as Ringov and Zollo (2007) that came to the result that “power distance has a negative effect on firm’s social and environmental performance”. It is also in line with research studies by Katz, Swanson, and Nelson (2001) that found “high power distance implies less concern about natural environment” and Peng et al. (2012) that argues “ power distance has negative impacts on corporation’s CSR engagement”.

Power distance is referred to the fact that the community accepts the authority and power differences. Since an organization is a community of people with the same objective, there would be power distance between different organizational layers. This cultural value is in consistent with GSCM variables which measure the top and mid-level managers’ commitment to support GSCM practices (IEM1 and IEM2), cross-functional cooperation for environmental improvements (IEM3), environmental auditing programs for the organizations and its suppliers’ internal management (IEM5 and GP3), and willingness to exit the environmental management system (IEM7). Table 48 in Appendix I indicates the statistical information for these variables in Austria and Iran. The mean values of Austrian firms were greater than Iranians in all these variables, which explains more significant support by top and mid-level managers, greater cross-functional cooperation between different departments in organization to implement GSCM practices, meaningful number of environmental auditing programs in Austrian firms.

This finding indicated that power distance in countries with high score would be a setback to implement GSCM practices due to the preventive effects of the variables stated above. When the GSCM practices implementation is not supported by top management and it is not included in organizational strategic plans, it will not be communicated to mid-level managers, so that cross-functional cooperation cannot be executed and there will be no environmental compliance and auditing programs in the organization. Sometimes either mid-level managers or other employees would tend to implement environmental protection programs in their daily operations, but the power difference in the organization does not

allow them to do so. Therefore, power differences and status privileges hinder the GSCM implementation in organizations.

According to these findings and compliance with previous research studies, we conclude that power distance plays the disruptor role in GSCM implementation in countries with high power distance score likewise Iran.

H_{2a}: *Companies in cultures considered as high uncertainty avoidance implement more GSCM practices.*

According to Table 29 in Appendix III, the independent-sample T-test is significant for IMPL variable which means that there is a significant difference in mean values of IMPL variable for our two groups. This indicates the difference in GSCM implementation in Austria and Iran.

Austria is considered as high uncertainty avoidance country with the score of 5.16 than Iran with score of 3.67, according to the project GLOBE. Based on these scores, we assumed that Austrian companies would implement more GSCM practices than Iranian firms. The results of statistical analysis show that the mean difference between our two groups for GSCM implementation is 0.3454 which shows the higher scores for IMPL scale for Austrian firms. Therefore, we can reject the null hypothesis and approve our alternative hypothesis that “Companies in cultures considered as high uncertainty avoidance (Austria) implement more GSCM practices”.

This finding is in line with previous research studies that found positive relationship between uncertainty avoidance and environmental practices and sustainable supply chain management. The study by Peng et al. (2012) showed the positive effects of uncertainty avoidance on CSR engagement. Other research studies by Paraboteeah et al. (2012), Ringov and Zollo (2007), and Peng at al., (2014) also suggested the positive effect of high uncertainty avoidance on implementation of environmental and sustainable supply chain practices.

In explaining this finding, we can discuss that uncertainty avoidance is the degree to which organizations or a community rely on a particular set of rules or procedures to mitigate the unpredictability of future events (GLOBE Project). This definition has corresponded to the GSCM implementation variables, which measured the organizational inclination to perform total quality environmental management (IEM4), consider ISO14001 certification for their internal processes (IEM6) and Suppliers' ISO14001 certification (GP4), Eco-labeling of products (GP1), and second-tier supplier environmentally friendly practice evaluation (GP5). According to Table 49, Austrian firms had higher mean values for each of these

variables than Iranian firms, which means that Austrian companies more effectively follow procedures and rules to alleviate the uncertainty of future events. Therefore, they implement more GSCM practices in their organization by following GSCM procedures, and we concluded that uncertainty avoidance played the facilitator role in GSCM implementation in countries with high uncertainty avoidance.

H_{3a}: *Companies in cultures considered as greater performance orientation implement fewer GSCM practices.*

As discussed above, there was a significant difference between Austrian and Iranian firms in GSCM practices implementation. According to the GLOBE cultural framework, Iran is considered a country with a high-performance orientation since its score is 4.58 while the score of Austria is 4.44. Since there was a significant difference in GSCM implementation (IMPL) between Austria and Iran, we rejected our null hypothesis, and we approved our alternative hypothesis that "firms in cultures considered as greater performance orientation implement fewer GSCM practices."

The negative effect of high-performance orientation was approved by previous research studies. It was suggested by Parboteeah et al., (2012), Husted (2005), and Alas (2006) that high performance orientation hindered the process of environmental practices implementation.

