Universidade do Minho
Escola de Economia e Gestão

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Assessing the Sustainability of Tourism Supply Chain: A Case Study

December 2023

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UMinho | 2023

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Assessing the Sustainability of Tourism Supply Chain: A Case Study

Doctoral Thesis in Business Administration

Work developed under the supervision of
Professor José António Almeida Crispim

December 2023

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ACKNOWLEDGEMENTS

This thesis stands as a testament to the collaborative efforts and unwavering support that have been instrumental in its completion. Professor José Crispim has been a guiding force, providing invaluable mentorship, expertise, and unwavering commitment that shaped the trajectory and quality of this research.

I extend my heartfelt gratitude to my wife and colleague, Alaa Abdelsalam, whose constant support, understanding, and encouragement have been a driving force, sustaining me through the challenges of this academic journey. Her belief in my abilities has been a source of strength and motivation.

I would like to express my deepest gratitude to my children. Yahya and Cherif, whose existence from day one throughout my PhD journey served as the most motivating factor, propelling me to successfully complete the thesis work. In addition, my children attended courses and meetings with me from their early days. I am particularly grateful to Professor José Crispim for his understanding and support during this time, which made balancing academic pursuits and parenting responsibilities a more manageable and enriching experience.

To my mother, Magda Elderini, and my father, Mahmoud Elbelehy, I express deep appreciation for their enduring support, love, and encouragement. Their solid belief in my academic pursuits has provided the strength and motivation needed to overcome obstacles.

Special acknowledgment is extended to the Arab Academy for Science, Technology and Maritime Transport (AASTMT) for their vital financial support, playing a crucial role in the successful completion of my Ph.D. Their commitment to academic excellence has served as a cornerstone in my educational journey.

This thesis is not just an individual accomplishment; it reflects the collective efforts of my supervisor, family, spouse, and institution. Their support has been indispensable in reaching this significant academic milestone.

Last but not least, my sincere appreciation goes to the esteemed professors of the Ph.D. program and the dedicated members of the School of Economics and Management at Minho University. Their support and constant availability have been pivotal in shaping the success of this thesis, leaving an indelible mark on my academic journey, for which I am profoundly grateful.

STATEMENT OF INTEGRITY

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Assessing the Sustainability of Tourism Supply Chain: A Case Study

ABSTRACT

Hospitality and Tourism (H&T) organisations are currently interested in implementing sustainable practices in order to accomplish sustainable development goals. From a social perspective, the tourism industry has been criticised for its poor working conditions, low wages, seasonality, and pricing pressures. Furthermore, temporary H&T workers lack the assurance of social benefits promised by national labour laws, such as social security, health coverage, and labour union participation. Besides, the pressures of various tourism stakeholders on tourism enterprises mandates organisations to raise their awareness of the social consequences of their operations. Nonetheless, social sustainability adoption in H&T is still in its early stages and difficult to assess, particularly when addressed through their Supply Chains (SCs).

Egypt, a developing country on the Mediterranean coast, is a popular tourist destination and a desirable location for both local and multinational H&T companies. This strategic location has made Egypt's H&T sectors of the major source of income, directly contributing to nearly 1 million jobs in the Egyptian economy. However, beginning with the Arab Spring events in 2011, extending through the COVID-19 pandemic and the recently challenging economic situation in Egypt, the sector has encountered several socioeconomic problems resulting in negative consequences such as discharging employees, unpaid and mandatory leaves, late compensation, and benefit reductions, suspending promotions and new hiring. Despite the importance of the sector and the previously noted negative social consequences, there has been a remarkable lack of study to date that identifies and assesses social sustainability adoption in Egypt's H&T sectors from a SC perspective.

In the first study of this dissertation, we review existing research on social sustainability in the H&T SC systematically to identify their research approaches and the emerging key research themes, geographical and sectoral scope, as well as the studied social sustainability practices in current research and identify current research gaps. Our review concluded that early studies used qualitative methods to examine social sustainability adoption in developed countries, whereas more recent studies used quantitative methods. However, there is a gap in using Multi Criteria Decision Making (MCDM) to assess social sustainability. We identified eight categories of social practices, with society and community development category receiving the most attention, followed by employee-related social practices, and human rights categories receiving the least attention in previous research.

Then, in the second study, we start with the identification of the social sustainable practices, barriers, and enablers from the H&T literature. Afterwards, we draw on institutional and stakeholder theories to identify the adopted social sustainability practices in Egypt H&T SCs and the factors influencing their implementation. A mixed-method research approach is employed, which includes interviews with hotel managers and a literature-based questionnaire completed by 187 practitioners from Egypt's H&T SC entities including hotels or resorts, tourism companies, travel agents, and hotel's suppliers. The interviews revealed that social sustainability practices are implemented in the SCs of the two hotels, but they are limited to legal requirements and brand policies. Through statistical analysis, including Canonical Correlation Analysis (CCA), Tamhane's T2 test, and Levene test, it was determined that local suppliers play a pivotal role in boosting the adoption of social practices. Alongside, the findings revealed a very weak association between the five investigated barriers and the adoption of social sustainability practices. Interviews conducted in the study clarified that this weak relationship does not signify the absence of barriers but rather points to a lack of awareness about social rights, especially in a culture that values social conservatism. Furthermore, significant variations in the majority of social sustainability practices (53 out of 62) were found to be explained by the 10 enablers. This underscores the importance of these enablers in influencing social sustainability practices within the studied context.

The third study describes the development steps and application of a group MCDM framework for the assessment of social sustainability practices in the H&T SCs and applies it to the Egyptian H&T industry. To identify the current adoption of 53 social practices grouped into 8 social categories within the H&T sector, this study draws upon the previously reviewed pertinent literature on social sustainability and incorporates findings from a survey conducted in the antecedent research, involving 187 managers, supervisors, and employees affiliated with H&T SCs. To determine the importance of each practice, an expert-group survey comprising 22 experts representing different tiers in the H&T SC in Egypt was undertaken. The Interval Valued Pythagorean Fuzzy Distance to Ideal Solution based on TOPSIS method was used to rank and assess the current level of social practices adoption. According to the assessment, social sustainability practices are poorly implemented in the Egyptian H&T SC. In terms of social categories, society development was ranked the highest, while health and safety was ranked the lowest. Hotels were better than tour operators and tourism companies at incorporating social practices, while tourism suppliers were the lowest at implementing social sustainability practices. Although there were no significant differences in social sustainability adoption amongst SC partners, there were discrepancies within the same social categories and across various social categories.

Keywords: Egypt, Hospitality, Social Sustainability, Sustainability Assessment, Sustainable Supply Chain, Tourism

Avaliando a Sustentabilidade da Cadeia de Suprimentos de Turismo: Um Estudo de Caso

RESUMO

As organizações de Hotelaria e Turismo (H&T) estão atualmente interessadas em implementar práticas sustentáveis para atingir os objetivos de desenvolvimento sustentável. Do ponto de vista social, a indústria do turismo tem sido criticada por suas más condições de trabalho, baixos salários, sazonalidade e pressões de preços. Além disso, os trabalhadores temporários de H&T carecem da garantia de benefícios sociais prometidos pelas leis nacionais do trabalho, como segurança social, cobertura de saúde e participação em sindicatos. As pressões de vários intervenientes do turismo sobre as empresas de turismo obrigam as organizações a aumentar sua conscientização sobre as consequências sociais das suas operações. No entanto, a adoção de sustentabilidade social em H&T ainda está em estágios iniciais e é difícil de avaliar, particularmente quando abordada por meio das suas Cadeias de Abastecimento.

O Egito, um país em desenvolvimento na costa do Mediterrâneo, é um destino turístico popular e um local desejável para empresas de H&T locais e multinacionais. Essa localização estratégica tornou O sector de H&T do Egito uma das principais fontes de rendimento, contribuindo diretamente para quase 1 milhão de empregos na economia egípcia. No entanto, a partir dos eventos da Primavera Árabe em 2011, passando pela pandemia de COVID-19 e pela recente situação económica desafiadora no Egito, o sector enfrentou vários problemas socioeconómicos que resultaram em consequências negativas, como demissões de funcionários, licenças obrigatórias não remuneradas, atraso em compensações e reduções de benefícios, suspensão de promoções e novas contratações. Apesar da importância do sector e das consequências sociais negativas anteriormente mencionadas, até o momento, houve notável falta de estudos que identifiquem e avaliem a adoção de sustentabilidade social nos setores de H&T do Egito sob a perspectiva das suas Cadeias de Abastecimento.

No primeiro estudo desta dissertação, fez-se a revisão da pesquisa a pesquisa existente sobre sustentabilidade social nas Cadeias de Abastecimentoi de H&T de forma sistemática para identificar as abordagens de pesquisa e os principais temas de pesquisa emergentes, âmbito geográfico e setorial, bem como as práticas de sustentabilidade social estudadas na pesquisa atual e identificar lacunas na pesquisa atual. A revisão concluiu que estudos iniciais usaram métodos qualitativos para examinar a adoção de sustentabilidade social em países desenvolvidos, enquanto estudos mais recentes utilizaram métodos quantitativos. No entanto, há uma lacuna no uso de MCDM para avaliar a sustentabilidade social. Identificamos oito categorias de práticas sociais, com a categoria de desenvolvimento da

sociedade e comunidade a receber mais atenção, seguida por práticas sociais relacionadas a funcionários, e as categorias de direitos humanos que recebem menos atenção na pesquisa anterior.

Em seguida, no segundo estudo, começamos com a identificação de práticas sociais sustentáveis, barreiras e facilitadores na literatura de H&T. Posteriormente, recorremos às teorias institucionais e de partes interessadas para identificar as práticas de sustentabilidade social adotadas nas Cadeias de Abastecimento de H&T no Egito e os fatores que influenciam sua implementação. Usamos uma abordagem de pesquisa mista, que inclui entrevistas com gerentes de hotéis e um questionário baseado na literatura respondido por 187 profissionais de entidades de H&T do Egito, incluindo hotéis ou resorts, empresas de turismo, agentes de viagens e fornecedores de hotéis. As entrevistas revelaram que as práticas de sustentabilidade social são implementadas nas Cadeias de Abastecimento dos dois hotéis, mas estão limitadas aos requisitos legais e políticas de marca. De acordo com a análise estatística (CCA, teste Tamhane T2 e teste Levene), os fornecedores locais impulsionam a adoção de práticas sociais. Além disso, as cinco barreiras investigadas têm uma relação muito fraca com a adoção de práticas de sustentabilidade social. De acordo com as entrevistas, isso não implica a ausência de barreiras, mas sim uma falta de conscientização sobre direitos sociais em uma cultura que valoriza o conservadorismo social. Variações significativas em muitas práticas de sustentabilidade social (53 de 62) foram explicadas pelos 10 facilitadores.

O terceiro estudo descreve as etapas de desenvolvimento e aplicação de um Framework MCDM em grupo para a avaliação de práticas de sustentabilidade social nas Cadeias de Abastecimento de H&T aplicado à indústria de H&T no Egito. Com base na literatura relevante anteriormente revista sobre sustentabilidade social em H&T e na pesquisa do estudo anterior com 187 gerentes, supervisores e funcionários de Cadeias de Abastecimento de H&T para identificar a adoção atual de 53 práticas sociais agrupadas em 8 categorias sociais. Para determinar a importância de cada prática, foi realizada uma consulta de 22 especialistas. o cálculo da distância de conjuntos do tipo “Interval Valued Pythagorean Fuzzy” para com o ideal, com base no método TOPSIS, foi usado para classificar e avaliar o nível atual de adoção de práticas sociais. De acordo com a avaliação, as práticas de sustentabilidade social são pouco implementadas nas Cadeias de Abastecimento de H&T no Egito. Em termos de categorias sociais, o desenvolvimento da sociedade foi classificado como o mais alto, enquanto a saúde e segurança foram classificadas como as mais baixas. Os hotéis superaram as operadoras de turismo e empresas de turismo na incorporação de práticas sociais, enquanto os fornecedores de turismo foram os menos eficazes na implementação de práticas de sustentabilidade social. Embora não tenham sido observadas diferenças significativas na adoção de sustentabilidade social entre os parceiros da Cadeia de

Abastecimento, houve discrepâncias dentro das mesmas categorias sociais e em várias categorias sociais diferentes.

Palavras-Chave: Egito, Hospitalidade, Sustentabilidade Social, Avaliação de Sustentabilidade, Cadeia de Suprimentos Sustentável, Turismo

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LIST OF ABBREVIATIONS

CCA	Canonical Correlation Analysis
CSR	Corporate Social Responsibility
H&T	Hospitality and Tourism
HSC	Hospitality Supply Chain
IVPFS	Interval-Valued Pythagorean Fuzzy Set
IVPFWQ	The interval-valued Pythagorean fuzzy-weighted quadratic Operator
MCDM	Multi Criteria Decision Making
S-LCA	Social Life Cycle Assessment
SC	Supply Chain
SCSS	Supply Chain Social Sustainability
SEM	Structural Equation Modelling
TOPSIS	Technique for Order Preference by Similarity to Ideal Solution
TSC	Tourism Supply Chain

1. INTRODUCTION

1.1 Research justification

1.1.1 Sustainable Supply Chain Management (SSCM)

Sustainability as defined by the World Commission on Environment and Development entails meeting today's needs while safeguarding the needs of future generations (WCED, 1987). Since its foundation, the sustainability concept has become a cornerstone in any firm to achieve sustainable development goals as a result of the increasing pressure from customers, local communities, non-governmental organisations, and other stakeholders to provide evidence of firms' impact on the environment and society (Barbosa-Póvoa, da Silva, & Carvalho, 2017; Grosvold, Hoejmose, & Roehrich, 2014).

As businesses are currently held fully accountable for their supply chain actions and are mandated to measure and disclose not only their sustainability achievements but also those of the entire supply chain, the significance of sustainability has expanded beyond the company's boundaries itself (Qorri, Mujkić, & Kraslawski, 2018). As a response, the research field on Sustainable Supply Chain Management (SSCM) has gained substantial interest among both academics and industry practitioners (Ansari & Kant, 2017; Dubey et al., 2016; Reefke & Sundaram, 2017).

SSCM is defined as "the management of material, information and capital flows as well as the cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social into account which are derived from customer and stakeholder requirements" (Seuring & Müller, 2008). The majority of SSCM studies primarily focused on the manufacturing sector (Ansari & Kant, 2017) and there is a notable scarcity of research attention paid to the service sector in general or the tourism industry in particular (Gruchmann, Topp, & Seeler, 2022; Hussain, Khan, & Al-Aomar, 2016; Xinyan Zhang, Song, & Huang, 2009).

Moreover, despite the extensive attention devoted to the environmental and economic dimension in the current literature, little attention has been paid to the social dimension as evidenced by previous research

(P Ahi & Searcy, 2015; Ashby, Leat, & Hudson-Smith, 2012; Seuring & Müller, 2008). In the most recent comprehensive study to date, which systematically examined social sustainability in supply chain management research, D'Eusanio et al. (2019) observed that most of the existing social indicators address a single entity within the supply chain and are used to assess the social performance of production processes, stressing that the concept is understudied in service supply chains. The study also emphasized the lack of appropriate methods and approaches for social sustainability assessment within the supply chain.

The key indicators of social sustainability include the development of products and/or services that ensure health and safety, fostering supply chain collaboration to enhance community development and human welfare, and engaging with suppliers, customers and other stakeholders to improve social outcomes (D'Eusanio et al., 2019; Mani, Gunasekaran, & Delgado, 2018b; Nakamba, Chan, & Sharmina, 2017; Pagell, Wu, & Wasserman, 2010; Staniškienė & Stankevičiūtė, 2018).

In the context of developing countries and emerging economies, researchers have noted more scarcity of SSCM studies (Mani, Agarwal, et al., 2016; Rajeev, Pati, Padhi, & Govindan, 2017). Specifically, concerning the social dimension, Jia et al., (2018) highlighted a lack of research in developing countries particularly addressing social sustainability, with the limited existing studies primarily focusing on the buyer's perspective within the production industries, encompassing sectors such as equipment, fashion ,foundry, food, and agricultural. Consequently, there is a significant gap in the literature concerning supply chain social sustainability, both in the broader service sector and particularly within the H&T industry.

1.1.2 Social Sustainability in H&T Supply Chain

Hospitality and tourism are interrelated and connected industries due to the common characteristics of touristic destinations, where a single area encompasses many hospitality services, including accommodation in hotels and resorts, restaurants, tours, and various entertainment activities among other services (Lim, 2016). These interrelated companies, both nationals and multinationals, collectively form the tourism supply chain (Keskin & Ucal, 2021; Zhao & Hou, 2022). Tourist destinations tend to include many of such companies, which, in turn impose a significant sustainability challenge arising from the substantial resources consumption, driven by the large number of individuals - employees and visitors - associated with this destination (Babu, Kaur, & Rajendran, 2018). Additionally, the tourism sector is known for its poor working

conditions, low pay, and the demand to maintain low prices. This is aggravated by seasonal fluctuations, resulting in temporary hotels and tour operators staff who lack guaranteed social benefits (Baddeley & Font, 2011; Christian, 2017; Gruchmann et al., 2022).

Furthermore, the close relationship between tourism companies and various stakeholders, including customers, workers, public regulators, and environmental agencies require organizations to be more conscious of the social consequences of their operations (Shams, Vrontis, & Christofi, 2020; Vrontis, Christofi, Giacosa, & Serravalle, 2021). Given the multiple parties involved, ranging from service providers to customers, the tourism industry has a significant impact on social issues, underscoring the importance of studying social sustainability across H&T supply chain members. This is especially crucial in cases of over tourism in crowded resorts, cities and destinations (Milano, Novelli, & Cheer, 2019) or during global disruptions such as coronavirus pandemic which caused broad disruption of global travel and tourism.

Despite the acknowledged importance, the latest systematic review of sustainable supply chain management in tourism emphasized that social standards in tourism remains insufficient in the literature. Furthermore, it was noted that not all tourism stakeholders demonstrate equal level of commitment to practicing sustainability (Gruchmann et al., 2022). This stresses the need for research addressing social sustainability in H&T comprehensively from supply chain perspective.

1.2 Empirical Context

Egypt, classified as a developing country, is one of the most popular tourist destinations along the Mediterranean coast. It shares both commonalities and unique aspects with other countries such as Italy, Greece, Spain, Turkey, Tunisia and Morocco in the tourism sector (Baloglu & Mangaloglu, 2001; Perles-Ribes, Ramón-Rodríguez, Moreno-Izquierdo, & Torregrosa Martí, 2018). Moreover, Egypt attracts local small and medium enterprises and multinational companies in the tourism and hospitality industry, including hotels, resorts, and tour operators, particularly along the Red Sea Coast (El Dief & Font, 2010; Gohar & Mathias Kondolf, 2020). This positioning has elevated Egypt's tourism sector to become the second most significant source of revenue after the Suez Canal, directly contributing over a million jobs to the Egyptian economy (Salman, Tawfik, Samy, & Artal-Tur, 2017).

However, the sector has been plagued by challenges such as political instability, terrorism, and financial crisis since the onset of the Arab Spring revolutions in 2011. During the revolution year, the hospitality industry incurred financial losses of approximately 825 million US dollars, resulting in a substantial job loss, affecting up to 60% of employees in some hotels (Abuelkassem, Eleri, Abdelbary, & Hanaa, 2012). The most common managerial actions during this period in Egypt was discharging employees, unpaid and obligatory leaves, lateness of salary and reduction of benefits, stopping promotions and new hiring (Weheba, 2013).

In the Middle East region, the Egyptian tourism sector ranked third after the United Arab Emirates and Kingdom of Saudi Arabia, accounting for around 53% of all international tourism receipts. Globally, Egypt held the 36th position globally[1] until the outbreak of the Covid-19 pandemic. Based on the most recent available data, as of 2021[2], the tourism sector employed 2.21 million and contributed 5.1% to the GDP. Despite the sector significance and the previously mentioned adverse social implications, there is a notable absence of research to date that assess social sustainability in Egypt H&T industry from a supply chain perspective.

1.3 Research Questions and Objectives

Building on the previously discussed research gaps, the current thesis aims to answer the following central research question to contribute toward a better understanding of social sustainability in Egypt H&T supply chains "What are the opportunities for improving the social sustainability of H&T SCs in Egypt?"

Particularly, this thesis attempts to answers the following research questions:

(1) What is the current state of research on social sustainability practices within H&T SCs, and what are the key gaps in the existing literature?
(2) What is the current state of social sustainability implementation in H&T SCs in Egypt?
(3) How can a practical assessment framework be designed and applied to assess social sustainability practices adoption in H&T SCs in Egypt?

[1] https://www.worlddata.info/africa/egypt/tourism.php, https://www.unwto.org/country-profile-inbound-tourism
[2] https://www.statista.com/topics/5767/tourism-industry-of-the-egypt/#topicOverview

From the research questions, the following general research objectives were proposed to:

(1) Identify the social indicators (practices) addressed in H&T SC research and classify them into social categories.
(2) Identify research methods, geographical location, and sectoral differences in the reviewed studies.
(3) Outlining areas requiring further investigation in social sustainability within the H&T SCs.
(4) Identifying the social best practices adopted in the H&T SCs in Egypt.
(5) Identifying factors (barriers, enablers, or company's characteristics) affecting social practices adoption and their degree of association in the H&T SCs in Egypt.
(6) Analysing if differences exist in terms of practices adoption across the H&T SCs in Egypt.
(7) Develop an MCDM framework for the assessment of the level of social sustainability practices implementation in a H&T SCs.
(8) Apply the developed MCDM assessment framework to the Egyptian H&T SCs.

Table 1-1 demonstrates the distribution of research questions and objectives over the theoretical study and the two empirical studies:

Table 1-1 The distribution of research questions and objectives over the studies

	Chapter 2	**Chapter 3**	**Chapter 4**
Research Papers	1	2	3
Title	Social Sustainability in the Hospitality and Tourism Supply Chains: A Systematic Literature Review and Future Research Roadmap	Social Sustainability Practices in Egypt Hospitality and Tourism Supply Chains	Assessing the Adoption of Social Sustainability Practices in the Egyptian Hospitality and Tourism Supply Chain: A Group Multi-Criteria Decision-Making Approach
Research Questions	1	2	3
Research Objectives	1,2,3	4,5,6	7,8
Method	Systematic Literature Review	CCA, Tamhane's T2 test (for compare means) and Levene test (for equality of variances)	IVPFS based on TOPSIS
Data Collection	Academic Databases (Scopus & Web of Science)	Interviews & Questionnaire	Questionnaire & Expert-group survey

1.4 Study Delimitations

Investigating the existing status of social sustainability within H&T SCs in Egypt in terms of practices, enablers, barriers, and assessing the implementation of social practices can potentially contribute to enhance the level of adoption of these practices. The current thesis focuses on 62 social practices identified in the literature and synthetized in 8 social categories A) fair labour measures, B) Equal opportunity, C) Employee's development, D) Health and safety, E) Employee's participation and cooperation, F) Society development, G) Ethics and corruption, and H) Human rights. Moreover, the conducted research focus on 10 enablers and 5 barriers of sustainability practices adoption identified from the literature. Hence, while acknowledging the potential existence of other aspects related to supply chain social sustainability, this thesis specifically concentrates on conducting research to address gaps solely in relation to those aspects. Consequently, the findings of this study are exclusively applicable to those identified variables.