As defined by project GLOBE, performance orientation is the degree to which it aims to reach performance improvement and excellence. As discussed in chapter 2, one of the main aspects of performance orientation in environmental management practices is how organizations are connected to the outside world. We measured this characteristic in our research by considering the variables that explain the firms' cooperation with their external business partners. We examined the effect of performance orientation by variables that measured the degree of cooperation with customers and suppliers for GSCM implementation (GP2, CC1, CC2, CC3). Table 50 shows the significant difference between the mean values for each of these variables in Austrian and Iranian firms that which we can explain the more connection of Austrian firms to the outside environment and their external business partners. In conclusion, we determined the negative effect of performance orientation and its disrupting role in GSCM practices implementation.

H_{4a}: *Companies in cultures considered as greater future orientation implement more GSCM practices.*

Since the results of independent-sample T-test showed the significant difference in GSCM implementation (IMPL) between Austria and Iran, we reject the null hypothesis and approve

our research hypothesis that “companies in cultures considered as greater future orientation implement more GSCM practices”.

Our finding for the effects of future orientation on GSCM practices implementation is supported by previous research studies such as Paraboteeah et al., (2012) and Peng et al., (2014).

The future orientation score for Austria is 4.46 while it is 3.7 for Iran, which considered Austria as a high future-oriented country. The future-oriented countries tend to work on long-term planning for the future and focusing on future benefits rather than immediate and short-term achievements. In our research study, the GSCM variables which measure the design of products for reduced consumption of materials, reuse and recycle of component parts, and use of hazardous materials (ECO1, ECO2, and ECO3) and the variables which measure investment recovery and sales of excess materials (IR1, IR2, and IR3) correspond the future orientation in our population. As shown in Table 51, there is a significant difference in mean values between Austria and Iran for these variables, which means that Austrian firms are more future-oriented than Iranian firms. As a result, we determined the positive effect of future-orientation on GSCM implementation, and it worked as facilitator in GSCM process.

H_{1b}: *GSCM practices performance will be more effectively measured in high power distance countries.*

Table 31 in Appendix III indicates the results of independent-sample T-test between mean values of PERF variable in two groups. The results show a relatively significant difference in mean values between our independent groups. The mean value for the first group (Austrians) is 2.4197 and for the second group is 2.5619 which result in mean difference of -0.14218. Since the mean value for GSCM performance (PERF) for Iran and Austria is relatively close, we can conclude that there is no significant difference in GSCM performance, and we retain the null hypothesis.

GSCM performance (PERF) consists of three main variables which are environmental performance, economic performance, and operational performance. Environmental performance mainly measured the reduction of air emission and degree of waste management efficiency in organizations, while the economic performance examined the cost reduction and fees for waste treatment. Additionally, operational performance evaluated capacity utilization, reduction in scrap rate, and inventory levels. Since there is no significant different in GSCM performance measurement between our two groups, we can conclude that Austrian and Iranian firms follow a relatively similar procedure for GSCM

practices performance. Therefore, power distance did not hinder the measurement process of GSCM performance and played the role of a facilitator with positive effect.

H_{2b}: *GSCM practices performance will be more effectively measured in high uncertainty avoidance countries.*

H_{3b}: *GSCM practices performance will be less effectively measured in countries with greater performance orientation.*

H_{4b}: *GSCM practices performance will be more effectively measured in countries with greater future orientation.*

According to the results of independent-sample T-test in Table 31, there is no significant difference in GSCM performance (PERF) between Austria and Iran, which means Austrian and Iranian firms used a similar guideline to measure their GSCM performance. Thus, regarding the above hypotheses, we can retain the null hypothesis and we did not find any fact to approve them.

For GSCM performance, since we could not detect any significant difference between our two groups, we can determine that cultural factors like higher uncertainty avoidance and future orientation could not influence the GSCM performance in our two populations so that they had a neutral role in this process. Furthermore, we assumed that the GSCM performance will be less effectively measured in countries with greater performance orientation likewise Iran, but our data analysis and hypothesis testing indicated no significant difference between our two groups with difference performance orientation score. Hence, we could not consider performance orientation as a disruptor in GSCM practices performance measurement, but its facilitating role could not also be approved.

Regarding our control variable to examine their intervening effects, we evaluated the effects of Longevity, as No. of years from firms' date of establishment, and industrial sector if the firm belongs to a carbon intensive industry or not.

Table 34 in Appendix III indicates the results of ANOVA test for Longevity effect on GSCM implementation variable (IMPL). The ANOVA test was significant that means GSCM practices were implemented differently in firms with different Longevity. We divided our sample into four different categories of Longevity. To determine the difference between groups, we used post-Hoc analysis with Bonferroni correction. The test indicated the significant difference between category 1 and 3. According to Table 32, firms which belong to category 3 (36 <Longevity < 70) implemented more GSCM practices since their mean value was 2.5143, and firms in category 1 (Longevity < 18) implemented less GSCM practices because their mean value was 2.0521. These two categories had the most

difference in means values for GSCM implementation in our population. As a result, we could determine the positive intervening effect of Longevity on GSCM implementation in Austria and Iran.