Additionally, it is important to note that the empirical studies of the thesis are conducted exclusively within the context of Egypt, the studies specifically targeted data collection from managers, supervisors and employees affiliated with H&T SC entities, encompassing hotels or resorts, tourism companies, travel agents, and hotels suppliers situated across various regions in Egypt. Thus, the findings should be interpreted within the specific geographical context under investigation and among the designated partners within the H&T SC that were the focus of this study.

1.5 Methodological Approach

In chapter three of the thesis, CCA is employed to explore the associations between the social practices adopted by the Egyptian H&T SCs and the enablers and barriers they encounter. Additionally, to determine variations within different H&T SC members, as well as between these member groups, we conducted Tamhane's T2 tests (for mean comparisons) and Levene tests (for assessing equality of variances) for all-pairs comparison. In chapter four, the Interval Valued Pythagorean Fuzzy Distance to Ideal Solution based on TOPSIS was applied to rank and assess the existing level of social practices adoption in H&T SCs in Egypt.

1.5.1 Specific Characteristics of the Problem

In exploring social sustainability practices within the H&T supply chain, multiple indicators come to the front. These social indicators range from the inherently subjective, encompassing attitudes, experiences, perceptions, and community satisfaction to more objectively measurable social indicators such as employment rates, access to clean potable water, and gender diversity (Rasoolimanesh, Ramakrishna, Hall, Esfandiar, & Seyfi, 2020). This complexity introduces a significant challenge, as the quantification of these diverse indicators proves to be difficult due to their subjective nature.

Adding another level of complexity to the assessment process is the persistent issue of social desirability bias in data collection. Ethical and social sustainability issues, when subjected to data collection, face the risk of social desirability bias, a phenomenon characterized by a tendency to deny socially undesirable behaviours while admitting socially desirable ones (Morais & Silvestre, 2018). This bias brings a degree of uncertainty into the collected data. Consequently, the challenge lies not only in the complexity of the indicators subjective nature but also in ensuring the accuracy and unbiased nature of the collected information.

Additionally, in the context of emerging economies like Egypt, where social norms exhibit notable variability, the situation is further intensified. Distinct social categories and practices emerge, underscoring the contextual, time-dependent, and dynamic nature of studies in the social sustainability domain (Yawar & Seuring, 2015). This variability introduces an additional level of complexity, highlighting the need for an assessment methodology that can adapt to the dynamic nature of social norms.

Considering these specific characteristics, the data collection process for social sustainability in H&T SCs in Egypt becomes inherently uncertain. The interplay of subjective indicators, social desirability bias, and the variability in social norms contributes to a heightened level of ambiguity. Moreover, acknowledging the relatively new and evolving nature of the field of social sustainability in H&T SCs, especially in Egypt as a developing country, introduces an additional level of uncertainty. Moreover, employees, managers, and supervisors' responses to the questionnaire, as well as H&T supply chain experts' opinions to the experts-group survey may results in increased uncertainty due to the evolving stage of understanding and implementing social sustainability practices in this context. Additionally, the diverse positions of stakeholders both upstream and downstream in the H&T supply chain add another level of complexity, introducing different

perspectives and challenges to the assessment process. As such, a robust methodology is essential to accommodate the complexities and uncertainties inherent in the assessment of social sustainability practices within the dynamic context of the H&T supply chain in Egypt.

1.5.2 Justification of Methodological Choice

Considering the problem characteristics outlined in Section 1.5.1, the chosen methodology for both empirical phases of the thesis is purposely designated. For the first empirical phase (chapter 3), CCA was employed to explore the interrelations between the adopted social practices and the enablers and barriers encountered by Egypt's H&T SC. This choice aligns with the identified problem characteristics as CCA proves appropriate for modelling the relationships between multiple dependent and independent variables, forming latent variables. Its compatibility with theoretical consistency, along with its flexibility to encompass various parametric tests such as ANOVA and MANOVA, positions it as a comprehensive and suitable technique within the social and behavioural sciences (Sherry, Henson, & Henson, 2005). Due to its proven applicability in both social science and supply chain management (Altaf, Ali, & Weber, 2020), CCA provides a valuable benefit of interpreting "many-to-many" relationships between two sets of variables while minimizing computational complexity. Additionally, CCA plays a crucial role in minimizing type I error, reducing the likelihood of inaccurately detecting differences, effects, or relationships that do not actually exist in the population. Its efficiency and consistent ability to identify significant relationships among multiple variables (practices, enablers, and barriers) underscore its suitability for the research's specific context.

Thus, the rationale behind selecting CCA as the multivariate analysis technique in the initial phase is further justified by its alignment with the research objectives and its expected advantages needed in this study. Moreover, the application of CCA, combined with Tamhane's T2 for comparing means and Levene's test for assessing the equality of variances, enhances the analytical depth of the study by allowing for a comprehensive examination of the multiple relationships and variations in social sustainability adoption within the H&T SC.

Subsequently, the second empirical phase (Chapter 4) focused on developing the social sustainability assessment framework, by applying the Fuzzy TOPSIS method. The incorporation of fuzzy set theory (Gupta & Ragade, 1977; Zadeh, 1965) serves to enhance the representation of human thought

processes and effectively address the inherent imprecision prevalent in the complex scenarios encountered within the H&T supply chain in Egypt. The selection of the Fuzzy TOPSIS method is purposeful, aligning with distinctive problem characteristics inherent in the assessment of social sustainability practices along the H&T supply chain. Fuzzy TOPSIS appears to be a suitable approach for addressing the complexities of social sustainability assessment within this research context, motivated by its capacity to handle vagueness in MCDM information, which is a common challenge in sustainability development research (Rani, Mishra, Rezaei, Liao, & Mardani, 2020).

The incorporation of IVPFS along with the TOPSIS method within the proposed framework, directly addresses the complexities inherent in assessing social sustainability practices within the dynamic context of the H&T supply chain in Egypt. IVPFS, distinguished by membership and non-membership interval forms, emerges as a highly effective tool for managing significant imprecision levels in the face of uncertainty (Peng & Li, 2019). In contrast, conventional fuzzy sets exhibit shortcomings in terms of precision and dependability when compared to the capabilities demonstrated by IVPFS (Hendiani, Lev, & Gharehbaghi, 2021).

The distinctive characteristics of this research problem characterized by the variability in social norms and inherent subjectivity in social sustainability indicators, align seamlessly with the strengths of IVPFS. This alignment facilitates the expression of the respondents' subjective judgments and enhances the robustness of assessing social practices. In the proposed assessment framework, the IVPFWQ operator (Tang & Yang, 2021) is employed for the purpose of multi-expert group decision-making. This operator is selected for aggregating decision matrix data and criteria weights.

Finally, the adoption of the TOPSIS method within the presented social sustainability framework is supported for its methodological simplicity, computational efficiency, and clarity in measuring the relative performance of social practices (Roszkowska, 2011). The outlined challenges in the problem characteristics, including the complexity of indicators and the necessity for a methodology accommodating multiple criteria, validate the appropriateness of TOPSIS. This method effectively addresses the challenges associated with extensive information, presenting visual representations of the best and worst alternatives. This alignment with the specific needs of the study distinguishes the Interval-Valued Pythagorean Fuzzy TOPSIS from other MCDM techniques previously employed in H&T research.

1.5.3 Research Flowchart

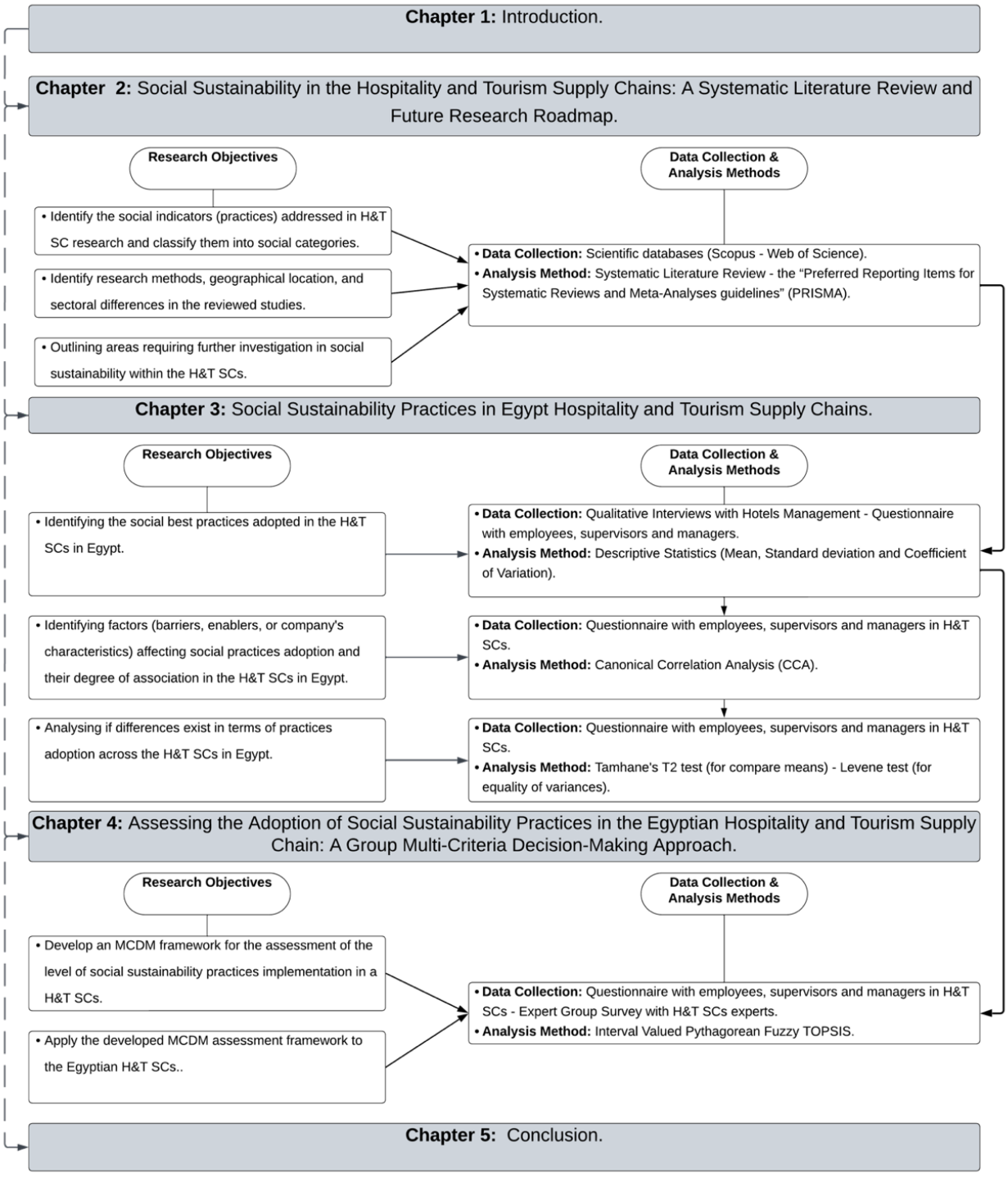


Figure 1-1 Thesis Flow Chart

1.6 Contributions of the Thesis

The primary contribution of the thesis is the reorientation of social sustainability research within the H&T field from an organizational perspective, predominant in previous studies, to a comprehensive examination of social sustainability adoption within the context of supply chains. Therefore, the thesis tight the gap of extremely limited social sustainability studies in H&T under the perspective of the SC as observed in the second chapter that systematically review existing research within this field.

From a practical perspective, the impact of the thesis findings holds substantial value for not only H&T supply chain managers and decision makers, but also for policymakers, the public and society at large, as they underscore the critical need to address social sustainability within the H&T by identifying the adopted social sustainability practices in Egypt and determining the factors affecting their implementation as presented in the third chapter. Also, the practical relevance of this study findings transcends the Egyptian boundaries, as similar H&T supply chains structures can be found in diverse touristic destinations. The theoretical contributions of this thesis are important as well, since we frame our investigation using institutional theory and stakeholder theory as a theoretical lens. This provides deep insights into understanding the influence of tourism stakeholder exerting institutional pressures. These pressures manifest as both enablers and barriers impacting the engagement of H&T supply chain partners in the implementation of social sustainability practices.

Furthermore, the fourth chapter of this thesis contributes by introducing a practical framework for the assessment of social sustainability within the complex, multi-tier H&T supply chains. Given the limited attempts by scholars to assess social sustainability practices within the context of H&T SCs, the developed framework offers a valuable resource for guiding decision-makers and policymakers to improve the poorly ranked social practices. Additionally, since the social practices under investigation in this research were identified from a wide range of pre-existing supply chain literature, the resulting framework for assessing social sustainability can be extended beyond the H&T supply chain context. For instance, the framework can be effectively employed in various SC contexts where decision-makers, policymakers, and experts find it challenging to provide precise and rational assessments. It is important to note that this study addresses critical societal concerns often ignored in H&T investigations, including employee-related social practices, health and safety, ethics and corruption, human rights, and societal development practices.

The presented Fuzzy TOPSIS framework expands upon the work of Hendiani et al. (2021) by transitioning from a single-expert to a multi-expert group decision-making approach by aggregating the preferences of multi-experts using the IVPF quadratic operator proposed in (Tang & Yang, 2021). Therefore, contributing to the development of MCDM methods, since such techniques have been underrepresented in H&T context (Vatankhah, Darvishmotevali, Rahimi, Jamali, & Ale Ebrahim, 2023) and are relatively unexplored from a supply chain perspective.

1.7 Organization of the Thesis

The thesis is structured as a sequence of individual articles, each chapter stands as independent research, offering specific results but interconnected contributions.

The remainder of the thesis is organized as follows:

- **Chapter 2: Social Sustainability in the Hospitality and Tourism Supply Chains: A Systematic Literature Review and Future Research Roadmap.** This chapter systematically review existing research on social sustainability within the H&T supply chain. The purpose is to identify research approaches, the geographic and sectoral scope of the reviewed studies, as well as identifying the studied social sustainability practices in exiting research, and current research gaps. The chapter start by an introduction followed by a section for literature background where the SSCM concept is explained with a focus on social sustainability in H&T SC. The third section, illustrate the systematic literature review process using PRISMA flow diagram. The fourth section starts with the descriptive results, followed by a detailed discussion based on the reviewed studies. Finally, the chapter discuss areas for further development that serve to provide a roadmap for future research to advance our understanding of social sustainability within H&T supply chain.
- **Chapter 3: Social Sustainability Practices in Egypt Hospitality and Tourism Supply Chains.** This chapter draws on institutional and stakeholder theories to identify the adopted social sustainability practices in Egypt and to determine the factors affecting their implementation. This chapter start with an introduction section showing the problem and purpose of the research. The second section proceeds with the theoretical foundation, relating the SSCM concept to institutional and stakeholder theory, ending by the research questions and conceptual model. The third section

review the literature of social sustainability practices, enablers and barriers in H&T research. Next, the fourth section presented the research methodology: research design, sample, methods. The fifth section discuss the results of the interviews and the statistical analysis (CCA, Tamhane's T2 test and Levene test) and discuss the findings in relation to the literature. The last section concludes the work, highlighting the practical and theoretical contribution, and providing direction for future research.

- **Chapter 4: Assessing the Adoption of Social Sustainability Practices in the Egyptian Hospitality and Tourism Supply Chain: A Group Multi-Criteria Decision-Making Approach.** This chapter develops a MCDM framework for the assessment of the level of social sustainability practices implementation to the Egyptian H&T SCs. The first section introduces the problem, identify the research gaps, and state the objectives of the study. After, the methodology section begins by providing a detailed summary of MCDM methods applied to assess social sustainability in H&T research, followed by a concise explanation of fuzzy theory. The section then outlines the research design, describing in detail the steps involved in developing "The Interval Valued Pythagorean Fuzzy Distance to Ideal Solution based on TOPSIS" framework and the methods used in the process. The third section shows the results of ranking the social practices adopted in the Egyptian H&T SCs. The last section, conclude the research by showing the practical contribution of the framework, and by providing recommendations for future research directions.
- **Chapter 5: Conclusions.** a common discussion for the findings of the three studies which answer the research questions, presenting the practical and theoretical contribution of the thesis, and the recommendations for further developments.

1.8 Publications and Work Based on the Thesis.

Submissions being processed in international journals:

- Social Sustainability Practices in Egypt Hospitality and Tourism Supply Chains. Submitted to "Business and Society Review" Journal
  https://onlinelibrary.wiley.com/journal/14678594
  - Status: Accepted for Publication.

- Assessing Social Sustainability in Egyptian Hospitality and Tourism Supply Chains: A Group Multi-Criteria Decision-Making Approach. submitted to "Benchmarking: an International Journal" https://www.emerald.com/insight/publication/issn/1463-5771
  - Status: Under Review.
- Social Sustainability in the Hospitality and Tourism Supply Chains: A Systematic Literature Review and Future Research Roadmap. Submitted to "Journal of Tourist Studies" https://journals.sagepub.com/description/TOU
  - Status: New submission.

2. Social Sustainability in the Hospitality and Tourism Supply Chains: A Systematic Literature Review and Future Research Roadmap

Abstract

Presently Hospitality and Tourism (H&T) organizations showed interest in adopting sustainable practices to achieve sustainable development goals. However, social sustainability adoption in tourism is still emerging and hard to evaluate, especially if assessed from a supply chain perspective. The aim of this research is to systematically review existing research on social sustainability within the H&T supply chain. The purpose is to identify research approaches and emerging themes, the geographic and sectoral scope of the reviewed studies, as well as to identify the studied social sustainability practices, and current research gaps. The systematic literature review has been carried out using the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines" (PRISMA). The authors analysed seventeen peer-reviewed journal papers from 2008 to the present. Early studies focused on social sustainability adoption in developed countries using qualitative methods while more recent studies employed quantitative methods. However, a gap exists in applying MCDM for social sustainability assessment. The review identified eight categories of social practices, among these, 'Society and community development' practices received most attention, followed by employees-related social practices while 'human rights' were the least addressed in existing research. From this review it was possible to provide a roadmap for future research to advance our understanding of social sustainability within H&T supply chain. To the best of the authors knowledge, there is a lack of literature review papers focusing on the social sustainability of the service supply chain in general and in H&T supply chain in particular within the Web of Science and Scopus databases.

Keywords: Tourism, Hospitality, Sustainable Supply Chain, Social Sustainability, Social Practices, Social Indicators, Literature Review.

2.1 Introduction

Prior to the Covid-19 pandemic, the global tourism industry had experienced continuous and substantial growth. This was evident in the marked increase in international arrivals, reaching 1.5 billion in 2019[3]. This figure represented a notable surge of nearly 53% over the decade preceding the pandemic. However, this growth was followed by a sharp decline, and such deterioration has substantial negative implications for the sustainability of Hospitality and Tourism (H&T) sectors. From a social standpoint, the tourism sector is known for its substandard working conditions, unsatisfactory salaries, disturbed by seasonality and the demands for maintaining low prices (Baddeley & Font, 2011; Christian, 2017). Moreover, temporary workers employed in H&T lack the assurances of social benefits that are provided for under the national labour legislation, including but not limited to social security, health insurance, and union representation (Christian, 2017).

H&T are interconnected sectors owing to the inherent characteristics of tourist destinations, where hospitality services like lodging in hotels and resorts, alongside restaurants, guided tours, and various other services, are also found within the same area. Therefore, sustainability practices in both sectors require remarkable efforts from all institutions and partners across the entire Supply Chain (SC), this is particularly important given that not all stakeholders exhibit uniform level of engagement and dedication to practicing sustainability (Gruchmann et al., 2022).

Xu & Gursoy (2015) defined the hospitality SC as *" a network of hospitality organizations engaged in different activities including the supply of various components of hospitality products and / or services such as raw food materials, equipment and furniture from various suppliers; distribution and marketing of the final hospitality products and / or services to the customers for a specific hospitality business such as a hotel or a restaurant"*. Sustainable hospitality SC management was also defined as "*the management of material, products, services, and cooperation and coordination among organizations in the hospitality SC to achieve three objectives of sustainable development: environmental, social, and economic sustainability"* (Xu & Gursoy, 2015a).

In a previous study concerned with social impacts in H&T, Font and Lynes (2018) reviewed the evolution of Corporate Social Responsibility (CSR) concept within the current H&T literature, employing stakeholder theory. Their findings underscored a significant research gap in the exploration of social

[3] https://www.statista.com/statistics/209334/total-number-of-international-tourist-arrivals/

responsibilities initiatives related to H&T SC partners such as suppliers and other stakeholders (governments and NGOs). They directed future research to focus on SC partners and stakeholders' roles within a strategic SC perspective. From this standpoint, both organisations in the H&T industry and researchers in this field should be mindful of the social practices and how their social indicators can be utilized to assess Supply Chain Social Sustainability (SCSS) (Gruchmann et al., 2022). Especially, to protect tourism labour, as this industry is characterized by poor working condition (Christian, 2017). However, D'Eusanio, Zamagni, & Petti (2019) who reviewed the social sustainability indicators and social assessment tools in SC management revealed that social indicators are mostly used to assess the social performance of production. Similarly, Chiesa and Przychodzen (2020) reviewed SCSS along with CSR concept in supply chain and underscored the lack of studies in the service sectors including tourism.

According to the above research gap, and to the best of the authors knowledge, there is a lack of review papers focusing on the social sustainability of the service SC in general and in H&T SC in particular within the Web of Science and Scopus databases. Therefore, this systematic literature review aims to provide a comprehensive overview of the existing research on social sustainability within the H&T SC. The purpose is to identify the emerging research themes, social categories, and practices (indicators) existing in the current H&T SC literature. Then, to explore and discuss the current application of SCSS concept in H&T in terms of research methods, the geographical location, and sectoral differences of the reviewed studies. Finally, to outline areas requiring further investigation in social sustainability within the H&T SC. Therefore, this research addresses the following research question: "What is the current state of research on social sustainability within the H&T SC, and what are the key research gaps in the existing literature?".

2.2 Literature Background

The terminology of sustainable development existed long time before the Sustainable Supply Chain Management (SSCM) concept to appear in SC literature and it is defined as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Several definitions for SSCM appeared in the current literature, most of the key authors in the field explained that the main notion of SC sustainability is to incorporate the environmental and social dimensions with the economic contribution of companies along the SC in order to satisfy customer and

stakeholders requirements (Payman Ahi & Searcy, 2013; Craig R. Carter, Dale S. Rogers, 2008; Seuring & Müller, 2008).

Subsequently, researchers in the SC management field embraced the sustainability concept by considering the Triple Bottom Line (TBL) approach in which equal attention is paid to the environment, society and the economy (Beske & Seuring, 2014). One of the most detailed and widely used definition in literature is the one proposed by Seuring & Müller (2008), in which SSCM is defined as "the management of material, information and capital flows as well as the cooperation among companies along the SC while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social into account which are derived from customer and stakeholder requirements".