To check the Longevity's effect on GSCM performance, we used the ANOVA test. As shown in Table 38, the Welch test was not significant, and we could not detect the significant difference between our categories. Additionally, Table 35 indicated the mean values of each category. The firms in category 2 (18 < Longevity < 36) measured the GSCM practices performance more effectively than other categories since their mean value was 2.6726. According to the mean values of our categories, we could determine that Longevity and GSCM performance had negative relationship with each other since the firms with higher Longevity measured their GSCM performance less effectively. Therefore, we could conclude that Longevity had negative intervening effect on GSCM performance measurement in our population.

In this research study, we considered Longevity as a control variable because we assumed that firms with higher Longevity had more capacity and financial power as well as maturity to maintain more commitments to environmental practices compared to the firms which are in their beginning years of establishment. This assumption was approved for GSCM implementation since we detected higher mean values for older firms, but we rejected it for GSCM performance since newly established and mid-aged firms measured their GSCM performance more effectively.

Another control variable of our research study was industrial sector (INS). Industrial sector was defined as the firm belongs to a carbon intensive industry or not. As discussed in Chapter 4, we used independent-sample T-test to examine the intervening effect of industrial sector on our two groups. Table 41 showed the results of independent-sample T-test for INS and GSCM implementation. The test was not significant since its p-value is greater than the standard error (0.05). According to the results generated by our statistical analysis, we could conclude that industrial sector had no intervening effect on GSCM implementation in Austrian and Iran.

We used the same approach to determine the effect of industrial sector in GSCM practices performance. Table 43 indicated the results of our statistical analysis. Since the p-value of independent-sample T-test is greater than the standard error (0.05), there was no significant difference between firms in carbon-intensive industries and other firms in GSCM practices performance. Therefore, industrial sector had no intervening effect on measuring the GSCM performance in Austria and Iran.

We considered the industrial sector as a control variable for our research to investigate the role of restricting regulations by governments to oblige the firms to implement environmental practices in their daily processes. Iran is a country with several different carbon-intensive industries like petrochemical, oil and gas, metal industries, and mineral sites that annually emit a great number of greenhouse gases. According to the World Bank data, Iran's latest CO2 emission index in 2016 was 8.317 while it was 7.033 for Austria. From another point of view, the total greenhouse gas emissions (% change from 1990) for Austria was 16.834 (2007), while it was 129.442 (2007) for Iran (World Bank Data). These figures show that Iran is a country with more carbon-intensive industries. Our finding indicated no difference in GSCM implementation and performance measurement between firms in carbon-intensive industries and others. It reflected that government surveillance and restricting laws did not change the firms' propensity towards GSCM implementation and the quality of GSCM performance measurement. Consequently, belonging to a carbon-intensive industry changed the firms' inclination to neither implement more GSCM practices nor effectively perform it.

We examined the interaction effect of Longevity and industrial sector on GSCM implementation and performance using Univariate Analysis of Variance. Tables 45 and 47 indicated the results of interaction effect testing for INS/Long_cat on GSCM implementation and performance. We could not determine any interaction effect for these variables which means that belonging to a specific industrial sector and Longevity did not influence the GSCM practices implementation and performance simultaneously. This finding is in consistent with the research study by Calza et al., (2016) in which “the introduction of the firm’s longevity and of the industry dummy does not influence the results of the model”.

Consequently, in this section, we evaluated our findings from statistical analysis and hypotheses testing to constitute a comparison sketch for GSCM implementation and performance measurement in Austria and Iran. Previous research studies have approved the role of culture and used different frameworks and approaches to delineate the importance of cultural values in shaping business practices in different organizations. They also approved that cultural differences greatly influence the environmental and sustainable supply chain management practices in different countries. Our findings also approved the positive or negative effects of cultural values on GSCM practices. Cultural values could take different roles, such as a facilitator, disruptor or neutral in implementing GSCM practices and measuring its performance. For instance, some cultural values played the role of a facilitator, which could accelerate the implementation and performance measurement of GSCM or environmental practices, while others could be considered disruptors, impeding this process.

5.2. Research Constraints

Similar to any other research projects, we encountered some constraints during our research process. Here are some of these limitations which had influenced our research:

1. There was a lack of sufficient literature directly examining the effects of cultural differences on GSCM practices.
2. In some cases, we identified that some of our respondents could not clearly understand the meaning of the questions so that a further explanation was necessary for some of the respondents to find the most appropriate answer. To solve this problem, we contacted them in person and gave them more information about the questions.
3. The questionnaire was relatively long, with 38 questions that might reduce our respondents' degree of concentration. Therefore, it might result in decreasing the response rate and reduce the research tool precision.
4. Due to the restricted condition caused by COVID-19 measurements, it was demanding to meet people to give them the questionnaire and perform an interview. To mitigate the effects of this constraint, we used an online questionnaire and sent it to our respondents via a link.