Unlike the well-established focus on "Environmental Sustainability", D'Eusanio et al. (2019) observed that SC scholars have recently begun to show an interest in addressing "Social Sustainability". The evolution of SCSS concept is attributed to the well-established Corporate Social Responsibility (CSR) concept, characterized by a more evenly balanced power distribution within the SC (Sodhi & Tang, 2018). While CSR concentrates on a singular entity (within the company), SCSS signifies a paradigm shift toward a more holistic view.

CSR, as explained by Kotler & Lee (2008), encompasses a firm's actions aimed at improving the well-being of both internal and external corporate stakeholders. This concept supposes that businesses bear a responsibility to the society in which they operates as well as a responsibility to all stakeholders, extending beyond the individual interest of shareholders (van Marrewijk, 2003). In addition to these social obligations, companies' adopting CSR aims at enhancing their business functions to achieve efficiency and redesigning or creating new operations to help vulnerable segments of society (Rangan, Chase, & Karim, 2015) . In the operations management literature, there is a growing interest in exploring how CSR initiatives impacts SC management, and how SC managers incorporate or implement CSR, this field has been termed as "Corporate Social Sustainability in SCs" (Sodhi & Tang, 2018).

Concisely, despite the shared social interest between the concepts, the significant difference is that SCSS concept or the equivalent corporate social sustainability in SCs concept stresses that organizations should address social initiatives not only within their boundaries, as reflected in the CSR concept, but also across their entire SC. This involves a detailed process of assessment by analysing, monitoring, measuring and ranking the social aspects (D'Eusanio et al., 2019).

Nakamba, Chan, and Sharmina (2017) defined social sustainability as "the management of practices, capabilities, stakeholders and resources to address human potential and welfare both within and outside the communities of the SC". From a SC perspective, it can be related to products and processes assessed in order to identify socio-economic conditions such as safety, health, hygiene, wages, and labour rights, education and housing, etc. of the people who are part of the SC (V. Mani et al., 2016). The major indicators that are considered socially sustainable includes new product or service development that ensure health and safety, SC collaboration to develop the community and improve human welfare, working with suppliers, customers or other stakeholders to improve social outcomes (D'Eusanio et al., 2019; Mani et al., 2018b; Nakamba et al., 2017; Pagell et al., 2010; Staniškienė & Stankevičiūtė, 2018).

Yawar & Seuring (2017) argued that social issues in SCs started to be active mostly in the application of supplier development by focusing on improving suppliers' behaviour towards meeting specific requirements concerning labour conditions, working hours, health and safety, child labour, human rights, minority development, gender diversity, and the inclusion of disabled people. Likewise , Jia et al. (2018) demonstrated that social sustainability is an emerging research area with a primary focus to integrate the local community into SC activities by concentrating on labour conditions, maximizing employee and community well-being, job creation, quality of life, diversity and connectedness to the community.

Despite the different sustainability characteristics between manufacturing and service SCs (Carter & Liane Easton, 2011), these social indicators are comparable in both production and service SCs research, with the primary distinction lying in the SC structural difference. The main problem in social dimension assessment is the lack of integrated approach that can measure the aforementioned multiple indicators (Barbosa-Póvoa et al., 2017). Even with the appearance of Social Life Cycle Assessment (S-LCA), it is not widely used in assessing the diverse social impacts (D'Eusanio et al., 2019).

In a recent study, D'Eusanio et al. (2019) performed a systematic literature review with the objective of identifying the existing tools and methods used to assess social sustainability of organizations within the SC management, their findings highlighted that these assessment tools are predominantly applied in production. Yet, Gruchmann et al. (2022) conducted a systematic literature review aimed at mapping previous research on SSCM in tourism. Despite the efforts, the social dimension remained underrepresented within the review. This highlights the importance and justify the purpose of this research focusing on social sustainability from H&T SC perspective.

2.3 Methods

A systematic literature review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines to ensure methodological appropriateness, robustness, and transparency in the analysis process (Popovic, Barbosa-Póvoa, Kraslawski, & Carvalho, 2018). The selected search terms were carefully defined following a comprehensive review of the current literature pertaining to the the previously discussed interconnected social-related concepts.

Regarding the selected keywords for this review, Quarshie et al. (2016) acknowledged in their literature review that the concepts of CSR and sustainability exhibit significant overlap within the field of SC management. They assert that it is challenging to precisely define distinct boundaries around the two concepts or to accurately elucidate their interrelation. However, Markman and Krause (2016) emphasized that CSR is not synonymous with sustainability. Acknowledging this discrepancy, both terms were retained for this paper, aligning with the recommendation of Chiesa and Przychodzen (2020). Therefore, the operationalized search terms for the research topics were: (("social sustainability" OR "social responsibility") AND ("tourism" OR "hospitality") AND ("supply chain" OR "supply chain management")).

The Databases for searching the identified keywords, titles and abstracts were Scopus and Web of Science accessed from “Minho University (Portugal) up to September 2023. A total of (88) studies were identified, afterwards, the duplicated studies were removed, by checking title, author, year of publications, resulting in (45) studies as shown in The PRISMA flow diagram (Figure 2-1).

successively, a screening process was initiated to identify the relevant publications for the research question. The screening was conducted among the abstracts, resulting in the exclusions of papers which discussed the concept of sustainable tourism or sustainable development of tourism, as those studies are not contributing to social sustainability dimension from SC perspective. As a result, (27) studies were analysed in full-text and only those matching the following criteria were considered for the analysis: A) papers that explicitly addressed social sustainability/social responsibility either alone or within the TBL approach. B) papers assessing or measuring the social impacts, identifying social indicators or its related factors. C) papers proposing or implementing methods, tools, or approaches for the assessment of social sustainability in either quantitative or qualitative approach. By doing so, (17) relevant published studies were selected for the review and were analysed in detail (Appendix A). The method applied to conduct the systematic literature review

presents some limitations due to the restrictions on the criteria such as publications only in English as well as peer-review open-access journals or accessible from Minho University, and hence potentially relevant publications may have been disregarded. Therefore, the reproducibility of the results could be affected as the screening of the resulting articles was performed by the authors.

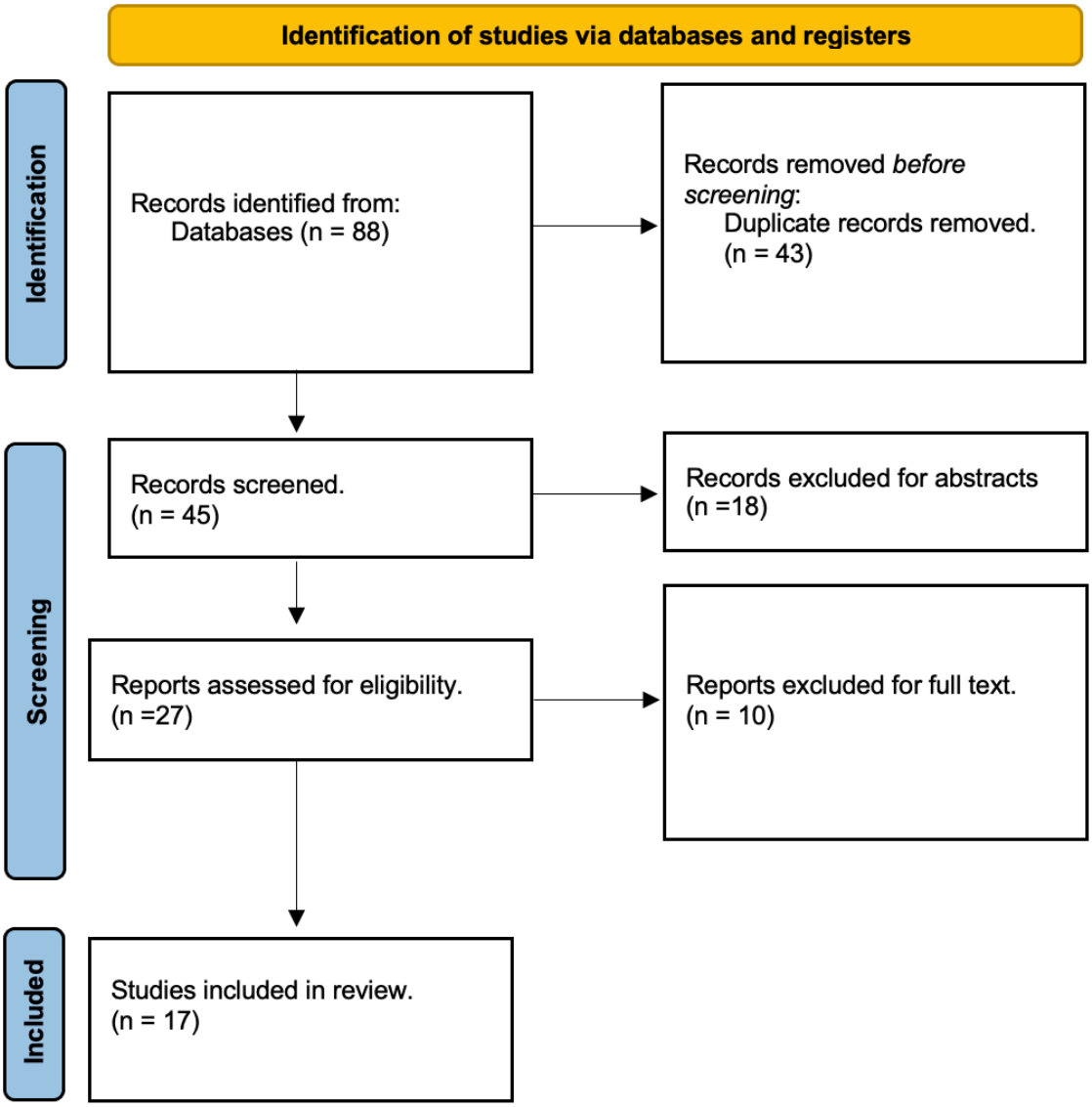


Figure 2-1 PRISMA flow diagram

2.4 Results and Discussion

2.4.1 Descriptive Results of the Systematic Review

To depict the present status of the subject of investigation, a descriptive analysis of the findings was performed. To express the development of social sustainability within the H&T SC research, Figure 2-2 displays the distribution of publications, indicating a varying pattern from 2008 to 2023.

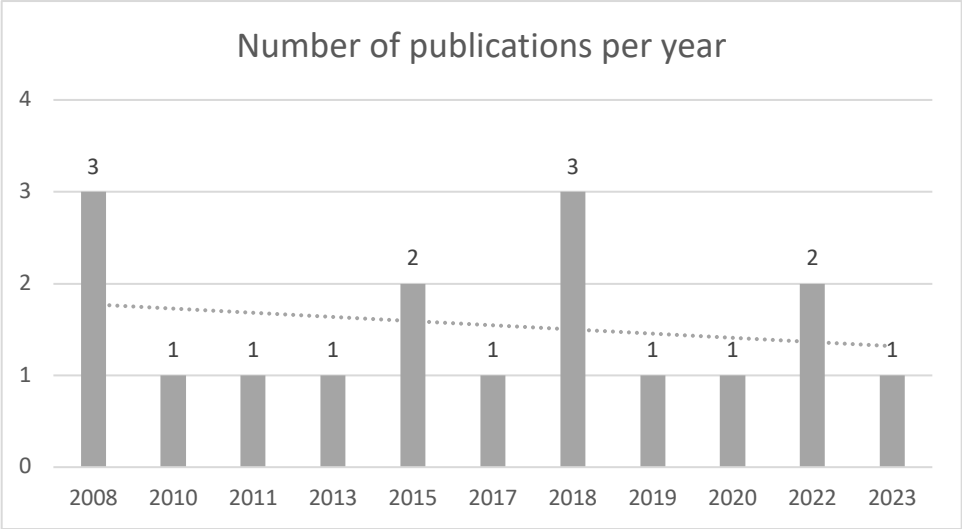


Figure 2-2 time distribution of the publications

Table 2-1 below outlines the distribution of the 17 reviewed journals papers across 14 different journals. The distribution of publications may suggest a broad range of subject areas (H&T, SCM, and sustainability) or sources contributing to the understanding of the topic. However, on closer inspection, almost half of these articles (9 out of 17) are from H&T field journals, emphasizing its significant role in shaping the discourse on SC social sustainability in H&T context. Despite the limited number of reviewed journal papers, this relative diversity in journal's subject areas not only reflects a wide array of contributions to the literature but also underscores their quality, as evidenced by the exclusion of grey literature, with the papers exclusively sourced from Scopus and Web of Science indexed journals.

Table 2-1 Distribution of publications in journals.

Type/no.	Journal	Frequency
Journals With More Than One Publication in The Reviewed Topic		
1	Sustainability (Switzerland)	3
2	Journal of Sustainable Tourism	2
Journals With a Single Publication in The Reviewed Topic		
3	Uncertain Supply Chain Management	1
4	Journal of Cleaner Production	1
5	Benchmarking: An International Journal	1
6	Business Strategy and Environment	1
7	European Planning Studies	1
8	Tourism Management	1
9	Journal of Hospitality Marketing and Management	1
10	Journal Of Travel and Tourism Marketing	1
11	Current Issues in Tourism	1
12	Tourismos	1
13	International Journal of Hospitality Management	1
14	International Journal of Contemporary Hospitality Management	1
Total		**17**

Figure 2-3 shows the characteristics of the analysed set of research papers with respect to the type of study. Out of the (17) analysed research papers, (7) studies employed a quantitative research approach, while (6) studies utilized a qualitative approach. The remaining (4) studies employed mixed research methods, combining both qualitative and quantitative approach.

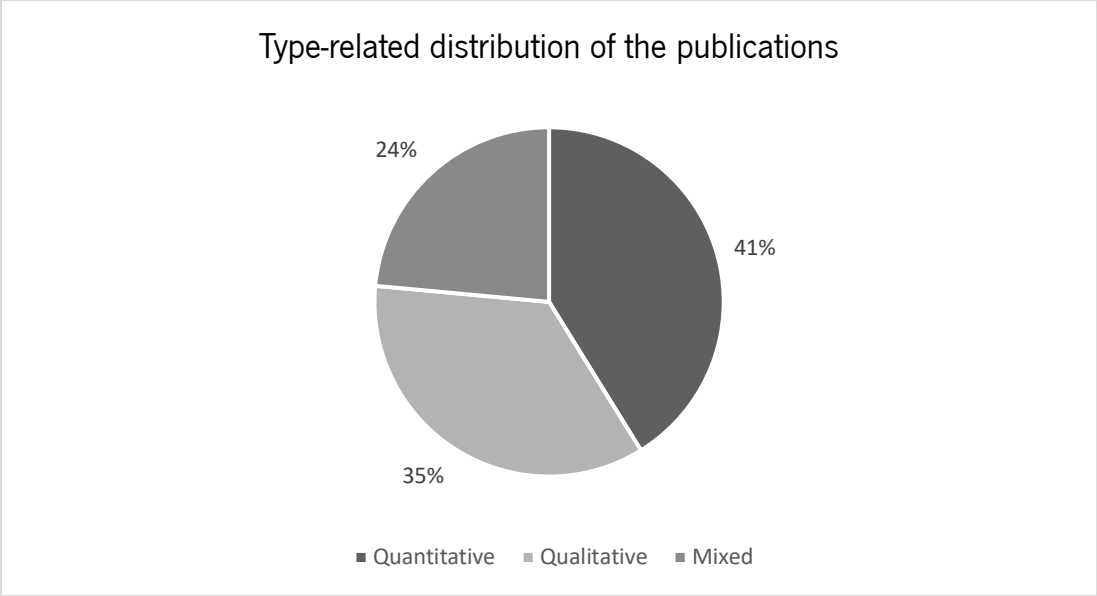


Figure 2-3 Type-related distribution of the publications

The reviewed research paper focused on social sustainability dimension either alone or with other sustainability dimensions in H&T SC research. According to Figure 2-4, papers that studied the TBL approach, which encompasses the three dimensions of sustainability, were the most common (11), while only limited number of papers (6) focusing exclusively on social sustainability.

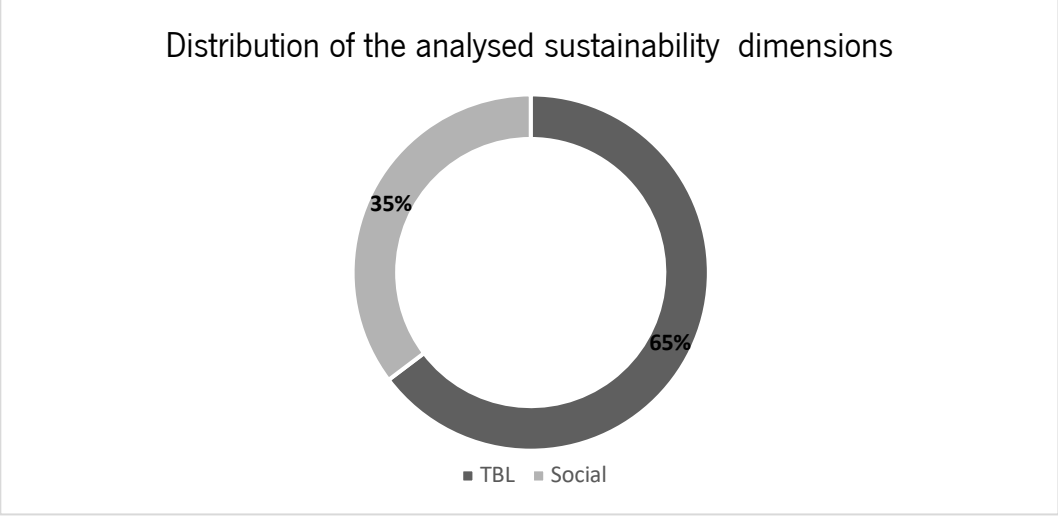


Figure 2-4 Distribution of the analysed sustainability dimensions

2.4.2 Research Themes in H&T SC Social Sustainability

Table 2-2 below identifies four key research themes that have emerged from the 17 reviewed studies research aim and purpose (as presented in Appendix A). It also provides an identification of the SC actors involved in each of the studies. Remarkably, all of the reviewed studies are empirical investigations, except two studies developed theoretical frameworks (Schwartz, Tapper, & Font, 2008; Xu & Gursoy, 2015a) and only one study developed theoretical model that was empirically applied (Sigala, 2008). All the three theoretical frameworks focused on the social dimension as part of the TBL approach. It is noteworthy that none of the 17 reviewed studies attempted to employ explicit theoretical lenses for existing theories verification or theory building.

Table 2-2 Research themes in H&T supply chain social sustainability.

Themes	SC Scope	SC Actors	Reference
Theme 1: *Social Sustainability practices identification/ impact assessment.*	TSC	Accommodation.	(Arzoumanidis & D'Eusanio, 2023)
		Hotels. Accommodations.	(Sanfiel-Fumero, Armas-Cruz, & González-Morales, 2017)
		Hotels.	(Babu et al., 2018)
		Accommodation. Suppliers.	(da Costa & Carvalho, 2011)
		Travel agents. Tour operators.	(Keating, 2022)
	Tour Operators	Mass tour operators.	(Dodds & Kuehnel, 2010)
	Tourism Sector	Accommodation. Customers.	(Arcese, Lucchetti, & Merli, 2013)
Theme 2: *Investigating factors associated with social sustainability concept.*	TSC	Accommodation. Transportation. Excursions. local foods. crafts producers.	(Thahir, Hadi, Zahra, Arif, & Rombe, 2022)
		Hotels. Tour operators. Restaurants.	(Mandal, 2018)
	HSC	Customers (tourists).	(Modica, Altinay, Farmaki, Gursoy, & Zenga, 2020)
		Customers (hotel guests).	(Xu & Gursoy, 2015b)
	Small Tourism Enterprises	Accommodation. Catering. Retailing.	(L. Zhang & Zhang, 2018)

Theme 3: *Identifying key determinates of sustainability practices.*	Tour Operators	Tour operators. Ground Agents.	(Richards & Font, 2019)
		Tour operators.	(Font, Tapper, Schwartz, & Kornilaki, 2008)
Theme 4: *Theoretical models/ frameworks development.*	HSC	Upstream, focal, and downstream hospitality entities.	(Xu & Gursoy, 2015a)
	Tour Operators	Small, Medium, Large tour operators.	(Schwartz et al., 2008)
		Tour operators.	(Sigala, 2008)

Social Sustainability Practices Identification and/or Impact Assessment

In the first theme, the seven studies included that aimed at *"Social sustainability practices identification/ impact assessment"* all displayed a clear focus on TSC. However, few TSC actors are incorporated in their investigations; the majority relied merely on hotels or accommodation entities to collect SC information, with rare instances considering suppliers, tour operators, travel agents, or customers. In two separate studies, Arcese et al. (2013) and Arzoumanidis and D'Eusanio (2023) conducted social life cycle assessments (S-LCA) to evaluate the social footprint in Italian tourism. The first study collected the perceptions of accommodation and customers, they revealed positive results within the "Worker" category, while negative effects of indicators were observed in the "Cultural Heritage" category. The later study collected the perceptions of accommodations only and found that the "Health and Safety" category was the most affected, followed by "Labour Rights and Decent Work."

In addition to the previous two studies, five additional studies employed diverse techniques for social assessment in different geographical contexts. Notably, da Costa and Carvalho (2011) and Dodds and Kuehnel (2010) adopted a case study approach, while the remaining three studies, namely Babu et al. (2018), Keating (2022) and Sanfiel-Fumero et al. (2017), employed distinct quantitative methods. These studies used unique questionnaires, each tailored to capture specific indicators of social practices, reflecting the heterogeneity of TSC social sustainability assessment approaches across different regions.

Investigating Factors Associated with Social Sustainability Concept.

Regarding the second theme, five studies centred around *"Investigating factors associated with social sustainability concept."* Among these, two studies within the TSC scope investigated the relationship of different factors such as managerial innovation as well as technological and managerial capabilities and their connections to social sustainability as part of the TBL approach from the perceptions of multiple upstream and downstream TSC actors (Mandal, 2018; Thahir et al., 2022). Another two studies within the HSC scope focused on the effects of sustainable HSC management practices on customer attitudes and behaviours in different geographical contexts, as perceived by hotel guests and tourists (Modica et al., 2020; Xu & Gursoy, 2015b). The remaining study of Zhang and Zhang (2018) investigated the links among social networks, the perception of social sustainability, and the future business intentions of small tourism companies (accommodation, catering and retailing).

Identifying Key Determinates of Sustainability Practices.

Concerning the third theme in which authors aim at *"Identifying key determinates of sustainability practices,"* only two studies were found, both addressing just the tour operators. The first study of Font et al. (2008) assessed the potential and challenges of applying SSCM concepts and experiences from the manufacturing sector in the tourism industry. This study concluded that SSCM initiatives depend on the strength of relationship between tour operators and their suppliers, organizational cultures as well as resources allocated to sustainability investments. Likewise, the more recent study of Richards and Font (2019) analysed the opportunities and barriers faced by tour operators and ground handlers in promoting sustainable tourism products. This research focused on supplier collaboration and concluded that organizational culture is perquisite for sustainability adoption in buyer-supplier relationships.

Social Sustainability Theoretical Models/Frameworks Development.

In the last theme, where authors aimed at *"Social sustainability theoretical models/frameworks development,"* only three studies were related. Two of them focused on tour operators (Schwartz et al., 2008;

Sigala, 2008), while the third focused on the entire HSC (Xu & Gursoy, 2015a). The first study of Schwartz *et al.* (2008) presented a theoretical framework for tour operators to improve sustainability performance through SC management processes. This framework outlined industry-specific steps, including business engagement, integration of SSCM, suppliers' assessment, priority setting, and progress evaluation. In the second study, Sigala (2008) developed a SSCM theoretical model for tour operators based on SC management and collaboration concepts and applied it to a leading tour operator known for its strong commitment to sustainability. The third study of Xu and Gursoy (2015a) proposed an HSC theoretical framework aimed at addressing the antecedents, consequences, actions, evaluation mechanisms, and sustainability practices that can be adopted by HSC members. This study is mutually relevant to the third theme since the framework addressed the antecedents of sustainability adoption.

2.4.3 Social Sustainability Categories and Practices n H&T SC

During the review, it was observed that social sustainability practices have been addressed on an ad hoc basis, particularly in studies that adopt the TBL approach. The inclusion and elaboration of detailed social practices in such studies appear to be relatively limited compared to the emphasis placed on the environmental dimension. This observation aligns with findings from a review conducted by Gruchmann et al. (2022).

Responding to this literature gap, a diverse range of socially sustainable practices spanning eight distinct social categories has been identified from the reviewed H&T SC research and the findings were summarized in Table 2-3 below. The first column classifies the social category while the second column outline the associated social indicators (practices) identified during the review. It is noteworthy that within the reviewed studies, numerous social indicators share similarities, even though they may employ different names to depict identical practices. Consequently, the most prevalent name was adopted to designate the social practice, lessening redundancy.

Table 2-3 Summary of Social Sustainability Practices in H&T research.

Social Categories	Social indicators (Practices)	References
Fair labour measures	Local employment support.	
	Employee satisfaction.	

	Jobs creation.	(Arcese et al., 2013; Arzoumanidis & D'Eusanio, 2023; Babu et al., 2018; da Costa & Carvalho, 2011; Font et al., 2008; Keating, 2022; Modica et al., 2020; Thahir et al., 2022; Xu & Gursoy, 2015b, 2015a; L. Zhang & Zhang, 2018)
	Fair payments.	
Equal opportunity	No discrimination among employees.	(Arcese et al., 2013; Arzoumanidis & D'Eusanio, 2023; Thahir et al., 2022; Xu & Gursoy, 2015a)
	Employees' benefits.	
	Diversity.	
Employees development	Education, training, and development for employees.	(Arcese et al., 2013; Babu et al., 2018; Font et al., 2008; Modica et al., 2020; Sigala, 2008; Xu & Gursoy, 2015a, 2015b)
Health and safety	Health and safety for employees and customers.	(Arcese et al., 2013; Arzoumanidis & D'Eusanio, 2023; Babu et al., 2018; Modica et al., 2020; Richards & Font, 2019; Xu & Gursoy, 2015a, 2015b)
	Employee's compliance with hygiene policies.	
	Food safety and hygiene.	
Employee's Participation and Cooperation	Team working.	(Babu et al., 2018; Keating, 2022; Xu & Gursoy, 2015a; L. Zhang & Zhang, 2018)
	Rewards for cooperative activities.	
	Employee relations.	
Society and community development	Local community development and support including local sourcing.	(Arcese et al., 2013; Arzoumanidis & D'Eusanio, 2023; da Costa & Carvalho, 2011; Dodds & Kuehnel, 2010; Font et al., 2008; Keating, 2022; Modica et al., 2020; Richards & Font, 2019; Schwartz et al., 2008; Thahir et al., 2022; Xu & Gursoy, 2015a, 2015b; L. Zhang & Zhang, 2018)
	Participation in community activities.	
	Social and cultural heritage preservation.	
	Donations and poverty reduction.	
	Respect consumer rights.	
Ethics and corruption	Ethical code of conduct.	(Arcese et al., 2013; Arzoumanidis & D'Eusanio, 2023; Keating, 2022; Modica et al., 2020; Xu & Gursoy, 2015b)
	Legal and ethical operations.	
	Ethical compliance team.	
Human rights	Organization culture against commercial and sexual exploitation for children, teenagers, women and minority groups.	(Arzoumanidis & D'Eusanio, 2023; Keating, 2022)
	Indeginous rights.	
	Gender equality.	

Among the 8 identified social categories, 4 specifically concentrate on employees as essential stakeholder in H&T SC, by addressing *"fair labour measures"* that comprise indicators related to local employment support and creation together with employee's satisfaction. Additionally, *"employee's development"* comprising indicators related to training, educating, and developing employees' professional skills. Furthermore, *"employee's participation and cooperation"* including indicators related to team working and employees' relations, as well as the rewards for cooperative activities. Lastly, *"equal opportunities"* containing indicators related to eliminating discrimination among employees, ensuring diversity of staff members, and the fair distribution of benefits among them.

The review revealed that *"society development"* category received significant attention compared to other categories, as many of the reviewed studies comprised indicators related to the development of local communities, the preservation of social and cultural heritage, as well as donations to charitable organizations and society at large to reduce poverty. Contrariwise, the category of *"human rights"* received notably less attention and recently incorporated. Consequently, there exists a research gap necessitating further investigation into these less investigated categories of social sustainability within the context of H&T research.

2.4.4 Social Sustainability Current Applications in H&T SC Research

As demonstrated in Table 2-4, the early studies conducted from 2008 to 2010 focused on exploring sustainability adoption including the social dimension by collecting data from tour operators in developed countries due to their significant influence on both the supply and demand sides of the hospitality SC through the provision of holiday packages (Font et al., 2008). More specifically, these studies demonstrated how tour operators controlled the SC by either directing tourist flows (Schwartz et al., 2008) or influencing the actions of their SC partners to implement sustainable TSC practices by contracting with suppliers who followed sustainable standards (Sigala, 2008). Thus, their aim was primarly focused on creating conceptual models and frameworks for H&T SC sustainability.

Successively, Dodds & Kuehnel (2010) attempted to investigate corporate social responsibility among five mass tour operators in Canada. Their focus was on understanding the operators' awareness levels, their degree of participation in corporate social practices, and the challenges associated with adopting CSR. However, the study examined only a limited number of social practices. Notably, early research during this period relied on case studies.

Subsequently, researchers began to broaden their scope by collecting data from different entities, such as accommodations and tourism service providers at the destination level to examine sustainability (da Costa & Carvalho, 2011), they also introduced new methodologies, such as S-LCA to the tourism industry

by considering multiple stakeholders, including workers, the local community/society, and customers (Arcese et al., 2013).

In a later development, Xu & Gursoy (2015a) presented a conceptual framework for sustainable hospitality SC management, comprehensively addressing the social dimension beside the environmental and economic dimension. Their framework included diverse social sustainable practices related to employee health and safety, employee training, customers, the community, suppliers, and government. The study also discussed the barriers and enablers of social practices, the impact of company characteristics on the adoption of social sustainability measures, as well as the effects on hospitality companies themselves and their customers. The authors extended their research by conducting a study analyzing the effects of sustainable hospitality SC management practices on customer attitudes and behaviors in the United States using structural equation modeling (Xu & Gursoy, 2015b). This study was replicated in Italy by Modica et al. (2020) using the same model variables and the findings was analogous showing that the social practices in sustainable hospitality SC management positively affect customer satisfaction but negatively affect willingness to pay a premium.

Table 2-4 Research design in H&T supply chain social sustainability research.

#	Author(s)/Year	Approach/ Methods	Data collection	SC Scope	Location	dimensions
1	(Arzoumanidis & D'Eusanio, 2023)	Mixed/ S-LCA	Questionnaire & Social Database	TSC	Italy	Social
2	(Keating, 2022)	Mixed/ Best Worst Method	Interviews & survey		Australia-China	
3	(Thahir et al., 2022)	Quantitative/SEM	Questionnaire		Indonesia	TBL
4	(Modica et al., 2020)			HSC	Italy	
5	(Richards & Font, 2019)	Qualitative/ case studies	Semi-structured interviews	Tour operators	UK	
6	(Babu et al., 2018)	Quantitative/IPA	Questionnaire	TSC	India	
7	(L. Zhang & Zhang, 2018)	Quantitative/Generalized SEM (GSEM)		Small tourism enterprises	Lao PDR	Social
8	(Mandal, 2018)	Quantitative/Partial Least Square (PLS) SEM		TSC	India	TBL
9	(Sanfiel-Fumero et al., 2017)	Quantitative/Nonparametric tests			Spain	Social
10	(Xu & Gursoy, 2015a)	Qualitative/Conceptual framework	Secondary data	HSC	NS	TBL
11	(Xu & Gursoy, 2015b)	Quantitative/ SEM	Questionnaire		USA	
12	(Arcese et al., 2013)	Mixed/S-LCA	Questionnaire & database documents	Tourism Sector	Italy	Social

13	(da Costa & Carvalho, 2011)	Qualitative/case Study	interviews	TSC	Portugal	TBL
14	(Dodds & Kuehnel, 2010)	Mixed/ Case studies	In depth Interviews & questionnaire	Tour Operators	Canada	Social
15	(Sigala, 2008)	Qualitative/ Case study	Interviews		Greece Germany	TBL
16	(Font et al., 2008)				UK	
17	(Schwartz et al., 2008)	Qualitative/ Conceptual Framework	Secondary data		NS	

Abbreviations: Hospitality Supply Chain (HSC), Tourism Supply Chain (TSC), Triple Bottom Line (TBL), Not Specified (NS), Social Life Cycle Assessment (S-LCA).

In more recent research, it has been observed that quantitative studies have dominated the research methods, by employing statistical analysis methods mostly using SEM. Alongside the earlier described SEM models (Modica et al., 2020; Xu & Gursoy, 2015b) , Zhang and Zhang (2018) explored the connections between social networks, perceptions of social sustainability, and future business intentions of Lao PDR small tourism enterprises. Thahir et al. (2022) investigated how environmental management, social support, and financial performance influence managerial innovation and, consequently, SSCM in tourism. Also Mandal (2018) used partial least squares (PLS) SEM to explore the impact of Big Data Analytics (BDA) management competencies as planning, investment, coordination, and control on sustainable tourism performance in India. It also aims to investigate the moderating effect of technology orientation on the link between BDA management capabilities and sustainable TSC performance. Apart from SEM, Sanfiel-Fumero et al. (2017) used a non-parametric statistical test (Mann-Whitney-Wilcoxon test), to compare managers' perceptions of hotels versus non-hotel accommodations and to assess CSR implementation in the Canary Islands, Spain, with the participation of public and private agents, using a TSC approach.

The most recent studies employed mixed methods approach, that are rarely used in this field as demonstrated in (Table 2-4). For instance, Arzoumanidis and D'Eusanio (2023) identified and assessed the social footprint of accomodation in the context of the Italian TSC, utilizing data from self-developed questionnaires in conjunction with Social Hotspot Databases. Additionally, Keating (2022) employed the best worst method to analyse CSR practices within the Australia-China TSC, drawing upon data collected through interviews and surveys.

2.4.5 Future Research Directions in H&T SC

Numerous research recommendations exists for enhancing social sustainability within the H&T SC research, especially as the social dimension is less studied compared to the environmental dimension (Gruchmann et al., 2022). Several researchers limited their studies by either addressing social sustainability in the H&T SC from focal firms (Arzoumanidis & D'Eusanio, 2023; Sanfiel-Fumero et al., 2017) or by considering limited number of intermediaries and stakeholders (Keating, 2022), hence the comprehensiveness of their results are diminished. Therefore, it is recommended the presence of downstream and upstream H&T SC members such as tourism products and services suppliers, hotels and resorts, travel agents and tour operators when studying social sustainability from SC perspective as well as the inclusion of social indicators focusing on H&T stakeholders such as local community, workers, managers, and consumers.

Furthermore, research investigating the role of different stakeholders in the implementation of social practices in the hospitality SC could provide valuable insights, also examining the impact of specific social practices from upstream or downstream TSC partners on customer satisfaction is recommended (Modica et al., 2020). This is critical in SC research as the SC partners requirements in social sustainability do not necessarily match stakeholders that lives in the community (Golicic, Lenk, & Hazen, 2020).

Since the image of tourism destination is significantly affected by the action of all stakeholders in a SC (Sanfiel-Fumero et al., 2017), it is recommended that future H&T research focus on the joint collaboration and coordinated planning of social actions with the SC members (Babu et al., 2018) facilitated by the power of focal firms to guide them in adopting social practices (Sanfiel-Fumero et al., 2017). Also studies investigating the tourism suppliers willingness to adopt social practices is required beside the development of a commonly agreed standardized metrics that takes into consideration the multiple tourism stakeholders (Sigala, 2008).

Furthermore, it is recommended to explore management perceptions in practicing social sustainability, not only to enhance innovation (Thahir et al., 2022) but to compare managers perspectives with those of employees towards sustainable practices adoption, which may yield interesting implications (Xu & Gursoy, 2015b). additionally, Dodds & Kuehnel (2010) recommended assessing social practices by investigating how the size of tourism entities in TSC influence their engagement in social practices. In the

context of developing countries, Zhang & Zhang (2018) underscored the importance of focusing on social sustainability by studying small tourism enterprises, given their significant role in local development.

The study of success factors and obstacles influencing sustainability adoption has been studied by Richards & Font (2019) but was limited to mass tour operators in UK. Expanding upon this study, future research could examine those factors or explore other-related factors such as challenges, barriers, and drivers or enablers influencing social adoption in developing countries from downstream and upstream H&T SC partners. Furthermore, there is a need for research addressing the cultural and political differences (Sigala, 2008) between developing and developed countries, as these factors can significantly impact the adoption and implementation of social practices.

Table 2-5 below summarizes the future research directions extracted from the reviewed studies as discussed in this section, in conjunction with the earlier sections' discussions.

Table 2-5 Research agenda

Future Research Direction	**Related Reference(s)**
Focusing on social sustainability in H&T SC including downstream and upstream members.	(Arzoumanidis & D'Eusanio, 2023; Sanfiel-Fumero et al., 2017)
Examining the role of different tourism stakeholders in social practices.	(Keating, 2022; Modica et al., 2020)
Examining the impact of specific social practices from upstream or downstream TSC partners on customer satisfaction.	(Modica et al., 2020)
Addressing joint collaboration and coordinated planning of social practices with SC members.	(Babu et al., 2018; Sanfiel-Fumero et al., 2017)
Exploration of tourism suppliers' willingness to adopt social practices.	(Sigala, 2008)
Development of standardized social sustainability metrics for multiple tourism stakeholders.	
Exploration of cultural and political differences between developing and developed countries.	
Investigating the difference between management perceptions of social sustainability and employee perspectives.	(Thahir et al., 2022; Xu & Gursoy, 2015b)
Studying the influence of tourism entity size in TSC on engagement in social practices.	(Dodds & Kuehnel, 2010)
Investigating social sustainability adoption in small tourism enterprises in developing countries.	(L. Zhang & Zhang, 2018)
Study of success factors, barriers, and drivers influencing social adoption in developing countries.	(Richards & Font, 2019)
Development of social metrics for lessening the challenges associated with quantitative social indicators in S-LCA technique.	(Arcese et al., 2013; Arzoumanidis & D'Eusanio, 2023)
Need for social sustainability assessment and performance optimisation techniques by the development or employment of MCDM, Fuzzy-MCDM frameworks. For example: Analytical Hierarchy (or network) Process (AHP), TOPSIS for social sustainability assessment in H&T SC.	Based on the author's review and (Sodhi & Tang, 2018)

Need for theoretical development (theory building and/or theory verification) and the employment of theoretical lenses, for example: stakeholder theory, institutional theory, social network, resource-based view, stakeholder resource-based view, resource dependence theory, performance-based view, contingency theory, attribution theory, transaction cost economics, population ecology etc.)	Based on the author's review and (Golicic et al., 2020; Sodhi & Tang, 2018)

Taking into account the gaps in the research methodologies employed, it was noted that currently, SEM predominates the quantitative research within this field, this observation align with findings by Zhang & Zhang (2018). Remarkably, the reviewed studies lack any utilization of multi-criteria assessment techniques for assessing the H&T SC social sustainability. Therefore, the development of new or the employment of existing Multi Criteria Decision Making (MCDM) frameworks for the assessment of the level of social sustainability implementation in H&T SC is highly recommended.

Also, it was observed that the couple of research adopting S-LCA technique in H&T often encounter challenges related to the sacristy of well-defined quantitative social indicators (Arcese et al., 2013; Arzoumanidis & D'Eusanio, 2023). To bridge this gap, a viable approach is to explore the quantitative social indicators developed by Popovic et al. (2018) for evaluating SCSS. These social indicators remain consistent for both production and service SCs, with the primary distinction lying in the structure of the SC. By doing so, we can incorporate and transfer advancements from the field of sustainable SC management research to the domain of H&T research (Gruchmann et al., 2022).

Furthermore, our review indicates that none of the examined studies utilized explicit theoretical frameworks to either validate existing theories or construct new ones. Consequently, our study proposes a number of well-known theories in Table 2-5 that have demonstrated their applicability in the field of SC, as affirmed by Golicic et al. (2020) in their broad examination of SCSS meaning and by Sodhi and Tang (2018) in their exploration of corporate social sustainability themes in SC research. These proposed theories can provide a robust foundation for guiding future research in the realm of H&T SCSS.

2.5 Conclusions

This study presents a systematic literature review that offers a comprehensive overview of current research concerning social sustainability within the H&T SC. The primary goals of this review are to identify common research themes and the social sustainability practices implemented within the H&T SC. Then, to identify the various research methodologies applied in the reviewed studies, examine the geographical and sectoral

scope covered in the literature, and highlight the SC actors involved in the research. Finally, we discuss the current research gaps that can provide valuable insights for guiding future research in this field.

This review highlights the underexplored nature of social dimension in H&T SC research, as from 2008 to the present, only 17 studies addressed the topic. Despite the emphasis on the TBL approach, which advocates equal attention to the economic, environmental, and social dimension, less consideration to the social dimension has been given in this field. Therefore, there is an urgent need for research that explicitly focus on social sustainability within the H&T SC.

The existing literature reveals four prominent key research themes. The foremost among these themes pertains to papers dedicated to the identification and/or impact assessment of social sustainability practices. Following closely are papers that explored the factors associated to the concept of social sustainability. In contrast, a less emphasized theme of research focuses on the development of theoretical models and frameworks. The least emphasized theme revolves around papers aimed at identifying the key determinants of sustainability practices. This delineation of research themes serves as a comprehensive overview of the current scholarly landscape in the field.

Subsequently, it was noticed that the social sustainability practices are being employed on an ad hoc basis, and we couldn't find a consensus on a clear set of social sustainability indicators in H&T SC research. As a response, a wide range of socially sustainable practices has been identified from the reviewed studies and aggregated in eight distinct social categories. It was apparent that 'society and community development' category received significant attention compared to the other identified categories while 'human rights' indicators were the least identified.

Also, it was observed that between 2008 and 2010, research primarily explored the sustainability adoption in H&T SC from the perspective of tour operators in developed countries, using mainly qualitative methods. Later, studies shifted their focus toward the application of quantitative methods in both developed and developing countries. However, MCDM methods for social sustainability assessment are still absent to date. It is noteworthy that most papers in this field are empirical in nature, with limited availability of theoretical papers focused on conceptual framework development. Additionally, there is a notable absence of research aimed at theory development or verification using theoretical lenses. Finally, from this review it was possible to identify numerous areas for further development, these recommendations attempt to provide a roadmap for future research to advance our understanding of social sustainability within H&T SC.

3. Social Sustainability in Egypt Hospitality and Tourism Supply Chains

Abstract

Social sustainability is in its early stages in hospitality and tourism supply chains, especially in developing countries. This research draws on institutional and stakeholder theories to identify the adopted social sustainability practices in Egypt and to determine the factors affecting their implementation. A mixed-method research approach is followed involving interviews of hotel managers and, a literature-based questionnaire answered by a total of 187 practitioners from hospitality and tourism supply chains in Egypt. The interviews revealed that social sustainability practices in the two hotels' supply chains are adopted but limited to legal requirements and brand policies. Statistical analysis indicated that local suppliers boost the adoption of social practices. All the studied barriers show very weak correlation with the adoption of social sustainability practices, according to the interviews, this does not imply barriers inexistence, but rather reflects lack of awareness regarding social rights in a culture that tend to preserve social conservatism. The enablers explained significant variations in many social sustainability practices (53 out of 62). This study is unique since it offers a novel approach by linking institutional and stakeholder theories to recognize weaknesses in tourism supply chain social sustainability, thereby providing directions for the future design of sustainable tourism policies.

Keywords: Supply chain sustainability, social sustainability, stakeholder theory, institutional theory, hospitality, tourism, Egypt, canonical correlation analysis.

3.1 Introduction

Hospitality and tourism (H&T) are interrelated industries due to the typical nature of touristic sites, which in the same area comprises hospitality services such as accommodation in hotels and resorts as well as restaurants, tours, entertainment activities among many other services (Chu & Hsu, 2021; Lim, 2016). Those interrelated companies (some are national others are multinationals) form the H&T Supply Chain (SC) (Keskin & Ucal, 2021; Zhao & Hou, 2022). Touristic destinations comprises many of those companies what represents a serious threat to sustainability because of the high number of people (employees and tourists) who consume significant resources (food, water, energy, etc.) (Babu et al., 2018). Moreover, the tourism industry has a reputation of low working conditions, low wages, and pressures to keep prices low. Worsened by seasonality that results in temporary workers in hotels and tour operators that do not have the guaranteed social benefits under national labour law such as social security, health insurance and union representation (Gruchmann et al., 2022).

Furthermore, the pressure of tourism stakeholders (consumers, workers, public regulators, environmental agencies, etc.), given their proximity to tourism companies, leads organizations to become more aware of their activities' social impacts (Shams et al., 2020; Vrontis et al., 2021). Due to the numerous parties and stakeholders involved (from all service providers to final customers), this economic activity has high impact on social issues, so studying social sustainability across SC members is somehow fundamental. Even more, in limited situations of 'overtourism' in over-crowded resorts, cities and destinations (Milano et al., 2019) or due to the Coronavirus pandemic of an almost total shutdown of the global travel and tourism system.

Social sustainability focuses on human well-being for current and future generations. Corporate social responsibility (CSR) refers to a firm's actions that improve the well-being of both internal and external corporate stakeholders (Kotler & Lee, 2008). Research indicates that CSR positively and negatively affects employee attitudes and behaviours (primary stakeholder of any firm), such as organizational commitment, organizational reputation, employee turnover and market reactions (Jang, Kim, & Lee, 2022). However, the 'employee voice' is generally unexplored (Wells, Manika, Gregory-Smith, Taheri, & McCowlen, 2015).

Social sustainability requires a shift from the dominant organizational logic of prioritizing self-interest, which seeks to maximize profits and benefit shareholders (Waddock, 2016, 2020) without regard for equity,

to a new logic that promotes human well-being, and hence flourishing for all. This involves benefiting not only the organization but also the multiple stakeholders and partners within the supply chains, ultimately contributing to the betterment of society as a whole.