5.3. Suggestions for further research

5.3.1. Research suggestions

1. We suggest that GSCM practices implementation and performance will be examined in countries with a more significant difference in cultural values for further research projects.
2. We only examined four cultural values according to the GLOBE project in this research study. We suggest that other cultural values are also considered to evaluate GSCM practices implementation and performance measurement in further studies.
3. To ease the data collection and alleviate the risks of misunderstanding of questions, we suggest using qualitative and quantitative methods for data analysis simultaneously and performing interviews besides questionnaires to increase the response rate.
4. Evaluating the effects of other control variables, such as country’s GDP per capita, firms’ size, and income is another suggestion for future research projects.
5. Since our research goal was to examine cultural differences in GSCM practices between two countries, multi-level analysis could be another suggestion. Future research project can investigate the cultural differences in GSCM practices

implementation and performance measurement in country and firms' level by using Hierarchical Linear Modeling (HLM) methods in different populations.

5.3.2. Practical suggestions

Firms can consider the findings of this research to:

1. Identify the culture's effects when they decide to implement their GSCM practices in a foreign branch office with a different culture.
2. Alleviate the negative effects of cultural elements on their GSCM practices implementation and performance measurement in a foreign subsidiary.
3. Evaluate the quality of GSCM practices implementation and performance measurement in their internal organization and find appropriate solution to improve them.
4. Identify different factors of GSCM practices implementation and performance measurement to adapt them in their internal processes.

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Appendix I: Data Analysis Results

Section I: Descriptive Statistics of GSCM implementation variables

Table 20. IEM_TOTAL – Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,5446
Median		2,5000
Mode		1,88[a]
Std. Deviation		,76850
Variance		,591
Skewness		,195
Std. Error of Skewness		,287
Kurtosis		-,374
Std. Error of Kurtosis		,566
Range		3,50
Minimum		1,00
Maximum		4,50
Percentiles	25	1,8750
	50	2,5000
	75	3,2500

Table 21. GP_TOTAL – Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,3690
Median		2,3333
Mode		2,00
Std. Deviation		,62289
Variance		,388
Skewness		,410
Std. Error of Skewness		,287
Kurtosis		,253
Std. Error of Kurtosis		,566
Range		3,17
Minimum		1,17
Maximum		4,33

Percentiles	25	1,9583
	50	2,3333
	75	3,8333

Table 22. CC_TOTAL – Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,3143
Median		2,2500
Mode		2,50
Std. Deviation		,68853
Variance		,474
Skewness		,658
Std. Error of Skewness		,287
Kurtosis		-,175
Std. Error of Kurtosis		,566
Range		2,75
Minimum		1,25
Maximum		4,00
Percentiles	25	1,7500
	50	2,2500
	75	3,5625

Table 23. ECO_TOAL - Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,4214
Median		2,2500
Mode		2,00
Std. Deviation		,74763
Variance		,559
Skewness		,615
Std. Error of Skewness		,287
Kurtosis		-,334
Std. Error of Kurtosis		,566
Range		3,00
Minimum		1,00
Maximum		4,00
Percentiles	25	1,9375
	50	2,2500

	75	2,7500

Table 24. IR_TOTAL – Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,4143
Median		2,3750
Mode		2,25
Std. Deviation		,61663
Variance		,380
Skewness		,193
Std. Error of Skewness		,287
Kurtosis		,264
Std. Error of Kurtosis		,566
Range		3,00
Minimum		1,00
Maximum		4,00
Percentiles	25	2,0000
	50	2,3750
	75	2,7500

Section II: Descriptive Statistics of GSCM performance variables

Table 25. EP_TOTAL – Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,7837
Median		2,8571
Mode		2,86
Std. Deviation		,84873
Variance		,720
Skewness		-,040
Std. Error of Skewness		,287
Kurtosis		-,431
Std. Error of Kurtosis		,566
Range		3,57
Minimum		1,00
Maximum		4,57
Percentiles	25	2,1429

	50	2,8571
	75	3,4286

Table 26. ECP_TOTAL – Descriptive Statistics

N	Valid	70
	Missing	0
Mean		2,5429
Median		2,5000
Mode		2,17
Std. Deviation		,71542
Variance		,512
Skewness		,305
Std. Error of Skewness		,287
Kurtosis		-,346
Std. Error of Kurtosis		,566
Range		3,00
Minimum		1,17
Maximum		4,17
Percentiles	25	2,0000
	50	2,5000
	75	3,0000

Table 27. OP_TOTAL – Descriptive Statistics

N	Valid	70
	Missing	0
Mean		3,1367
Median		3,1429
Mode		3,00
Std. Deviation		,61213
Variance		,375
Skewness		-,540
Std. Error of Skewness		,287
Kurtosis		,444
Std. Error of Kurtosis		,566
Range		3,14
Minimum		1,14
Maximum		4,29
Percentiles	25	2,7143
	50	3,1429
	75	3,5714