Nakamba, Chan, and Sharmina (2017) defined social sustainability from the SC perspective as "the management of practices, capabilities, stakeholders and resources to address human potential and welfare both within and outside the communities of the SC". Mani et al. (2016) explained that social sustainability within the SC management can be related to products and processes assessed to identify socio-economic conditions such as safety, health, hygiene, wages, and labour rights, education, and housing, etc. of the people who are part of the SC. Looking at the SC perspective is fundamental since social practices have been adopted due to customers pressure and those can be final consumers or companies. getting pressured by customers and impose pressure on suppliers is persistent in a SC.

The adoption of socially sustainable practices in the SC has been growing but the scientific community still avoids the usage of social indicators as they are subjectively perceived and hard to evaluate (Mota, Gomes, Carvalho, & Barbosa-Povoa, 2018). Though, social sustainability within the SC in terms of integrated management of social aspects needs to be considered (D'Eusanio et al., 2019; Tipi & El Gazzar, 2021). In the service sector in general, social sustainability is relatively new (Hussain, Ajmal, Gunasekaran, & Khan, 2018) and more in the H&T industry in particular.

Most of the Sustainable Supply Chain Management (SSCM) research focuses on the manufacturing sector, few studies exist concerning social sustainability in developing countries and the current tend to focus on buyer perspective in production industry (e.g., equipment, fashion, foundry), food industry and agricultural (Ansari & Kant, 2017; Jia et al., 2018). Moreover, Rasoolimanesh, Ramakrishna, Hall, Esfandiar, & Seyfi (2020) demonstrated that the focus of sustainable tourism indicators is on European countries rather than the global south which is the major focus of the sustainable development goals.

Egypt as a developing country is one of the most popular touristic destinations located along the Mediterranean coastline and share common and unique characteristics as well as strength and weaknesses with Italy, Greece, Spain, Turkey, Tunisia and Morocco tourism sector (Baloglu & Mangaloglu, 2001; Perles-Ribes et al., 2018). Besides, it is one of the attractive destinations for local small and medium enterprises (SMEs) and multinational tourism and hospitality entities such as hotels, resorts and tour operators especially along the Red Sea coast (El Dief & Font, 2010; Gohar & Mathias Kondolf, 2020). Such position made the

tourism sector in Egypt the most important source of income after Suez Canal, with a direct contribution of more than 1 million jobs to the Egyptian economy (Salman et al., 2017).

However, the sector suffered from political instability, terrorism, and financial crises since the Arab spring revolutions started in 2011. The hospitality industry incurred around 825 million US dollars financial losses in 2011 and around 20% of hotel employees lost their jobs (in some hotels, rises up to 60%) (Abuelkassem et al., 2012). In 2019, the sector recovered by generating around 14.26 billion US dollars corresponding to 3.9% of the gross domestic product (GDP) from 13 million tourists. The sector is ranked third after United Arab Emirates and Kingdom of Saudi Arabia in Middle East region respectively with approximately 53% of all international tourism receipts and ranked 36th in the world in absolute terms[4] until the pandemic of Covid-19.

This research draws on Institutional Theory (IT) and Stakeholder Theory (ST) to explore the social sustainability practices adopted in Egypt H&T SC through: 1) Identifying the social best practices adopted in the SC, 2) Identifying factors (barriers, enablers, or company's characteristics) affecting social practices adoption and their degree of association, and 3) Analysing if differences exist in terms of practices adoption across the SC.

3.2 Theoretical Foundation

Sustainability practices adoption are not usually economically beneficial for many firms, besides that the economic explanations alone cannot fully account for organizational phenomena (Kauppi & Luzzini, 2022). Consequently, IT theory has gained significant scholarly interest as a theoretical lens to understand the causes for sustainable practices adoption within organizational context (Jennings & Zandbergen, 1995; Yawar & Kauppi, 2018). Furthermore, it is commonly utilized as an analytical framework to underline the drivers and enablers that facilitate or the barriers that hinder the adoption of sustainable practices (Caldera, Desha, & Dawes, 2019; Dai, Xie, & Chu, 2021; Ranta, Aarikka-Stenroos, Ritala, & Mäkinen, 2018).

Institutional Theory as explained by DiMaggio & Powell (1983) clarifies that firms' decision-making processes are influenced by three distinct institutional pressures: *coercive, normative, and mimetic pressure*.

[4] https://www.worlddata.info/africa/egypt/tourism.php, https://www.unwto.org/country-profile-inbound-tourism

Coercive pressure manifests through the enforcement of governmental regulations, obligatory adherence, and the need to comply with the standards set by the governing bodies. Furthermore, coercive institutional pressures can be in the form of various incentive mechanisms, including but not limited to tax deductions, subsidies, and favourable bank financing rates (Arranz, Sena, & Kwong, 2022). Also, a powerful firm in a SC can impose a coercive strategy to force its own interest by demanding its partners to adopt specific practices (Kauppi & Luzzini, 2022).

Normative pressure stem from norms specified by institutions such as industry associations and obliges firms to present themselves as legitimate actors within their respective industry by following the professional standards and norms commonly shared by employees and managers in a given industry (Dai et al., 2021). Further, Sebastianelli & Tamimi (2020) explained that the normative pressure usually originates from external stakeholders with either direct interest in the firm such as customer or indirect interest such as society and local communities (stakeholder theory). However, normative pressure have no authority to directly enforce compliance or penalize non-compliance as in coercive pressure, but decision makers believe that compliance with norms would create a good public image and attract more customers (Alziady & Enayah, 2019).

Mimetic pressure arises when firms imitate successful actions of other leading companies as well as imitating competitors that gained benefits from being the first movers in the industry (Alziady & Enayah, 2019) or imitating the publications of best practices especially when facing uncertainties in order to minimize their expenses (Kauppi & Luzzini, 2022).

Despite its widespread use in organizational research, the IT is rarely employed within the perspective of SSCM to offer insights and explicate the underlying forces that drive the adoption of socially sustainable practices within the SC (Dai et al., 2021; Kauppi & Luzzini, 2022; Yawar & Kauppi, 2018) especially in the context of emerging economies (Govindan, Shaw, & Majumdar, 2021).

Sebastianelli & Tamimi (2020) proposed that Stakeholder Theory can serve as a valuable addition to the IT theory when examining the factors behind SSCM. The ST as explained by Freeman (2010) examines the dynamics between organizations and various individuals or groups i.e. stakeholders that have the ability to influence or be influenced by the business operations of the organization. The ST asserts that while the generation of value is a key driving force for enterprises, it also acknowledges the importance of distributing this value among a diverse range of stakeholders. These stakeholders go beyond just shareholders and managers, encompassing individuals and groups in society who are interested in the firm operations

(Theodoulidis, Diaz, Crotto, & Rancati, 2017). Therefore, stakeholder pressure from buyers, suppliers, employees, customers, governmental organizations, NGOs, and the local community plays a crucial role in raising awareness about sustainability and subsequently driving its implementation within organizations (Govindan et al., 2021).

Different studies highlighted the internal and external stakeholders, the SC focal firm, upstream and downstream stakeholders possible contribution to SSCM practices (Busse, Schleper, Weilenmann, & Wagner, 2017; Meixell & Luoma, 2015; Siems & Seuring, 2021) and they emphasized the significance of stakeholder pressures in fostering the adoption of social sustainability practices. Though, the influence of stakeholders varies between industries and with respect to the tier levels in the SC (Sebastianelli & Tamimi, 2020).

Furthermore, a recent study noted that the intersection between stakeholders and the SC itself as well as the contribution of stakeholders towards achieving a more sustainable SC, are often overlooked areas of analysis (Siems, Seuring, & Schilling, 2022). Based on the foregoing, it can be inferred that while IT and ST are two distinct theories, they both share a common ground in acknowledging the significant role of stakeholders in shaping institutional pressures from different viewpoints. This pressure arises from stakeholders' expectations, which, in turn, may impact the adoption of socially sustainable practices.

3.2.1 Research Questions and Conceptual Model

To address this need, the present study developed the following central research question *"What is the current state of social sustainability implementation in H&T SCs in Egypt?"*

The sub-questions to answer the proposed central research question are:

- **RQ1:** Which social sustainability practices identified in literature are perceived adopted in the H&T SCs?
- **RQ2:** What are the key barriers that are perceived to affect the adoption of social sustainability practices within the H&T SCs from an institutional theory perspective?
- **RQ3:** What are the key enablers that are perceived to enhance the adoption of social sustainability practices within the H&T SCs from an institutional theory perspective?
- **RQ4:** To what extent the perceived social sustainability practices, barriers, and enablers across the H&T SCs varies due to the different stakeholders and institutional pressures?

Answering the research questions requires an exploration of the social sustainability practices adopted in H&T SCs in Egypt with respect to upstream suppliers, the focal firm "hotels," and downstream customers "travel agents and tour operators." The considered variables and their relationships, as per the research questions are illustrated in the conceptual model (Figure 3-1).

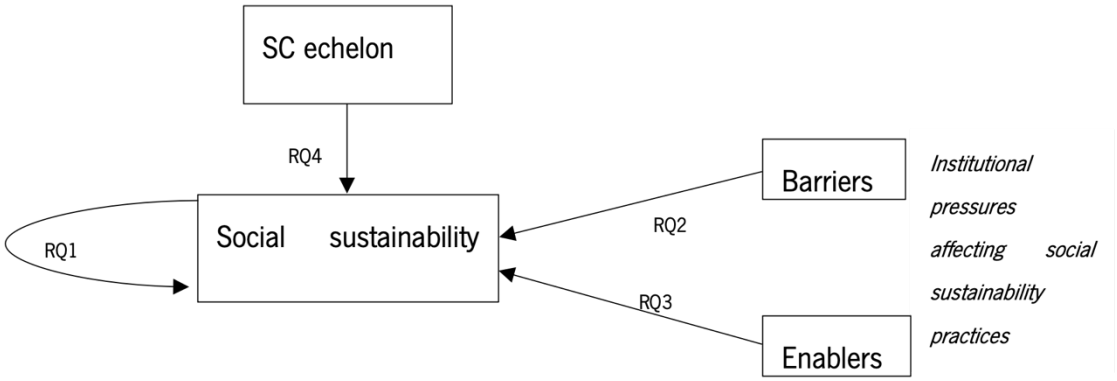


Figure 3-1 Conceptual Model.

3.2.2 Research Contribution

The contributions of this study extend beyond Egypt, as similar H&T SCs involving local SMEs interacting with multinational hotel companies can be observed in various cultural destinations worldwide. Furthermore, as this research aims to explore the current state of social sustainability in H&T SCs from the point of view of employees as a primary stakeholder, it also tight the gap of extremely limited studies in H&T under the perspective of the SC given voice to the 'employees', pointing fields of improvement. These insights are of interest to policymakers and the general public, as they highlight the importance of addressing social sustainability within the H&T industry, particularly regarding the downstream supply chain lack of pressure or motivation to adopt social practices. Such gap is clearly obvious as observed in Rasoolimanesh et al. (2020) that policy makers of sustainable tourism are often exposed to conflict of interests especially when the practices are developed through a purely scientific approach. Also, Gruchmann, Topp, & Seeler (2022) observed that not all tourism stakeholders are equally involved and committed to practicing sustainability and that the fragmented structure of the tourism industry challenge the implementation of sustainable strategies.

Therefore, this paper contributes theoretically by framing the investigation around IT and ST as a theoretical lens that could provide potentially rich insights in understanding the tourism stakeholders' influence in imposing institutional pressures in the form of enablers and barriers affecting the engagement of H&T SC partners in the implementation of socially sustainable practices.

3.3 Literature Review

Many researchers emphasized that SC scholars have just started newly to show an interest in addressing social sustainability. Gruchmann, Topp, & Seeler (2022) systematically reviewed previous research on SSCM in tourism and emphasized that most of tourism research are focused on consumption practices by tourists whereas studies on corporate and SSCM are few. Also, practicing sustainability at tourism corporate levels is well-studied compared to SC level which is still rare. Therefore, the study recommended to combine traditional and non-traditional actors on a multiple-tiers T&H SC to be studied more comprehensively. Regarding social sustainability in SC, D'Eusanio, Zamagni, & Petti (2019) analysed the existing social sustainability methods and tools within the SC management. To the best of the author's knowledge, research for guiding tourism decision makers to identify the adopted social sustainability practices and the associated barriers and enablers of the H&T SC, has not yet been provided.

3.3.1 Social Sustainability Practices in Hospitality and Tourism Supply Chain

Social sustainability practices in tourism are either subjective indicators "for example attitudes, experiences, perceptions and the satisfaction of employees and communities," those subjective indicators are context-based, or objective indicators "such as employment rates, usage and availability of clean potable water, gender diversity." Therefore, social indicators are not always quantifiable and may be somewhat subjective (Rasoolimanesh et al., 2020). The current literature lacks studies focusing on the identification of social practices adoption across the H&T SC , only 2 studies focusing on the social dimension were identified. Sanfiel-Fumero, Armas-Cruz, and González-Morales (2017) assessed social practices adoption in hotels SC in Canary Islands, Spain using non-parametric tests. However, the authors only collected the perception of a single agent of the Tourism SC (TSC) (tourist accommodation) and suggested that future studies should

include other TSC agents. Thomas-Francois, Von Massow, and Joppe (2017) developed a conceptual model based on sustainable development logic for integrating social sustainability practices in farmers-hotels relation in the Caribbean TSC.

Because many sustainable SC management related practices might not been discussed in the tourism literature to date as observed in Gruchmann et al. (2022), the study encouraged tourism research to integrate the general SSCM practices. Consistently, due to the lack of studies in socially sustainable H&T SC we had to extend the search to tourism sustainability in general, Hence, 62 social practices synthetized in 8 social categories were identified (Appendix C): A) fair labour measures, B) Equal opportunity, C) Employee's development, D) Health and safety, E) Employee's participation and cooperation, F) Society development, G) Ethics and corruption, and H) Human rights. Those social categories differ from one place to another due to the variation in social norms especially in emerging economies which make their studies contextual, time-dependent, dynamic and emerging (Yawar & Seuring, 2015).

3.3.2 Social Sustainability Enablers and Barriers in Hospitality and Tourism Supply Chain

The identification of barriers and enablers of sustainability practices adoption are mainly studied in individual companies, only 2 researches (Sifolo et al. 2019; Morales-Contreras et al. 2019) focused on enablers and barriers of TSC sustainable purchasing (with focus on buyer-supplier problems in all 3 sustainable dimensions). Sifolo et al. (2019) concluded that the main barriers hindering sustainability adoption is that TSC partners hardly share knowledge with other tourism stakeholders. Morales-Contreras et al. (2019) revealed that the main enablers of TSC sustainability are the degree of awareness and commitment of the hotel chain management, the economic savings and cost associated with the implemented practices, and the brand image.

The most identified barriers are related to the conflicts between hotel chains and suppliers on the requirements to meet sustainability criteria while maintaining lower prices, high quality, good service, and delivery time. Gruchmann et al. (2022) also identified that the lack of financial resources is often the main constraint for SSCM implementation in H&T context, followed by the lack of resources not only on the focal firm, but also to the intermediaries in the H&T SC such as suppliers and tour operators. Moreover, cultural

differences between national and multinational firms may act as a barrier especially due to the H&T SC fragmented structure including multiple small suppliers operating under different national rules and legislations.

Comparing these studies with others from economics and management disciplines concerning the enablers and barriers, we could not find substantial differences. Accordingly, 10 enablers and 5 barriers of sustainability practices adoption were identified in Table 3-1 and Table 3-2 below and then classified based on the 3 types of institutional pressures explained earlier.

Table 3-1 Barriers of sustainability adoption in H&T SC.

Institutional Pressures	Barriers	Literature Findings
Coercive	Lack of political support, legislation, and regulation enforcement.	The lack of policies and insufficient budget were emphasized by several studies in other developing contexts underlining that governmental support should take top priority in encouraging tourism companies to get involved in sustainability (Alameeri, Ajmal, Hussain, & Helo, 2018; Sajjad, Jillani, & Raziq, 2018; L. Zhang & Zhang, 2018).
	High economic cost and lack of resources.	Sajjad et al., (2018) concluded that the management of hotels are lacking capacity and resources for social sustainability especially in developing countries.
Normative	Social-related barriers and uncooperative culture as well as conflict of SC partners' interest.	(Islam, Zhang, & Hasan, 2020; Sajjad et al., 2018; Sifolo et al., 2019) findings also underlined the need for tourism stakeholder's collaboration to promote sustainability practices using a structured strategy and a well-established framework instead of ad hoc practices.
Mimetic	Uncertainty of outcomes.	Sajjad et al., (2018) demonstrated that most hotel managers is uncertain of the benefits and practical implications of sustainability concept, which make them reluctant to improve their sustainability practices.
	Lack of knowledge, skills and awareness.	Sajjad et al., (2018) found that the management of hotels especially in developing countries does not have the required knowledge to respond to sustainability issues. Similarly, Aimagambetov et al., (2017) highlighted in their study the lack of sufficient experience in the management and sustainability development in tourism industry under the market conditions of developing countries.

Table 3-2 Enablers of sustainability adoption in H&T SC.

Institutional Pressures	Enablers	Literature findings
Coercive	National and international regulations.	A Large number of studies highlighted that national government laws act as convincing enablers for enforcing social sustainability practices (Alameeri et al., 2018; Babu et al., 2018; Dodds & Kuehnel, 2010; Høgevold, Svensson, & Padin, 2015; Jia et al., 2018; Legrand, Huegel, & Sloan, 2013)
	Economic Incentive and cost savings.	Hotels mostly focus on economic sustainability however, the environmental and social dimensions of sustainability are ignored due to the difficulty to justify the cost associated

		with the practices especially in developing countries (Alameeri et al., 2018; Morales-Contreras et al., 2019)
	Buyer Pressure.	Zhang and Zhang, (2018) stressed the need, in the developing countries, of support (of pressure) from tourism stakeholders with the small and local tourism SC partners since they lack the ability or motivation to engage in sustainability by themselves.
	Sustainable certification and reporting needs and transparency and integrity of reporting.	The periodical audits and the sustainability reporting concerning the social certification awarded to the organizations are important enablers (Dodds & Kuehnel, 2010; Jones, Hillier, & Comfort, 2016; Kim, Lee, & Fairhurst, 2017; Legrand et al., 2013; magnus bostrom, michael gilek, eva hedenstrom, 2014)
Normative	Internal Leadership.	Alameeri et al., (2018) observed that employee management, development, and training through dedicated leadership is a high priority in UAE hotels as employee performance has a significant impact on service capability, which in turn plays an important role in hotel business growth and sustainability.
	Company values and morals.	Several studies highlight that company shared values and core business facilitate sustainability adoption (Jia et al., 2018; Karavasilis, Nerantzaki, Pantelidis, Paschaloudis, & Vrana, 2015; Legrand et al., 2013; Richards & Font, 2019; Sigala, 2014; Xu & Gursoy, 2015b)
	NGOs and society and consumer pressure.	Alameeri et al., (2018) observed that customer culture and education are the most relevant enablers for hotels, also Zhang and Zhang, (2018) highlighted that managers who are willing to communicate with tourists may also be more willing to engage in social sustainability and community-related activities.
Mimetic	SC partners and stakeholder collaboration and information sharing. Incentive alignment and fair compensation between SC partners.	Farijul, (2019) highlighted that the engagement of the business partners, with the help of the local community and government collaboration would improve the overall tourism systems, in both environmental and social sustainability practices.
	Innovation in sustainability.	Farijul, (2019) empirical study findings illustrate the importance to solve the emerging socio-environmental problems by the proper adoption of sustainable tourism innovation practices and performance.
	Competitive advantage and market position.	Zhang and Zhang, (2018) suggested that governmental support is essential to encourage sustainable tourism development in terms of competitive advantage, brand and image building toward social sustainability.

3.4 Methodology

3.4.1 Research Design

A mixed-method research approach with qualitative (interviews) and quantitative (questionnaire) data collection was followed as shown in Figure 3-2. The unit of analysis in this research is the H&T SC. The focal firm in the H&T SC is the hotels due to their leading role in specifying SC policies.

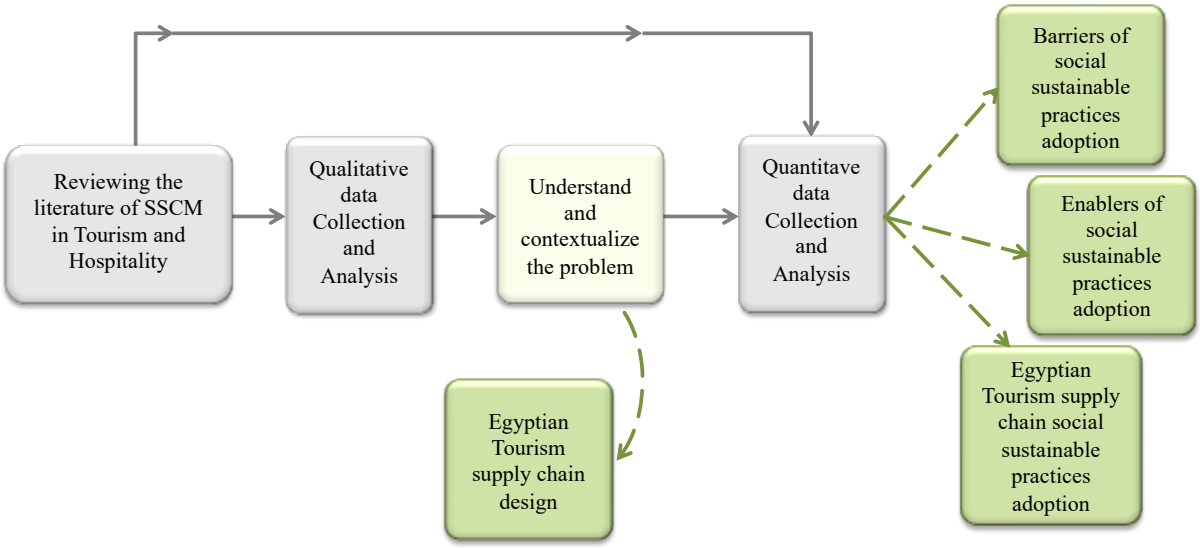


Figure 3-2 Research design.

The exploratory interviews were conducted in the focal firm, the questionnaire was distributed to multiple levels in H&T SC. The interview guide (Appendix B) adapted from the studies of Bals and Tate (2018) and Cole & Aitken (2019) was composed of 3 main sections: a) Collect information related to the interviewee's professional background, regarding the hotel's organizational structure and the hotel's downstream and upstream SC, b) Collect information on social sustainability practices adopted by the hotels' SC and c) Collect the main enablers and barriers of such practices.

The questionnaire is composed of: a) Demographic information such as gender, work experience, work position, type and size of company, b) Social sustainability practices, 62 questions adopted from (Hale, Legun, Campbell, & Carolan, 2019; Mani, Agarwal, et al., 2016; Mani, Gunasekaran, Papadopoulos, Hazen, & Dubey, 2016; Staniškienė & Stankevičiūtė, 2018), c) Enablers, 10 questions adopted from (Hale et al., 2019; Mani, Agarwal, et al., 2016; Mani, Gunasekaran, et al., 2016; Staniškienė & Stankevičiūtė, 2018), and d) Barriers, 5 questions adopted from (Hale et al., 2019; Mani, Agarwal, et al., 2016; Mani, Gunasekaran, et al., 2016; Staniškienė & Stankevičiūtė, 2018). Each question (variable) uses a concordance scale of 5, from 1 (strongly disagree) to 5 (strongly agree). Cronbach alpha was used to validate such scale (obtained 0.97 for practices, 0.95 for enablers and 0.77 for barriers).