Section III: Hypothesis Testing Data Analysis

Table 28. Independent-Sample T-test – Group Statistics - IMPL

	Nationality	N	Mean	Std. Deviation	Std. Error Mean
IMPL	Austrian	35	2,4333	,44245	,07479
	Iranian	35	2,0879	,27210	,04599

Table 29. Independent-Sample T-test - IMPL

		Leven's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
IMPL	Equal variances assumed	5,031	,028	3,934	68	,001	,34544	,08780	,17024	,52064
	Equal variances not assumed			3,934	56,499	,001	,34544	,08780	,16959	,52128

Table 30. Independent-Sample T-test – Group Statistics - PERF

	Nationality	N	Mean	Std. Deviation	Std. Error Mean
PERF	Austrian	35	2,4197	,54300	,09178
	Iranian	35	2,5619	,33954	,05739

Table 31. Independent-Sample T-test - PERF

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Differences	
		F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PERF	Equal variances assumed	11,122	,001	-1,313	68	,193	-1,4218	,10825	-,35819	,07383
	Equal variances not assumed			-1,313	57,062	,194	-1,4218	,10825	-,35894	,07459

Table 32. One-way ANOVA – IMPL/Long_cat – Descriptive Statistics

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	18	2,0521	,23163	,05459	1,9369	2,1673	1,65	2,67
2	22	2,2301	,34998	,07462	2,0749	2,3853	1,61	3,01
3	16	2,5143	,50727	,12682	2,2440	2,7846	1,65	3,64
4	14	2,2867	,39950	,10677	2,0560	2,5147	1,61	2,99
Total	70	2,2606	,40339	,04829	2,1643	2,3569	1,61	3,64

Table 33. Test of Homogeneity of Variances – IMPL/Long_cat

Levene Statistic	df1	df2	Sig
2,705	3	66	,052

Table 34. One-way ANOVA – IMPL/Long_cat

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	1,843	3	,614	4,304	,008
Within Groups	9,419	66	,143		
Total	11,261	69			

Table 35. One-way ANOVA – PERF/Long_cat – Descriptive Statistics

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	18	2,4593	,26681	,06289	2,3266	2,5920	2,09	2,95
2	22	2,6726	,37248	,07941	2,5075	2,8378	2,21	3,60
3	16	2,4807	,53089	,13272	2,1978	2,7635	1,61	3,47
4	14	2,2572	,58418	,15613	1,9199	2,5945	1,45	3,26
Total	70	2,4908	,45522	,05441	2,3823	2,5994	1,45	3,60

Table 36. Test of Homogeneity of Variances – PERF/Long_cat

Levene Statistic	df1	df2	Sig
4,010	3	66	,011

Table 37. One-way ANOVA – PERF/Long_cat

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	1,511	3	,504	2,599	,060
Within Groups	12,788	66	,194		
Total	14,298	69			

Table 38. Robust Tests of Equality of Means – PERF/Long_cat

	Statistic [a]	df1	df2	Sig
Welch	3	3	32,227	,086

a. Asymptotically F distributed.

Table 39. Post-Hoc Test – Multiple Comparison – Bonferroni Correction

(I) Long_cat	(J) Long_cat	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-,17803	,12006	,857	-,5046	,1486
	3	-,46224*	,12980	,004	-,8153	-,1092
	4	-,23462	,13462	,516	-,6008	,1316
2	1	,17803	,12006	,857	-,1486	,5046
	3	-,28421	,12412	,151	-,6215	,0534
	4	-,05659	,12915	1,000	-,4079	,2947
3	1	,46224*	,12980	,004	,1092	,8153
	2	,28421	,12412	,151	-,0534	,6218
	4	,22762	,13825	,627	-,1484	,6037
4	1	,23462	,13462	,516	-,1316	,6008
	2	,05659	,12915	1,000	-,2947	,4079
	3	-,22762	,13825	,627	-,6037	,1484

Figure 2. Means Plot - IMPL/Long_cat

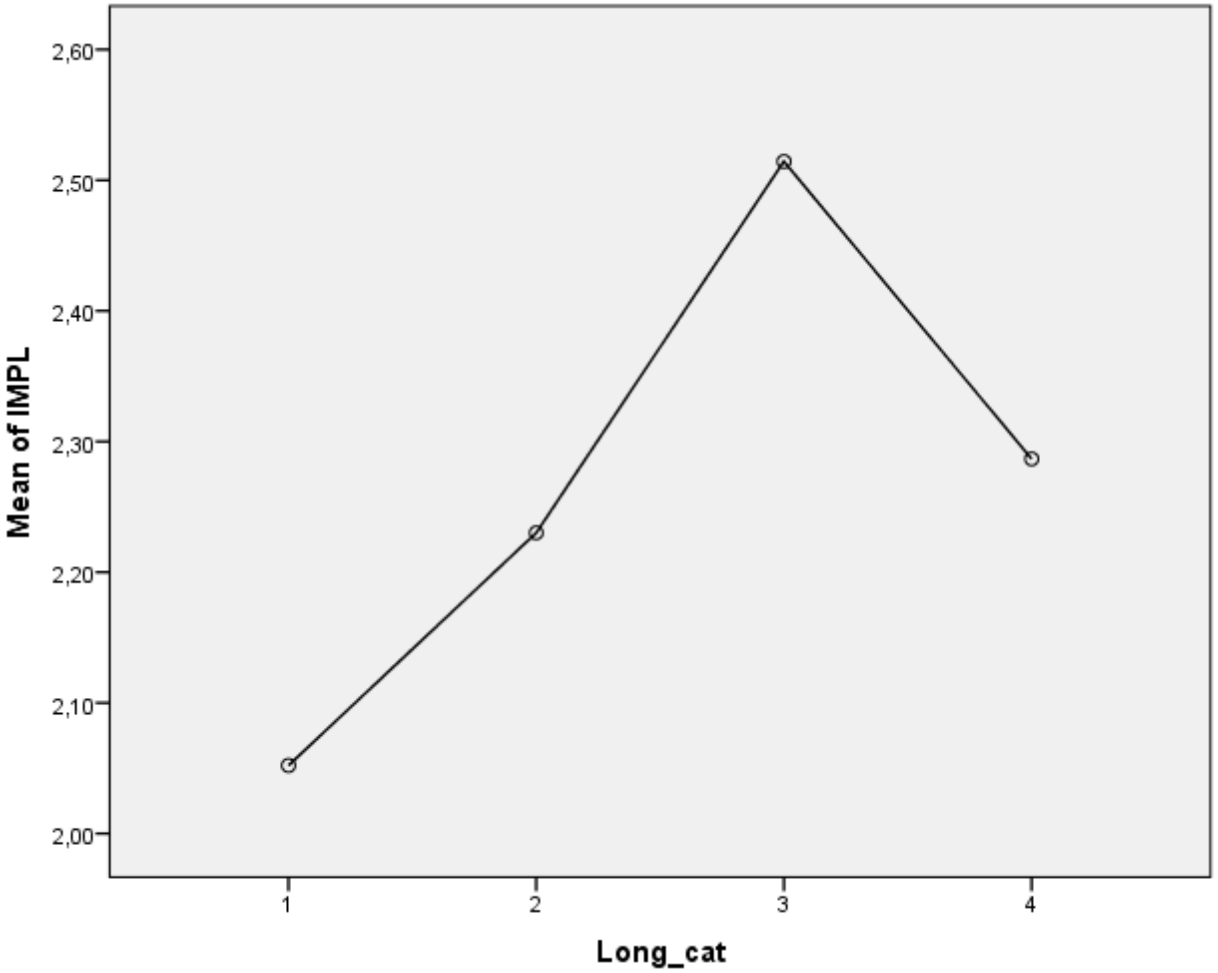

Table 40. Group Statistics – INS/IMPL

Industrial Sector		N	Mean	Std. Deviation	Std. Error Mean
IMPL	No	37	2,2964	,45180	,07427
	Yes	33	2,2205	,34519	,06009

Table 41. Independent-Sample T-test – INS/IMPL

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Differences	
		F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
IMPL	Equal variances assumed	1,984	,164	,782	68	,437	,07582	,09700	-,11775	,26939
	Equal variances not assumed			,794	66,499	,430	,07582	,09554	-,11490	,26654

Table 42. Group Statistics – INS/PERF

Industrial Sector		N	Mean	Std. Deviation	Std. Error Mean
PERF	No	37	2,4715	,44252	,07275
	Yes	33	2,5124	,47499	,08268

Table 43. Independent-Sample T-test – INS/PERF

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Differences	
		F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PERF	Equal variances assumed	,625	,432	-,373	68	,710	-,04092	,10968	-,25979	,17795
	Equal variances not assumed			-,372	65,715	,711	-,04092	,11013	-,26083	,17898

Table 44. Univariate Analysis of Variance – Between-Subjects Factors - IMPL

		Value Label	N
Industrial Sector	0	No	37
	1	Yes	33
Long_cat	1		18
	2		22
	3		16
	4		14

Table 45. Univariate Analysis of Variance – Test of Between-Subjects Effects

Dependent Variable: IMPL

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Corrected Model	2,983 [a]	7	,426	3,191	,006
Intercept	337,363	1	337,363	2526,486	,001
INS	,437	1	,437	3,271	,075
Long_cat	1,960	3	,653	4,894	,004
INS*Long_cat	,786	3	,262	1,962	,129
Error	8,279	62	,134		
Total	368,988	70			
Corrected Total	11,261	69			

a. R Squared = ,265 (Adjusted R Squared = ,182)