3.4.2 Sample

This study involved two distinct samples: interview participants and questionnaire respondents. The interviews were conducted with six senior managers from two five-stars multinational hotels: Hilton Heliopolis Hotel in Cairo and Radisson Blu Hotel in Alexandria, specifically: the human resources, the purchasing, and the marketing managers of each hotel were interviewed. All the interviewed managers have experience of more than 10 years in the H&T industry in Egypt to ensure their sufficient knowledge of the problem under investigation.

Additionally, informal conversations took place with a total of seven employees working in different departments of the two hotels. Furthermore, visual observations of the hotels' accommodation rooms, restaurants, and other facilities were conducted. The interviews were carried out between January and October 2020.

Data collection on ethical and social sustainability issues are usually susceptible to social desirability bias, which is the tendency to deny socially undesirable behaviours and to admit socially desirable ones (Morais & Silvestre, 2018). To avoid this bias in the interviews data collection, data analysis and interpretation three strategies were used. First, open-ended questions were used to reduces the social desirability bias. Second, the educational background of the interviewees as well as their managerial position and their roles within the hotel were taken into consideration during data interpretation. Third, data triangulation strategy was applied during data analysis and interpretation by relying on different data sources such as hotels sustainability reports, code of conduct, and published reports to reduce potential social desirability bias.

The target population for the questionnaire was managers, supervisors and employees working on H&T SC entities including hotels or resorts, tourism companies, travel agents, and hotels suppliers located in Egypt. The perception of employees and supervisors is very important as they are directly exposed and affected by the social practices adopted by the management. A structured questionnaire with closed questions was prepared on google forms in two languages (English and Arabic) and was sent to a random sample from the whole population in two waves from June to November 2021 by email and posted on multiple social media specific groups.

Before posting the questionnaire online, 3 managers and 3 employees had contributed to cultural adaption of the translation to Arabic language. The total sample consisted of 205 managers, supervisors, and employees approached based on their work experience in hospitality and tourism sector in Egypt, out of them 187 were valid responses (Table 3-3).

Additionally, the social desirability bias was controlled by making the questionnaire respondents anonymous without identifying themselves or their workplace. Thus, reducing their intention to misrepresent themselves or their workplace in socially desirable manner.

Table 3-3 Questionnaire sample.

Business area	**Frequency**	**%**	**Location**	**Frequency**	**%**	**Company Type**	**Frequency**	**%**
hotel or resort	134	71.7	Cairo& Giza	42	22.5	national company	5	2.7
tourism company	36	19.3	Alexandria& North Coast	19	10.2	private company	96	51.3
travel agent	3	1.6	Red Sea& Sharm Elsheikh	107	57.2	multinational company	41	21.9
hotels supplier	14	7.5	Luxor& Aswan	4	2.1	family-owned business	38	20.3
others	0	0	Others	15	8.0	others	7	3.7
Total valid	187	100.0		187	100.0		187	100.0
Profession	**Frequency**	**%**	**Years of experience**	**Frequency**	**%**	**Company branches**	**Frequency**	**%**
manager	84	44.9	less than 1 year	9	4.8	only one branch	60	32.1
supervisor	42	22.5	from 1 to 5 years	26	13.9	from 2 to 5 branches	62	33.2
employee	53	28.3	from 6 to 10 years	32	17.1	from 6 to 10 branches	10	5.3
other	8	4.3	more than 10 years	120	64.2	more than 10 branches	54	28.9
Total valid	187	100.0		187	100.0		187	100.0

3.4.3 Methods

The qualitative data collected were analysed using thematic analysis method following a deductive approach as the themes used in the analysis were previously determined based on the literature review of social sustainability practices. Interviews were audio recording and transcribe verbatim.

Canonical correlation analysis (CCA) was used to investigate the association between the social practices adopted with the enablers and barriers that Egypt H&T SC face. CCA is widely used in social science and SC management (Altaf et al., 2020), it considers multiple dependent and independent variables to model the relationship between the two latent variables formed. The benefit of using this method is to interpret the associations between two sets of variables “many to many” relationships while minimizing the size of the computational rate (Altaf et al., 2020). Tamhane's T2 (for compare means) and Levene (for equality of

variances) all-pairs comparison test were used to observe differences in each type of H&T SC members, and between members.

3.5 Results and Discussion

3.5.1 Egypt Hospitality and Tourism Supply Chain

The managers of the two 5 stars hotels owned and operated by two different multinational hospitality groups identified their SC partners both upstream and downstream. Figure 3-3 shows a typical Egyptian H&T SC with hotel as focal firm.

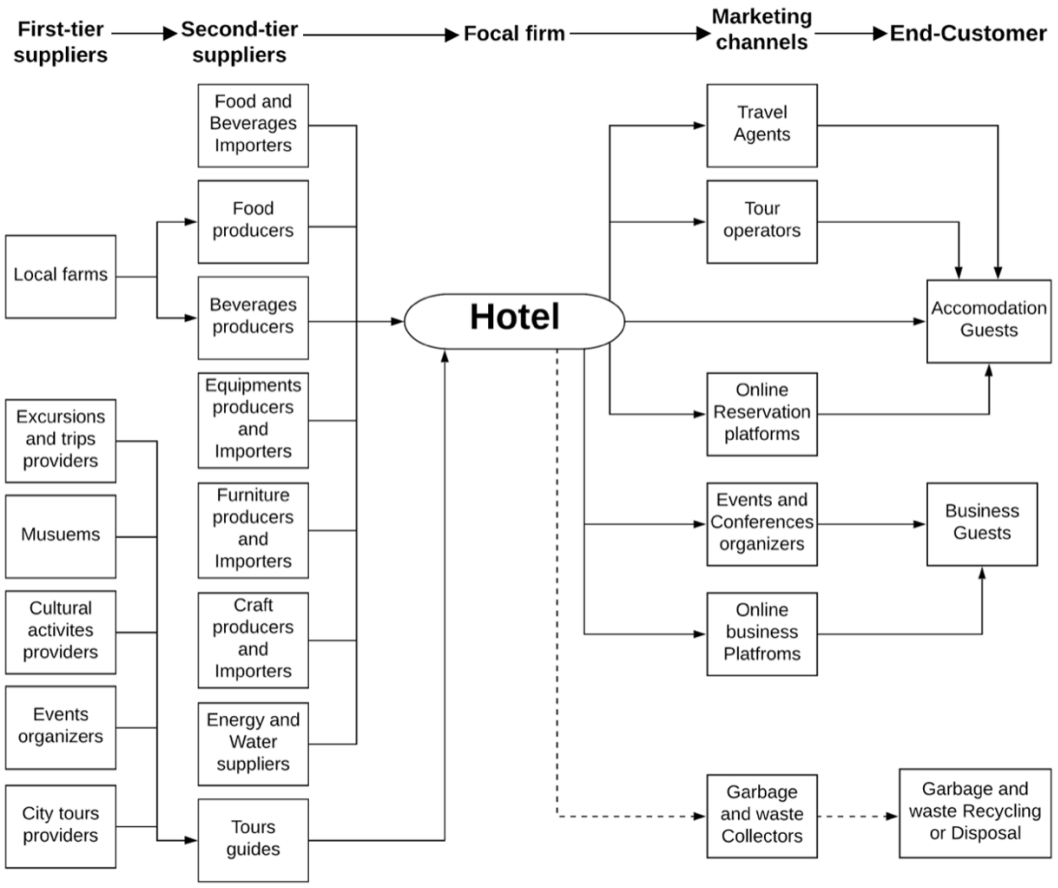


Figure 3-3 Hospitality and Tourism Supply Chain.

The purchasing manager of both hotels explained that most of their products are sourced from local small and medium size suppliers (agents or distributors) based on a short-term contract. Imported items (in smaller quantities), are sourced through intermediaries or official distributors in Egypt as they are experts on customs issues in importing food directly from overseas suppliers. Other specific products are sourced from single suppliers with a long-term contract of exclusivity that forces the hotel to source only from those suppliers for a predetermined product. Aspects taken into consideration in supplier selection are delivery time, cost, quality, packaging, and health and safety standards (ISO certificates).

The downstream SC at both hotels is also quite similar, composed of multiple marketing channels. The most important omnichannel are websites, social media platforms, booking channels such as booking.com, hotel.com and many other online booking platforms.

3.5.2 Social Sustainable Practices

Table 3-4 summarizes and compare the opinions of the interviewed with the questionnaire respondents' perceptions grouped by practices categories.

Table 3-4 Multiple source data comparison about social sustainability practices.

Social Practice category	**Opinions of the interviewed**	**Questionnaire respondents' perceptions**	
		Average	**Coefficient of variation**
Fair labour measures	**Fair Salaries:** Both hotels provide salaries above the minimum wage, nevertheless due to prices' inflation in Egypt, salaries are not satisfactory for employees.	2.96	29.4
	Employment practices and relations: hotels are providing legal employment contracts for full-time employees to ensure their rights and determine their obligations according to each hotel code of conduct. Both hotels have a weak relation with the Egyptian Tourism Union Federation (ETUF) due to their insignificant role.		
	Employee welfare: In hotel A, all employees can benefit from discounted reservation rates in any of the hotel branches. Hotel B managers are organizing a monthly event "best employee of the month" aiming at motivating their employees by providing financial and non-financial rewards.		
Equal opportunity	**Diversity and equal opportunity:** Hotel A employed handicapped people with down syndrome to increase their self-confidence. Hotel B is hiring employees in the housekeeping department without requiring an educational certificate. Both hotels ensure the provision of equal opportunities for males and females during the recruitment and selection of employees.	2.32	43.7
Employee development and training	**Training, Education, and personal skills development:** Hotel A stated that they provide periodical training and educative sessions for employees regarding environmental sustainability practices application.	2.70	48.2
Health and safety practices	**Employees' Health and Safety practices:** Both hotels offer health insurance for accidents at workplace, and mock training is implemented for first aid and firefighting on a regular basis.	3.17	36.1
Employee's participation and cooperation	**Teamwork encouragement and knowledge sharing:** Hotel A organizes workshops to let employees from different departments know each other and cooperate. Both hotels did not provide a financial reward for cooperative activities encouragement, but promote an open-door policy, employees have the freedom to share their work-related problems with managers.	3.13	37.8
Society development	**Business impacts on the community, community involvement and welfare:** Both hotels purchase from local suppliers to leverage the economic sustainability of local suppliers and to help the local community. Hotel A has a periodical campaign to help in cleaning the streets with the public garbage collectors surrounding the hotel and organizing sports day and awareness sessions for homeless children to include them in the community. Hotel B is organizing programs for orphans and handicaps. It also	2.27	42.1

	offers job opportunities in close poor neighbourhoods and provides paid summer internships for SOS Children's Village in Alexandria to include them in the community.		
	Community funding and support: Hotel A is donating clean food remains and soap remains to charitable organizations as well as supporting handicap and disabled people through dedicated bazar partitions in the hotel for selling their hand-made products. The hotel is financially supporting society-related problems such as public hospitals suffering from shortage of medical equipment. Hotel B is sponsoring and financially supporting the Rotary Club of Alexandria in their humanitarian activities dedicated to handicap inclusion to the community as well as financially supporting hospitals that provide treatment for cancer.		
Ethics and corruption	**Corruption in business:** Both hotels are publishing a detailed anti-corruption and anti-bribery policy over their websites as a part of their code of conduct.	2.68	52.3
Human rights	**Basic human rights practices:** The two Hotel chain global websites are publishing a human rights report.	2.46	53.4
	Human rights implementation and integration: both Hotels mentioned that their human rights goals for the year 2030 are to integrate human rights across the hotel value chain by partnering with suppliers to limit forced labour and trafficking. However, the interviewed managers mentioned that there are neither strict obligations nor real collaboration with suppliers or SC partners with respect to human rights. Hotel B Supplier's code of conduct includes obligations for suppliers to encourages them to take a stand against human trafficking and modern slavery. However, during the interview the managers stated that the hotel branch management is not imposing restrictions over the suppliers concerning human rights issues.		

The social sustainable practices adoption is still a challenge for the Egyptian H&T SC looking at the questionnaire answers (low average and high variability in answers, e.g., in "Society development", "Equal opportunity", "Human rights" or "Ethics and corruption" categories) despite: a) the statements inserted in the hotels internet pages or in the human rights hotel reports, b) the hotel actions and hotel efforts near suppliers and c) the obtained testimonies from the interviewed. Looking at the indicators of practices (Appendix C) the picture is: only 4 out 62 (A8 - "*I can talk to my manager about a better way to complete my work*", D9 - "*the organization is ensuring women's safety at workplace*", F2 - "*buying from local suppliers*", A7 - "*I have time to talk to my co-workers*") has score of "agree", for 38 indicators answers average show indecision about if such practices are adopted in the H&T SC in Egypt; the other 16 indicate practices yet not adopted. Looking to the frequencies of the answers (average as central tendency may lose some information richness) in

Figure 3-4, only 9 practices indicators from categories: A (Fair labour), D (Health and safety) and one of category F (Society development) obtain >50% of agreement. 21 has >50% of disagreement (i.e., correspond to practices not adopted) of 4 categories: A (Fair labour), B (Equal opportunity), F (Society development), and H (Human rights).

This high variability in responses was also found in Mani et al. (2016) concluded employees recognize a social practice but not to the same degree as managers. In addition, Hale et al. (2019) expressed that it is difficult to differentiate between social practices ranging from exceptionally good, to neutral, to below acceptable level especially with employees, due to the sensitivity of social sustainability issues. Such variability may arises as social indicators are not always quantifiable and may be somewhat subjective (Gruchmann et al., 2022; Rasoolimanesh et al., 2020).

So, answering RQ1 we conclude that only “Health and safety” has wide implementation, “Fair labour” is partially implemented, and the others are not, or at least respondents do not recognize them.

The results comparison had to be made with other industries due to the lack of studies addressing social sustainability in H&T SC. In the study of Mani et al. (2016) in Indian manufacturing industry most of their respondents are emphasizing "*buying from local suppliers*" in light with our results, and "*building schools, training, and educating the local youth to gain employment*", contrary to our results in “Society development” category. The same study also highlighted the wide implementation of many practices from “Equal opportunity”, “Ethics and Corruption”, and “Human rights” categories.

With respect to “Fair labour measures”, our findings shows that H&T SC entities in Egypt are paying unfair salaries besides not helping employees to fulfil their life needs, similarly Hale et al. (2019) identified that employees in the agriculture industry exercised unfair and unacceptable labour practices (incorrect pay, inadequate living conditions and lack of formal contracts) especially in poor countries. Staniškienė & Stankevičiūtė (2018) conclude that, in Lithuania, health and safety and equal opportunity are the most implemented social sustainable practices, analogous to our findings.

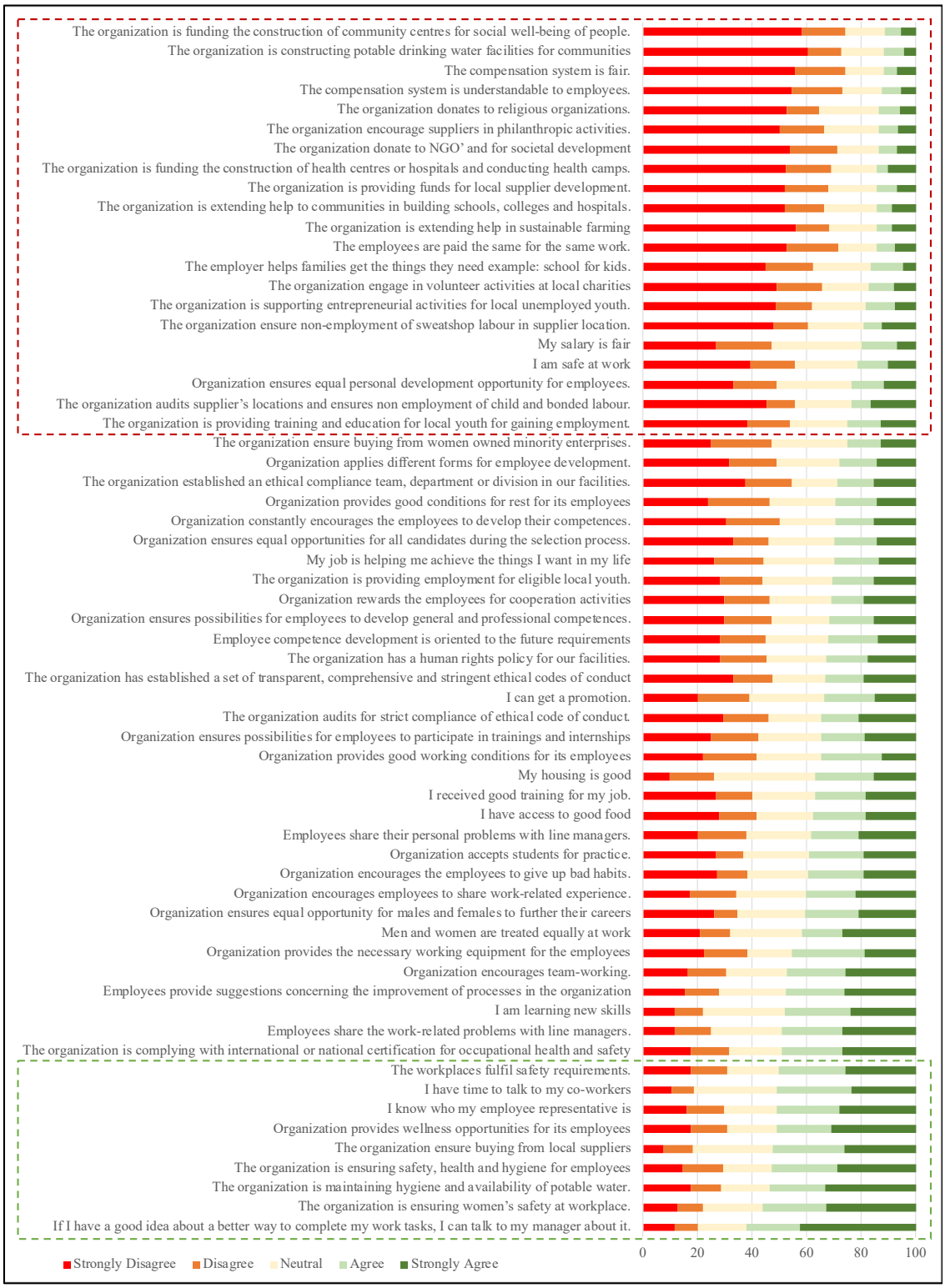


Figure 3-4 Social Sustainability Practices adopted.

3.5.3 Barriers and Enablers of Sustainability Practices

Table 3-5 summarizes and compare the opinions of the interviewed with the questionnaire respondents' perceptions grouped by barriers and enablers categories as well as the corresponding type of institutional pressure. Highest scored barriers are all except for *"the uncooperative culture between H&T SC partners for social practices adoption"* with a mean correspondent to the term (undecided). Highest scored enablers are *"sustainable certification and reporting needs and transparency and integrity of reporting"* and *"competitive advantage and enhance market position."* Nevertheless, all have a mean correspondent to the term neutral (undecided).

Table 3-5 Multiple source data comparison about barriers and enablers.

Institutional Pressures	**Barriers**	**Opinions of the interviewed**	**Questionnaire respondents' perceptions**	
			Average	**Coefficient of variation**
Coercive	**Lack of political support, legislation, and regulation enforcement.**	Both hotels clarified that there is neither governmental policy for hotels nor guidelines are provided from the ministry of tourism for hotel management incorporate sustainable goals in their strategies. The human resources manager of hotel B did mention that *"the only governmental initiative was the sustainability training program for hotel employees and managers, but it was discontinued due to insufficient budget since 2016".*	2.98	49.9
	High economic cost and lack of resources.	Hotel A is struggling to reduce purchasing expenses, service quality is the main priority for the hotel guests not sustainability issues. the purchasing manager of hotel B revealed that the application of sustainable practices in their branch is minimal in comparison to the hotel chain brand standards due to economic pressure.	3.10	44.5
Normative	**Social-related barriers and uncooperative culture as well as conflict of SC partners' interest.**	Hotels do not have any initiatives for developing their small and medium size suppliers nor cooperating with large suppliers in socially sustainable activities, because not perceived any gain with that.	2.67	50.1
Mimetic	**Uncertainty of outcomes.**	Both hotel managers clarified that they are not feeling significant outcomes from the social sustainability adoption. The Human resources manager of hotel B stated that *"it is very challenging to apply socially sustainable practices in any organization operating in a country where most of their population are striving for the minimum living standards, we are far away from real sustainability".*	2.99	45.9

	Lack of knowledge, skills, and awareness.	Both hotels clarified that until today hotels in Egypt are not benefiting from social sustainability in their marketing activities due to the lack of customer awareness and that the guest's preference for hotels is based mostly on the accommodation price and quality of service provided.	2.97	49.6
Institutional Pressures	**Enablers**	**Opinions of the interviewed**	**Questionnaire respondents' perceptions**	
			Average	**Coefficient of variation**
Coercive	**National and international regulations.**	Both hotels declared that the national regulations concerning labour practices presented in labour law are perceived as enablers, however with respect to the other practices the national regulations are not stringent.	2.77	51.9
	Economic Incentive and cost savings.	Economic incentive and cost savings are perceived enablers for environmental sustainability adoption but there are no economic incentives from the Egyptian government nor cost savings perception for social sustainability.	2.80	50.6
	Buyer Pressure.	Internal codes of conduct and hotel policies to comply with social principles are present on the hotel chain global level, but many of the social principles related to sustainability are not adopted at a national level due to the difficulty to oblige the local suppliers to comply with.	2.57	52.5
	Sustainable certification and reporting needs and transparency and integrity of reporting.	Both hotels are certified by sustainability certification organizations, hotel A is one of the first hotels certified by the Green Star Hotel (GSH) certificate in Cairo, and hotel B is the only hotel in Egypt that obtained a green key certificate, which implies a minimum level of sustainable practices adopted.	2.99	49.4
Normative	**Internal Leadership.**	Hotel A explained that the hotel management is devoting considerable efforts to build a specialized sustainability team, however, they are currently focusing and prioritizing environmental sustainability practices. Hotel B management did not declare a similar interest.	2.72	53.4
	Company values and morals.	Both hotels follow their brand global sustainability standards to match the periodical brand audit, hotel B human resources manager clarified that the main enabler for applying social activities is organizational reporting to the headquarter and the hotel chain management.	2.72	51.9
	NGOs and society and consumer pressure.	Hotel A is creating sustainability awareness for guests through screening their sustainable practices in the hotel television information channel and through the flyers in guest's rooms. Hotel B is donating 1 dollar from each guest accommodation receipt to the SOS Children's Village Alexandria.	2.73	50.4
Mimetic	**SC partners and stakeholder collaboration and information sharing.**	Both hotels declared that the relationship with many suppliers is a traditional buyer-supplier relationship without any sort of collaboration.	2.62	53.4

	Innovation in sustainability.	As innovative social practices, both hotels donate hand soap remains to charitable organizations to be remanufactured and sold back in the market.	2.65	53.6
	Competitive advantage and market position.	Both hotels did not perceive social sustainability as a source of competitive advantage in the Egyptian tourism sector and they declared that the determinant of market position is service quality and cost only.	2.82	52.9

Figure 3-5 show how the answers distribute in terms of proportions emphasize such indecision, so our results seem to be inconclusive for RQ2 and RQ3. Therefore, an association analysis between social practices adoption and barriers (or enablers) was performed through a Canonical Correlation Analysis. This multivariate statistical technique will better identify potential associations.