Table 46. Univariate Analysis of Variance – Between-Subjects Factors - PERF

		Value Label	N
Industrial Sector	0	No	37
	1	Yes	33
Long_cat	1		18
	2		22
	3		16
	4		14

Table 47. Univariate Analysis of Variance – Test of Between-Subjects Effects

Dependent Variable: PERF

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Corrected Model	1,874 [a]	7	,268	1,336	,249
Intercept	395,684	1	395,684	1974,513	,001
INS	,005	1	,005	,027	,870
Long_cat	1,561	3	,520	2,597	,060
INS*Long_cat	,353	3	,118	,588	,625
Error	12,425	62	,200		
Total	448,590	70			
Corrected Total	14,298	69			

a. R Squared = ,265 (Adjusted R Squared = ,182)

Section IV: GSCM variables corresponding to Cultural Values

Table 48. GSCM variables corresponding to Power Distance (PD) – Group Statistics

	Nationality	N	Mean	Std. Deviation	Std. Error Mean
IEM1	Austrian	35	2,23	1,215	,205
	Iranian	35	2,31	1,078	,182
IEM2	Austrian	35	3,14	1,287	,217
	Iranian	35	2,29	,825	,139
IEM3	Austrian	35	3,00	1,138	,192
	Iranian	35	2,37	,910	,154
IEM5	Austrian	35	3,31	1,491	,252
	Iranian	35	2,57	1,092	,185
GP3	Austrian	35	1,63	1,190	,201
	Iranian	35	1,80	,797	,135
IEM7	Austrian	35	2,74	1,245	,210
	Iranian	35	1,97	,891	,151

Table 49. GSCM variables corresponding to Uncertainty Avoidance (UA) – Group Statistics

	Nationality	N	Mean	Std. Deviation	Std. Error Mean
IEM4	Austrian	35	3,63	1,285	,217
	Iranian	35	2,40	1,035	,175
IEM6	Austrian	35	3,46	1,379	,233
	Iranian	35	2,57	1,313	,222
GP1	Austrian	35	3,26	,919	,155
	Iranian	35	1,71	,572	,097
GP4	Austrian	35	3,34	,938	,158
	Iranian	35	1,80	,584	,099
GP5	Austrian	35	3,03	,985	,166
	Iranian	35	2,14	,974	,165

Table 50. GSCM variables corresponding to Performance Orientation (PO) – Group Statistics

	Nationality	N	Mean	Std. Deviation	Std. Error Mean
CC1	Austrian	35	3,63	1,087	,184
	Iranian	35	1,74	,780	,132
GP2	Austrian	35	3,09	1,269	,214
	Iranian	35	2,34	1,110	,188
CC2	Austrian	35	2,89	1,388	,235
	Iranian	35	2,11	,900	,152
CC3	Austrian	35	2,91	1,442	,244
	Iranian	35	2,23	1,031	,174

Table 51. GSCM variables corresponding to Future Orientation (FO) – Group Statistics

	Nationality	N	Mean	Std. Deviation	Std. Error Mean
ECO1	Austrian	35	3,57	1,008	,170
	Iranian	35	1,97	,747	,126
ECO2	Austrian	35	3,51	1,040	,176
	Iranian	35	1,86	,733	,124
ECO3	Austrian	35	3,57	1,243	,210
	Iranian	35	1,89	,631	,107
IR1	Austrian	35	3,17	1,339	,226
	Iranian	35	2,46	,886	,150
IR2	Austrian	35	2,89	1,388	,235
	Iranian	35	2,29	1,037	,181
IR3	Austrian	35	3,09	1,222	,206
	Iranian	35	2,43	,917	,155

Appendix II: GSCM Questionnaire

Nationality

O Austrian

O Iranian

Firm's date of establishment

Is your firm working in a carbon-intensive industry?

(Describing an industry that has a high carbon or other greenhouse gases footprint in relation to its economic performance)

O Yes

O No

Section I: GSCM Implementation

1: not considering it

2. planning to consider it

3. considering it currently

4: initiating implementation

5: implementing successfully

Internal Environment Management (IEM)

1. During the past five years, to what extent were the senior managers committed to Green Supply Chain Management practices in your organization?

O 1

O 2

O 3

O 4

O 5

2. During the past five years, to what extent did the mid-level managers support the Green Supply Chain Management practices in your organization?

O 1

O 2

O 3

O 4

O 5

3. In your company, to what extent do you score the degree of cross-functional cooperation for environmental improvements?

O 1

O 2

O 3

O 4

O 5

4. In your company, to what extent is the total quality environmental management system implemented?

O 1

O 2

O 3

O 4

O 5

5. During the past five years, to what extent was your company inclined to perform environmental compliance and auditing programs?

O 1

O 2

O 3

O 4

O 5

6. To what extent is your company willing to implement ISO 14001 certification principles?

O 1

O 2

O 3

O 4

O 5

7. To what extent is your company willing to exit the Environmental Management System in next two years?

O 1

O 2

O 3

O 4

O 5

Green Purchasing (GP)

8. To what extent does your company implement a product Eco-labeling system?

O 1

O 2

O 3

O 4

O 5

9. During the past five years, to what extent did your company cooperate with suppliers for environmental objectives?

O 1

O 2

O 3

O 4

O 5

10. During the past five years, to what extent did your company perform environmental audit for suppliers' internal management?

O 1

O 2

O 3

O 4

O 5

11. When you are selecting a supplier or business partner, to what extent do you consider if they have an ISO14001 Certificate?

O 1

O 2

O 3

O 4

O 5

12. To what extent is the second-tier supplier environmentally friendly practice implementation important to your company?

O 1

O 2

O 3

O 4

O 5

Cooperation with Customers (CC)

13. During the past five years, to what extent did your company cooperate with the customers for eco-design?

O 1

O 2

O 3

O 4

O 5

14. During the past five years, to what extent did your company cooperate with customers for cleaner production?

O 1

O 2

O 3

O 4

O 5

15. During the past five years, to what extent did your company cooperate with customers for green packaging?

O 1

O 2

O 3

O 4

O 5

Eco-Design (ECO)

16. During the past five years, to what extent did your company use the design of products for reduced consumption of material / energy?

O 1

O 2

O 3

O 4

O 5

17. During the past five years, to what extent did your company use the design of products for reuse, recycle, recovery of material and component parts?

O 1

O 2

O 3

O 4

O 5

18. During the past five years, to what extent did your company use the design of products to avoid or reduce the use of hazardous products and/or their manufacturing?

O 1

O 2

O 3

O 4

O 5

Investment Recovery (IR)

19. During the past five years, to what extent did your company implement the investment recovery (sale) of excess inventory / materials?

O 1

O 2

O 3

O 4

O 5

20. To what extent does your company implement the sale of scrap and used materials?

O 1

O 2

O 3

O 4

O 5

21. During the last five years, to what extent did your company implement the sale of excess capital equipment?

O 1

O 2

O 3

O 4

O 5

Section II: GSCM Performance

1: not at all

2: a little bit

3: to some degree

4: relatively significant

5: significant

Environmental Performance (EP)

22. During the past five years, to what extent did your company engage in the reduction of air emissions?

O 1

O 2

O 3

O 4

O 5

23. During the past five years, to what extent did your company engage in the reduction of wastewater?

O 1

O 2

O 3

O 4

O 5

24. During the past five years, to what extent did your company engage in the reduction of solid waste?

O 1

O 2

O 3

O 4

O 5

25. During the last five years, to what extent did your company decrease the consumption of hazardous/harmful toxic materials?

O 1

O 2

O 3

O 4

O 5

26. During the last five years, to what extent did your company decrease the frequency of environmental accidents?

O 1

O 2

O 3

O 4

O 5

27. To what extent did your company commit to improving the enterprise's environmental situation in the last five years?

O 1

O 2

O 3

O 4

O 5

Economic Performance (ECP)

28. During the past five years, to what extent did your company reduce the cost of materials purchasing?

O 1

O 2

O 3

O 4

O 5

29. During the past five years, to what extent did your company decrease the cost for energy consumption?

O 1

O 2

O 3

O 4

O 5

30. To what extent did your company decrease the fee for waste treatment in the last five years?

O 1

O 2

O 3

O 4

O 5

31. To what extent did your company decrease the fee for waste discharge in last five years?

O 1

O 2

O 3

O 4

O 5

32. During the last five years, to what extent did your company decrease the fine for environmental accidents?

O 1

O 2

O 3

O 4

O 5

Operational Performance (OP)

33. To what extent did your company increase the amount of goods delivered on time in last five years?

O 1

O 2

O 3

O 4

O 5

34. During the last five years, to what extent did your company decrease inventory levels?

O 1

O 2

O 3

O 4

O 5

35. During the last five years, to what extent did your company decrease scrap rate?

O 1

O 2

O 3

O 4

O 5

36. To what extent did your company promote product quality in past five years?

O 1

O 2

O 3

O 4

O 5

37. During the last five years, to what extent did your company increase the product line?

O 1

O 2

O 3

O 4

O 5

38. During the last five years, to what extent did your company improve capacity utilization?

O 1

O 2

O 3

O 4

O 5

Statement of Affirmation

I hereby declare that all parts of this thesis were exclusively prepared by me, without using resources other than those stated above. The thoughts taken directly or indirectly from external sources are appropriately annotated. This thesis or parts of it were not previously submitted to any other academic institution and have not yet been published.

Dornbirn, 07. January 2022 Hooman Asghari