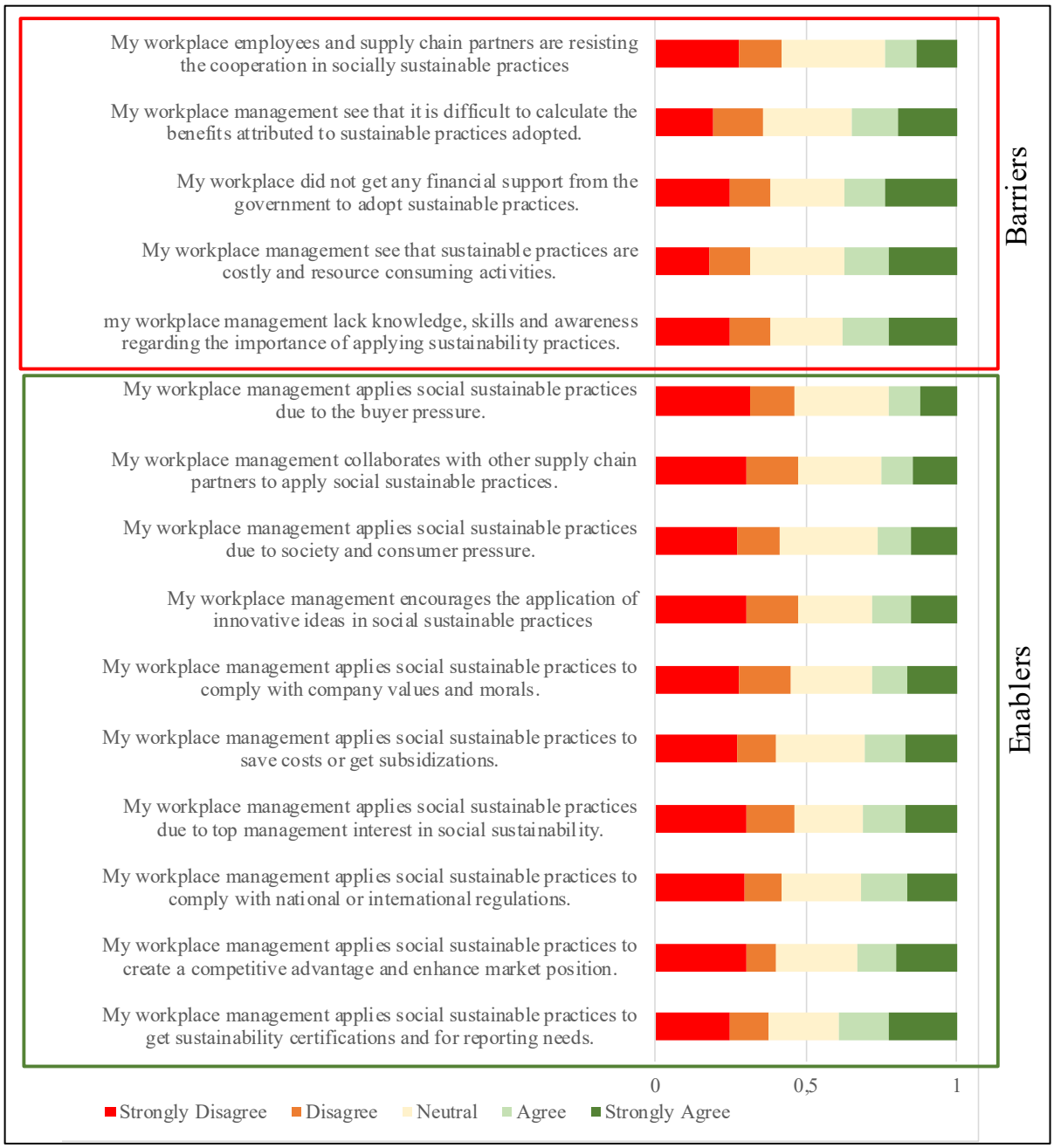


Figure 3-5 Barriers and enablers perceived.

The multivariate CCA model show a statistically significant association, about 99.9% of the variance shared between the variable sets was explained, Wilks test=0.00011 (< 0.05). The first Canonical function (the only considered, due to low variance explained 11.7% by the second function) explains 37.5% of variance.

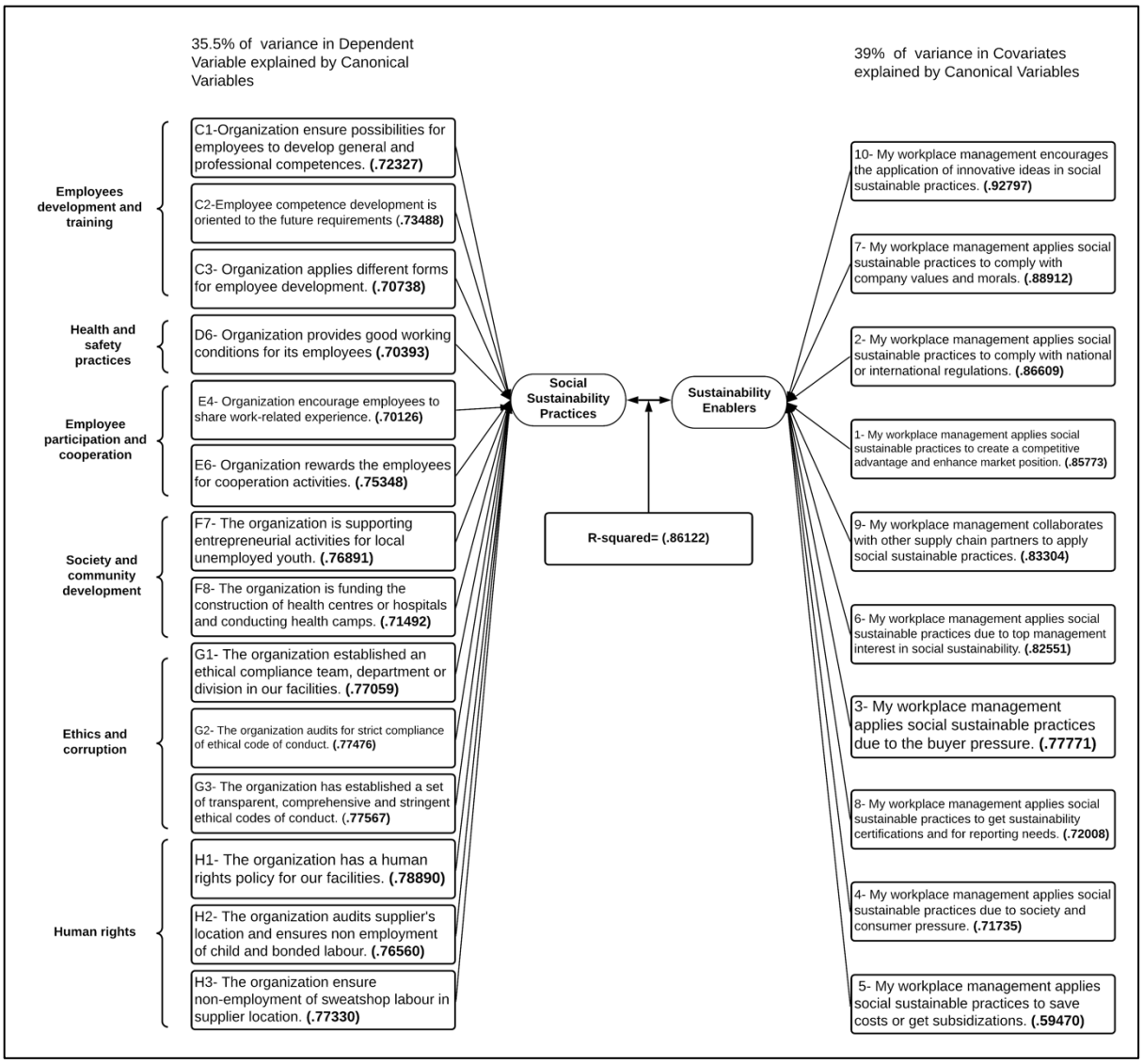


Figure 3-6 CCA association between the enablers and social sustainability practices.

Figure 3-6 shows the strongly correlated variables (correlation coefficient > 0.7). With a cut-off of 0.4, 53 practices (out of the 62) show a significant relationship with the first Canonical function: 14 practices were strong correlated as shown in the above figure, 39 were moderate correlated (between 0.4 and 0.7), and 9 weak correlated (< 0.4) are shown in (Appendix C).

The model shows that all the included enablers are strong and positively associated with social practices, exception to *"cost savings and getting subsidization"* (moderately associated). Nevertheless, interviews point it as essential for the successful implementation of sustainability practices. Concerning costs, Alameeri et al. (2018) and Morales-Contreras et al. (2019) conclude that social practices are ignored by

managers due to the difficulty to justify the cost associated with the practices especially in developing countries. Sebastianelli & Tamimi (2020) underlined that the limited resources and excessive cost associated with sustainable SC implementation are significant barriers to innovation hindering the capabilities of being proactive in sustainability.

The higher association value belongs to *"managers encouragement to the application of innovative ideas"*. This result is confirmed by the study of Farijul (2019) that highlight the importance of innovation in improving social sustainability adoption. This association demonstrates the mimetic pressure, showing that tourism organizations aim to promote the imitation of successful and leading organizations when it comes to generating innovative ideas in social sustainability adoption.

Literature most referred enablers are: *"Managers interest to comply with values and morals"* (Jia et al., 2018; Karavasilis et al., 2015; Legrand et al., 2013; Novacka, Pícha, Navratil, Topaloglu, & Švec, 2019; Richards & Font, 2019; Sigala, 2014; Xu & Gursoy, 2015b), and *"the management interest to comply with national and international regulations"* (Alameeri et al., 2018; Babu et al., 2018; Dodds & Kuehnel, 2010; Høgevold et al., 2015; Jia et al., 2018; Legrand et al., 2013). The above findings from the literature reflect that normative and coercive pressure are important for the implementation of social sustainability practices.

Surprisingly, the model does not reflect considerable associations between barriers and social practices adoption. According to the interviews answers such does not reflect their inexistence, hotels managers revealed that: lack of customer awareness, lack of perceived gain, cost pressure, traditional buyer-supplier relationship without any sort of collaboration, lack of political support were pointed as main barriers to social practices adoption.

Morales-Contreras et al. (2019) point out the possibility of participants confound barriers with enablers. Examples could be: if management acknowledge that they apply social sustainable practices to save costs or get subsidizations (enabler 5) it could implies that they do not see them as costly or resource consuming activities (barrier 5); or, if management admit that they collaborate with other SC partners to apply social sustainable practices (enabler 9) it implies that they do not see SC partners are resisting in socially sustainable practices implementation (barrier 2). In conclusion, for RQ2 no barrier was perceived by the employees and for RQ3 all enablers show associations with some social practices (i.e., if implemented, employees believe that more social practices will be adopted).

3.5.4 Differences Across the Hospitality and Tourism Supply Chain

Gruchmann, Topp, & Seeler (2022) indicated that not all tourism stakeholders are equally involved and committed to practicing sustainability. Within the scope of stakeholder theory and through Tamhane's T2 test and Levene test, it was possible to verify if group differences across H&T SC members in terms of mean and dispersion exist. 26 out 62 social indicators show statistically significant ($p<0.05$) differences (Figure 3-7). Only "Ethics and corruption" and "Human rights" categories do not show any differences, i.e., H&T SC members identically adopt these practices. Suppliers show higher scores comparing the other H&T SC members which denotes a better social practices adoption, on contrary hotels and distributors present lower means in specific practices on "*fair labour*" and "*society development*". Only two practice indicators show dispersion among the suppliers (i.e., not all suppliers score identically, there is significant variability in answers): "*compensation is fair*" and "*compensation is understandable*."

Our findings are unlike Sanfiel-Fumero et al. (2017) in proposing that accommodation in Spain perceives greater consumer pressure to adopt social practices than other SC partners, and of Venkatesh Mani and Gunasekaran (2018) results about the intensity of customer and social pressure in emerging economies which positively influences social sustainability adoption in general. Our results suggest that the pressure comes from the Hotels.

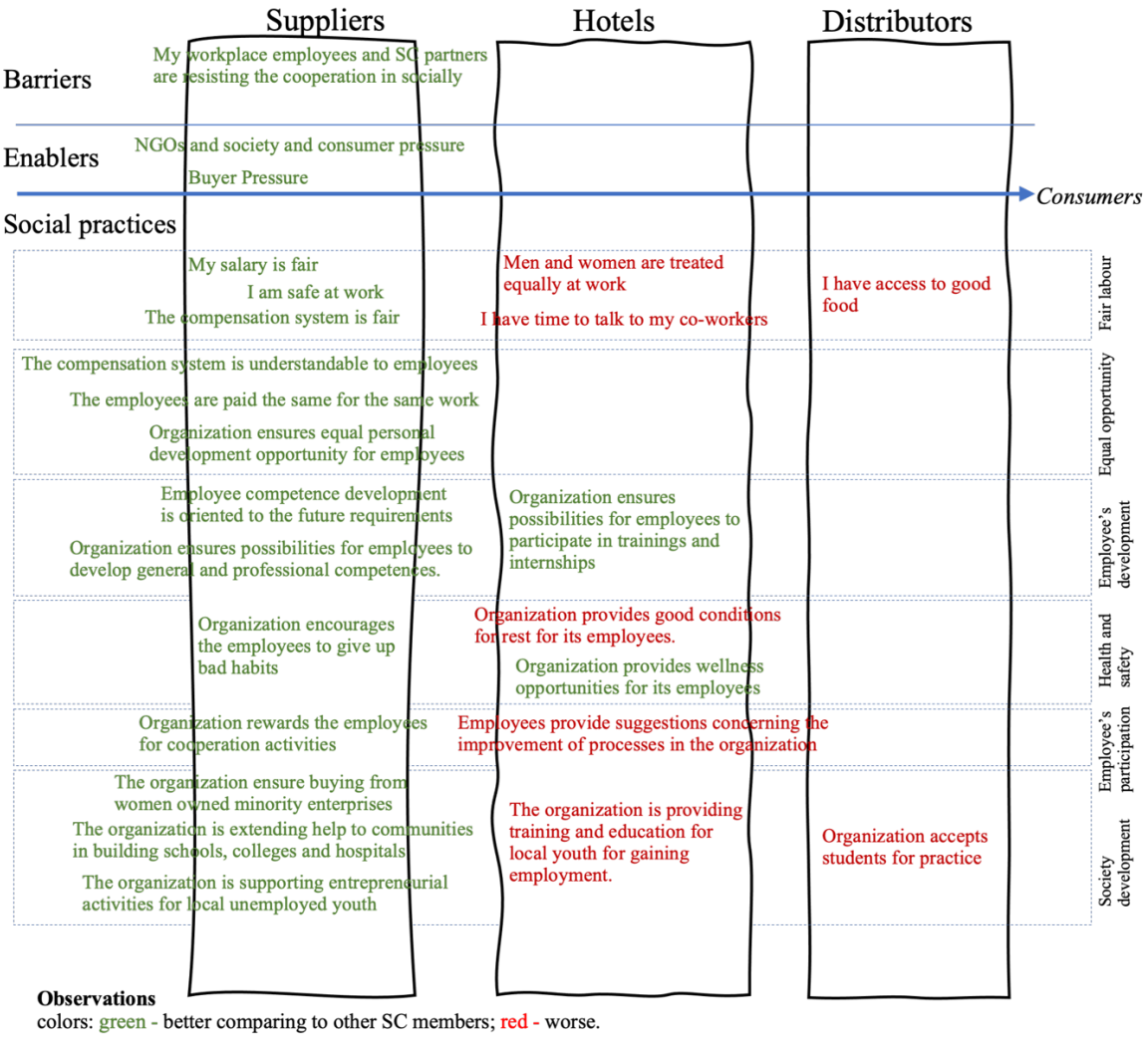


Figure 3-7 Group differences across H&T SC members in terms of mean and dispersion.

Due to the aggregation of several companies in *Distributors* there is a risk of bias since tour operators or travel agent may have a different level in social practices adoption. Venkatesh Mani and Gunasekaran (2018) concluded that suppliers adopting social practices become more compliant and have a better bargaining power to negotiate with buyer than non-compliant ones. In our case, suppliers also are in better position than others H&T SC members but due to customer pressure and not due to power conquest in negotiation.

From the perspective of both IT and ST regarding barriers and enablers group differences, suppliers distinguish to the other H&T SC members in the barrier "*cooperation between H&T SC partners for social practices adoption*", and in the enablers: "*buyer pressure*" and "*society and consumer pressure*". Such uncooperative culture was underlined by Morais and Silvestre (2018) that individualistic firms seeks to

maximize only their own outcomes from social sustainability adoption. Thus, our findings is in contradiction with Venkatesh Mani, Gunasekaran, and Delgado (2018a) study stating that focal firms in emerging economies display their commitment toward suppliers in social sustainability to enhance their SC performance. The variations in enablers highlight the extent of pressure exerted by hotels on their suppliers and reveal an unexpected position in the relationship with distributors (by not exerting pressure on hotels and not exposed to market pressure). Answering RQ4, significant differences across the H&T SC were identified.

3.6 Conclusions

This research provides practical insights that are relevant to tourism stakeholders and policymakers aiming to support and facilitate the implementation of social sustainability practices in H&T SC, as well as firms planning the decision of whether and how to adopt such practices. Thus, moving from merely environmental and economic sustainability to promoting the missing logic of social sustainability towards flourishing for all.

The study starts with the identification of the social sustainable practices, barriers, and enablers in the literature. Based on the interviews findings and questionnaire analysis it was clear that currently, social sustainability practices are poorly implemented on an ad-hoc basis at an organizational level only and are not strategically employed along the H&T SC in Egypt. Even though many hotels and resorts in Egypt are publishing their sustainability plan and achievements in their reports for marketing purposes.

The most implemented social practices in the Egyptian H&T SC, according to the employees' perceptions, are related to "Health and safety", despite Egyptian regulations enforcing the implementation of "Ethics and corruption" and "Human rights" practices across the H&T SC in Egypt. Therefore, a stronger coercive pressure from the government through stricter enforcement of regulations is still necessary to ensure the successful implementation of social practices.

Hotels and its downstream SC partners i.e., tour operators and travel agents have lower implementation of social practices compared to suppliers, namely in implementing "Fair labour" and "Society development" practices.

Within the scope of institutional theory, the main barrier hindering the adoption of social sustainability in the Egyptian H&T SC is the lack of knowledge, skills, and awareness regarding the importance of

sustainability practices as well as the management perception that sustainability practices are costly and resource consuming. Thus, our findings follow Sanfiel-Fumero, Armas-Cruz, and González-Morales (2017) conclusions that the lack of commitment from the management is the most barrier hindering the implementation of SC management in tourism. Therefore, this research emphasizes the importance of institutional pressures in encouraging tourism organizations in acquiring the necessary skills and knowledge for the successful adoption of social sustainability practices, without them tourism SC entities may be unable to be socially sustainable if they lack the necessary abilities and resources.

The suppliers' respondents also revealed that H&T SC partners in Egypt are unwilling to cooperate in socially sustainable practices, this was clear as the interviewed hotels managers admitted their uncooperative behaviour with suppliers in sustainability issues as they perceive social sustainability as an afterthought. The main enablers for sustainability adoption are related with certifications and reporting needs (coercive pressure), the desire to create a competitive advantage and enhance their market position (mimetic pressure).

The management encouragement to the application of innovative ideas in social sustainable practices (mimetic pressure), there desire to follow company value and morals (normative pressure), and to follow national or international regulations (coercive pressure) are the most associated enablers with the studied practices. The significance of these associations underscores the pivotal role played by institutional pressures in fostering the adoption of social sustainability practices. Thus, our findings align with the standpoint found in institutional theory literature, which suggests that relying solely on the coercive pressure is insufficient to create significant changes in the institutional environment (Edelman, Uggen, & Erlanger, 1999; Scott, 2008).

Cost savings and getting subsidization from the government are moderately associated due to the management general perception that socially sustainability practices are costly and resource consuming activities. Besides, the interviewed managers revealed that there is no subsidization or tax incentives from the government to encourage the adoption of sustainability practices in tourism organizations which in turn worsen the degree of the practice's adoption.

Also, from the perspective of stakeholder theory, our results based on group differences obtained by Tamhane's T2 test showed that hotels, and resorts "has gender discrimination", "provides lower salaries", "provides poor working conditions", "do not encourage participation of the employees", and "do not contribute to local society" compared to other H&T SC partners.

Remarkably, the above-mentioned practices are promoted by the United Nations in their sustainable development goals[5] and recently adopted by the Egyptian ministry of tourism. Therefore, it is recommended that tourism policy makers in Egypt represented on the ministry of tourism and chamber of tourism establishments to design a specific awareness creation and training programs for hotels management to enforce and improve their adoption of the poor performed practices.

This study contributes to photograph the current social sustainable practices adoption in the core industry in Egypt, tourism, and hospitality through the 'employee voice' and from a SC perspective using the lens of IT and ST. This cultural destination shares the same characteristics, local suppliers, and multinational hotels, with others Mediterranean regions, therefore, it can be used as basis for future comparisons.

This broader perspective of the network of companies connected is of paramount importance to ensure social sustainability in the entire SC, by showing the industry standards required to facilitate social sustainability practices building and encouraging local authorities and SC intermediaries to be accountable in supporting local businesses in overcoming barriers and enhancing current labour conditions. Also, listen to the employees through the questionnaire and managers through the interviews brings a more realistic auscultation of those stakeholders about social practices implementation on H&T SC. Additionally, the study contributes theoretically to the SC social sustainability literature by identifying the weaknesses in H&T SC. Hence, this research is filling a research gap and help practitioners to better evaluate their socially sustainable practices adopted.

Moreover, this research distinguishes itself from previous investigations in the field of H&T by shifting the primary focus from an organizational viewpoint to an examination of social sustainability adoption within the context of supply chains. Hence, this research contributions goes beyond the traditional sights of sustainability. This aspect has been identified as a significant gap in existing literature. Further research has the potential to expand upon this study by examining and contrasting the social sustainability practices implemented within the H&T SC in various geographical settings. This exploration would also involve investigating the factors that facilitate or hinder the adoption of social practices in developed versus developing nations. Furthermore, future investigations could employ or combine different theoretical perspectives other than institutional and stakeholder theories to offer further theoretical insights and implications.

[5] https://www.undp.org/sustainable-development-https://www.undp.org/sustainable-development-goals

4. Assessing Social Sustainability in Egyptian Hospitality and Tourism Supply Chains: A Group Multi-Criteria Decision-Making Approach

Abstract

This paper proposes a Group Multi-Criteria Decision-Making framework for the assessment of social sustainability practices in Hospitality and Tourism (H&T) supply chain and applies it to the Egyptian H&T industry. The authors reviewed the relevant literature on social sustainability in H&T, followed by a survey of 187 managers, supervisors, and employees from H&T supply chains to identify the current adoption of 53 social practices classified in 8 social categories. An experts-group survey with 22 experts was conducted to obtain the importance of each practice. The Interval Valued Pythagorean Fuzzy Distance to Ideal Solution based on TOPSIS was used to rank and assess the current level of social practices adoption. The study found that social sustainability practices are poorly adopted in the Egyptian H&T supply chain. In terms of social categories, "society development" was ranked best while "health and safety" was the worst adopted. Hotels were better at implementing social practices than tour operators and tourism companies, and tourism suppliers were the worst in applying social sustainability practices. Although there were not social sustainability adoption substantial differences between supply chain partners, there were discrepancies within the same social categories and across different social categories. This study presents a unique and practical social sustainability assessment framework for multi-tier H&T supply chains. Since few authors attempt to assess social sustainability practices in H&T supply chain context, the framework provides an opportunity for guiding decision and policy makers to improve the poorly ranked social practices.

Keywords: Supply Chain Sustainability, Social Sustainability, Hospitality and Tourism, Egypt, MCDM, Fuzzy TOPSIS, IVPFS

4.1 Introduction

Social sustainability concentrates on the human side of the sustainability concept to improve the well-being of stakeholders and society. The commission of the European communities defined corporate social sustainability as a voluntary commitment of companies to contribute to the improvement of social and environmental issues into business practices (European Commission, 2002). Social sustainability has been embedded in Supply Chain (SC) concept due to the increased attention to social issues arising from the growing pressures from the government, customers, NGOs, and stakeholders (Popovic et al., 2018). The SC Social Sustainability (SCSS) concept is defined as the management of practices, capabilities, stakeholders and resources to address human potential and welfare both within and outside the communities of the SC (Nakamba et al., 2017). Currently, organisations attempt to be socially responsible by assessing their social impacts and/or performances, as well as those of their SC actors to gain a competitive advantage. In this way practitioners and academia should put emphasis on the methods and tools that are available for making socially responsible decisions (D'Eusanio et al., 2019). This includes the assessment of products, services and processes to identify various socio-economic conditions, including labour practice and decent work, health and safety, hygiene, wages, labour rights and human rights, education, housing, and others of the SC stakeholders (Mani, Agarwal, et al., 2016; Popovic et al., 2018).

This concept of SCSS is closely related to that of corporate social responsibility (CSR), with the key difference being that the latter focuses on a single entity within the SC. According to Kotler & Lee (2008) CSR encompasses a company's actions that aim to improve the well-being of both internal and external corporate stakeholders. In this way, the CSR concept assumes that businesses have a responsibility toward the society in which they operate, as well as to all stakeholders, which extends beyond the individual interests of shareholders (van Marrewijk, 2003). Hence, the difference is that SCSS concept stress that the organizations should address social initiatives not only within their boundaries as reflected in CSR concept, but also across their entire SC through a detailed process of assessment by analysing, monitoring, measuring and ranking the social aspects (D'Eusanio et al., 2019). Therefore, in order to advance performance measurement in social sustainability, diverse assessment tools to capture how companies perform in terms of social sustainability needs to be developed (Nakamba et al., 2017).

However, sustainability assessment in the SC is complicated due to the different perspectives on the concept, which includes interrelated dimensions, conflicting stakeholder expectations, and the need for a strong and transparent relationship between all entities along the upstream and downstream SC (Bubicz et al., 2019). This complexity is increased in the service SC, where sustainability is still a relatively new concept, despite the fact that the service sector is just as important to manufacturing in general, and sometimes even more as in the Arab world and the Middle East, where services contribute the most to their local economies (Hussain, Khan, & Al-Aomar, 2016). While sustainability goals of manufacturing and service SCs are similar, sustainable transformation differs significantly between a product-based SC and a service-based SC due to the structural difference associated with the intangible nature of the service that make it more difficult to visualize and not easy to measure its performance (Lisa M Ellram, Tate, & Billington, 2007), more difficult to standardise and impossible to store; additionally, service SCs are distinguished by high customer involvement, unstructured and customised processing (Hussain, Khan, & Al-Aomar, 2016). To sum up, the inherent differences in services necessitate the development of SC management tools tailored to the services sector, as the human labour is a significant component of the total value delivered which makes the management and control of many services difficult (L M Ellram, Tate, & Billington, 2004).

D'Eusanio et al. (2019) conducted a systematic literature review to assess existing tools and methods for evaluating SCSS, the review identified various approaches, including multi criteria decision methods (MCDM), social impact assessment (SIA), social life cycle assessment (S-LCA), statistical approaches and social indicators employed in SCSS research. However, a notable gap was identified in terms of performance assessment methods that offer a holistic social assessment within the supply chain by collecting the opinions and perceptions from multiple stakeholders. Furthermore, it was observed that the previously mentioned assessment tools are predominantly applied in production contexts. Similarly, Chithambaranathan et al. (2015) emphasized that, despite the importance of service SC, research applying MCDM approaches in evaluating sustainable service SC is quite scarce. In alignment with this, Paul et al. (2021) recommended the application of MCDM methodologies to investigate the sustainability dimensions in service SC. More recently, Nagariya et al. (2022) noted the absence of a framework for assessing the performance of sustainable service-only SC management. From this research gaps, the need for the development of social assessment framework specific to the service SC considering the unique characteristics of services, becomes evident.

One of those vital services SCs is Hospitality and Tourism (H&T), and they are interrelated industries due to the typical nature of touristic destinations, which encompass hospitality services in the same area. This includes accommodation in hotels and resorts, as well as restaurants. Hospitality SC is regarded as networks of hospitality organizations engaged in different activities including the supply of various components of hospitality products and /or services such as raw food materials, equipment and furniture from various suppliers; distribution and marketing of the final hospitality products and /or services to the customers for a specific hospitality business such as a hotel or a restaurant (Xu & Gursoy, 2015a).

Assessing social sustainability in H&T SC is crucial as the global tourism SCs are characterized by poor working conditions, low labour standards and wages, worsened by seasonality and price pressures of global operators (Baddeley & Font, 2011; Gruchmann et al., 2022). Also in terms of number of employees it is one of the largest industries in the world; thus, they present a serious challenge for sustainability adoption (Babu et al., 2018). Moreover, the role of tourism SC partners "i.e., travel agencies, tour operators, and suppliers, etc." in the SC is rarely studied, and even less regarding their performance towards sustainable practices (Babu & Kaur, 2020; Ibarnia, Garay, & Guevara, 2020).

Recently, Gruchmann et al. (2022) underline that different perspectives is needed in tourism SCs to facilitate sustainability practices building, moreover, Vatankhah et al. (2023) in the most recent bibliometric analysis that review the application of multi-criteria decision making techniques in H&T, indicate three researches only applying MCDM techniques to address sustainability in this research area (C. L. Chen & Bau, 2016; Lu, Hsu, Liou, & Lo, 2018; Yang, Chuang, Lo, & Lee, 2020). Thus, underscore the knowledge gap by pointing future research toward the application of MCDM techniques for addressing sustainability as a hot topic, and explicitly recommended the use of MCDM techniques in identifying the best alternatives to address sustainability in the design and provision of services by H&T industries.

Similarly, Liao et al. (2022) in another bibliometric analysis of fuzzy MCDM methods in H&T industries, underlined two research papers only applying MCDM techniques for addressing sustainable tourism, the first combined fuzzy AHP and ANP to identify and prioritize sustainable development strategies in ecotourism (Arsić, Nikolić, & Živković, 2017) and the second combined fuzzy DEMATEL and DEMATEL-based ANP in assessing green marketing orientations in terms of sustainability (Ho, Tsai, Chen, & Lu, 2021). Nevertheless, none of them focused on addressing social dimension of sustainability. It is worth mentioning that limited reviewed studies have applied MCDM techniques for addressing sustainability in H&T SCs., which

is also noticeable in Garabinović et al. (2021) research reviewing the application of MCDM methods in research papers from the field of ecotourism and sustainable tourism. Accordingly, the proposed SC social sustainability assessment framework in this study based on fuzzy TOPSIS is expected to provide valuable practical implications for H&T managers, together with its academic contribution to SCSS since the framework is an addition to the few existing fuzzy techniques applied in existing H&T research.

Considering the above-mentioned research gaps in social sustainability in the broader service SC and per se in H&T, the research question of this study is "How can a practical assessment framework be designed and applied to assess social sustainability practices adoption in the H&T SC in Egypt?" Accordingly, the objective of this study is to develop a group MCDM framework for the assessment of the level of social sustainability practices implementation in H&T SC. To illustrate its implementation, the assessment framework is applied to the Egyptian H&T SCs.

4.2 Research Background

4.2.1 MCDM Application in H&T Social Sustainability

A literature review of assessment frameworks or models aimed at empirically measuring social sustainability practices in the H&T SC was performed. The search terms used in Scopus and Web of Science databases were ((''sustainable supply chain management'' OR ''supply chain social sustainability'' OR ''social sustainability'') AND (''tourism'' OR ''hospitality'' OR ''hotels'' OR ''accommodation'') AND (''framework'' OR ''model'') AND (''assess'' OR ''measure''))) in titles, abstracts and keywords. 153 articles were identified and after duplicates were removed, the abstracts of 115 retrieved studies were read and their full text was skimmed. 21 of these 115 studies met the inclusion criteria of being written in English and focusing on assessment frameworks for social sustainability practices in the H&T literature.

Of the 21 studies eligible for review, 13 utilized statistical techniques, such as Structural Equation Modelling (SEM) that was applied in (Hussain, Al-Aomar, & Melhem, 2019; Metaxas, Chatzoglou, & Koulouriotis, 2019; Modica et al., 2020; Pereira-Moliner et al., 2021; Sudapet, Sukoco, Ibrahim, & Setiawan, 2019; Tasci, Fyall, & Woosnam, 2021; Thahir et al., 2022), Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) that was applied in (Babu & Kaur, 2020; Modica et al., 2020; Qiu Zhang,

Fan, Tse, & King, 2017), others relied on various non-parametric tests (Aimagambetov et al., 2017; da Costa Maynard, Zandonadi, Nakano, & Botelho, 2020; Hassan, Shehata, El-Dief, & Salem, 2021; Sanfiel-Fumero et al., 2017) to analyse the relationship between sustainability dimensions and other relevant variables, or to validate their proposed models.

Finally, 8 studies utilized the Multi-Criteria Decision Making (MCDM) approach to develop assessment frameworks for the implementation of social sustainability practices within the H&T industry, relying on the opinions of experts in the field. A summary of the 8 research papers is presented in Table 4-1.

Table 4-1 Summary of MCDM Research Assessing Hospitality and Tourism Social Sustainability.

Reference	Study Purpose/ Objective	MCDM Method(s)	Data Collection	Social Category	Social Practices	Results
(Alameeri et al., 2018)	Identification, categorization, and prioritization for sustainability dimensions.	AHP	Survey Experts' opinion	-Health and Safety -Human Rights -Society Development	Wages and welfare. Employee opportunities. Health and safety. Working hours. Staff employment. Corporate citizenship. Community projects. Society well-being. Charity and donations. Human rights measures. Fair competition. Ethical operation.	Employee training and development is the highest while charity and donations are lowest priority. There is a need for a greater focus on local community-related practices due to their importance in social dimension.
(Lee, Jan, & Liu, 2021)	To obtain criteria weights for social practices.		Delphi Survey	-Society Development. -Fair Labour measures.	Local community development. Suppliers' responsibility. Laws regulating employee benefits. Non-discrimination with employees. Employee training. compensation policies.	The company build close relationship with local community was weighted highest and Increasing leisure opportunities for nearby areas was weighted lowest. The infrastructure to accommodate disabled people needs improvements.
(C. L. Chen & Bau, 2016)	Identification and ranking of sustainability practices.	Fuzzy-AHP	Interviews experts' opinion	-Safety -Local community value.	Lifeguard and lifesaving equipment Safe access to beaches. Emergency plans.	Safety at beach is considered relatively important factor in the second level.

(Lu et al., 2018)	Decision matrix and influences. Obtain weights Ranking social practices.	DEMATEL ANP VIKOR	Questionnaire Interviews Experts' opinion	-Health and Safety. - Employee Development.	Health care management. Safety at workplace. Employees relations. Education/ training for employees.	Social perspective has the highest degree of net influence. Safe work environment, human resources and healthcare management should be enhanced.
(Cvelbar & Dwyer, 2013)	Ranking the importance and performance of sustainability indicators (13 social practices)	IPA	Delphi Survey Experts' opinion	-Fair Labour measures. -society development.	Employee training. Employee satisfaction with working conditions and salaries. Satisfaction of residents. Cooperation with government.	Hotels does not consider social sustainability, especially employees and local community as important as economic and environmental factors.
(Babu et al., 2018)	Ranking the importance and performance of sustainability dimensions.		Survey	-Health and Safety - Fair labour measures.	Hygiene policy. Fair payments. Safety awareness. Social awareness (customer). Supplier social commitment and awareness.	The respondents are rating social sustainability practices as less important than other dimensions.
(Srivastav & Srivastava, 2021)	Rank the order of the sustainability dimensions.	Fuzzy-TOPSIS	Survey Experts' opinion	-Social Dimension	Studied the social dimension along with environmental and economic dimension.	Economic and social sustainability were ranked first and second, while cultural and environmental were ranked third and fourth, respectively.
(He, Huang, Mishra, & Alrasheedi, 2021)	Obtain criteria weights. Ranking sustainable indicators in community-based tourism.	SWARA MULTIMORA	Focus Group Interviews	-Society Development. -Employee development.	Training and education. Stakeholder's involvement. Community wellbeing. Socio-equity. Community participation.	The analysis revealed that all assessed socio-cultural indicators are low ranked except for training and education which is ranked third.

All the reviewed studies in Table 4-1 aimed at assessing the social sustainability practices in the H&T industry using various MCDM methods. in terms of ranking methods, 3 of the studies relied on pairwise comparisons methods, explicitly AHP, while fewer relied on either distance-based method such as TOPSIS and VIKOR or interaction-based methods such as DEMATEL. Concerning the scale used, most of the reviewed studies applied discrete methods while few applied fuzzy decision-making methods as Fuzzy-AHP and Fuzzy-TOPSIS. Also, A couple of the reviewed studies employed IPA as a ranking method that is based on the

conceptual foundation of multi-attribute choice models (Martilla & James, 1977), however, it is not formally categorized as MCDM method. Rather, it is considered a fundamental diagnostic decision tool that helps to identify and prioritize areas for improvement across different attributes (Azzopardi & Nash, 2013).

These methods were used to rank sustainability dimensions in various regions including India, Taiwan, United Arab of Emirates (UAE), and Slovenia. The SWARA and AHP have serious limitations, such as the inability to effectively capture uncertain opinions from experts and the difficulties in combining conflicting opinions from multiple experts. Hence, fuzzy TOPSIS method is assumed to offer a more robust representation of the decision maker's preferences (Hendiani et al., 2021).

Furthermore, despite the considerable level of uncertainty present in the decision-making scenarios examined in the reviewed studies, only one study by He *et al.* (2021) has employed the use of Interval Valued Pythagorean Fuzzy Sets (IVPFS). Conventional fuzzy sets are predominantly employed to address the vagueness of data. However, in terms of precision and dependability, these conventional fuzzy sets cannot be compared to interval-valued Pythagorean fuzzy sets (Hendiani et al., 2021).

The use of IVPFS has been demonstrated to be beneficial for decision makers as it allows for the expression of subjective judgments. More precisely, IVPFS represent this uncertainty by using interval-valued membership functions allowing decision makers to consider the degree of uncertainty associated with each data item, which can lead to more robust and accurate decision making.

Moreover, the 8 studies that utilized MCDM approaches were limited in their perspective as they evaluated social sustainability in only one echelon of the SC, except Babu et al. (2018) attempted to take a SC viewpoint, but their focus was only on the opinions of hotel experts without considering the viewpoints of multiple stakeholders in the H&T industry. Additionally, the study evaluated only few social practices "employee compliance with hygiene policy, fair payments, safety awareness, supplier social commitment and awareness" giving more weight to environmental and economic practices when assessing suppliers, focal firms, and customers.

In summary, while the review primarily looked at studies that included social sustainability, many of these studies either evaluated the generic social dimension along with other sustainability dimensions without specifying specific practices, or only assessed a limited range of social practices while ignoring other important social practices. For example, their focus was limited to practices related to society, community, and employee development while ignoring other critical practices such as health and safety, ethics, fair labour, and human rights.

This proposed assessment framework addresses these limitations by collecting data from the entire SC and evaluating the specific social sustainability practices adopted by each member of the SC. This contributes to both theory by providing an MCDM-based assessment framework and to practice by guiding managers, policy makers, and consumers to put pressure on poorly ranked dimensions in the SC.

4.2.2 Fuzzy Theory

Fuzzy set theory was first introduced by Zadeh (1965) to address the challenge of representing human thought processes, which inevitably involve imprecise and subjective elements. This is because fuzziness is an inherent aspect of human efforts to conceptualize and interrelate all perceptions. In complex scenarios involving multiple variables, even when relevant information is available, precision can be compromised (Gupta & Ragade, 1977).

In academia, researchers strive for objectivity based on the collective perceptions of practitioners. Therefore, Fuzzy sets are groups of objects that have varying degrees of membership, which are defined by a membership function that assigns each object a grade of membership between zero and one. In contrast to traditional set theory and Boolean logic, where an object or proposition is either included or not, graded membership allows for subsets to be formed by allowing partial membership.

Tseng et al. (2018) emphasized the lack of frameworks for evaluating the performance of sustainable service SC management under uncertainty which resulted in unawareness of the sustainable service design and the service process in SC management. From the reviewed studies in H&T presented in Table 4-1, He et al. (2021) and Srivastav and Srivastava (2021), who both used fuzzy techniques to address uncertainty, focused on TBL assessment in community-based tourism and did not take into account the entities in the SC or consider specific social practices. In this research, using fuzzy numbers is preferable than traditional crips numbers since it aids the experts in responding with accurate choices despite the uncertain problem.

4.3 Methodology: Research Design

This section then outlines the research design, describing in detail the steps involved in developing the proposed framework and the methods used in the process. The framework development steps, and the associated methods employed are depicted in (Figure 4-1).

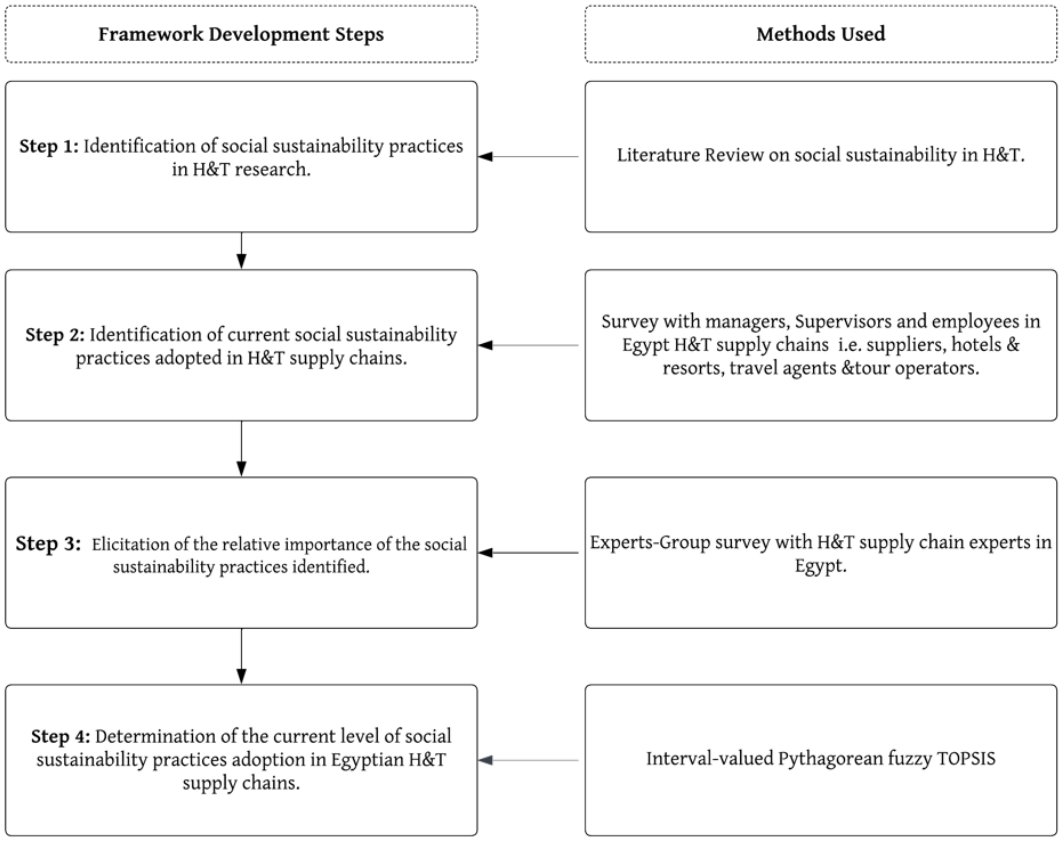


Figure 4-1 Supply Chain Social Sustainability Assessment Framework Development Steps.

4.3.1 Identification of Social Sustainability Practices (step 1)

A scoping review to identify social sustainability indicators suited for H&T SC by searching Web of Science and Scopus databases for (("supply chain social sustainability" OR "social sustainability") AND ("tourism" OR "hospitality" OR "hotels" OR "accommodation")) in titles, abstracts and keywords was performed. After duplicates

were removed, the abstracts of 185 retrieved studies were read and their full text was skimmed. 51 of the 185 studies met the inclusion criteria of being written in English, with a focus on social sustainability. Studies that did not concern H&T SC literature were not excluded because that would be too limitative, i.e., identified social practices were supplemented by practices identified from SC sustainability literature (Hale et al., 2019; Mani, Agarwal, et al., 2016; Mani, Gunasekaran, et al., 2016; Staniškienė & Stankevičiūtė, 2018). Accordingly, the 51 studies full-text were assessed for eligibility to ensure that all of them are either discussing social practices or identifying social indicators in the H&T literature and not just mentioning the concept of social sustainability in passing from which 35 studies were included in the social practices identification (Appendix D).

4.3.2 Survey (step 2)

The questionnaire used to determine the current social sustainable practices adoption is composed of demographic information such as gender, work experience, work position, type, and size of the company, along with 53 questions reflecting the social sustainability practices previously identified. Each question uses a linguistic term set = {strongly disagree, disagree, I am not sure, agree, strongly agree} to facilitate the expression of the respondents (Appendix E). This structured questionnaire of closed questions was created on google forms in both English and Arabic, it was sent to a random sample from the entire population through two rounds of dissemination from June to November 2020 by email and made available on multiple social media platforms.

The target population for the questionnaire was managers, supervisors and employees working on H&T SC entities located in Egypt including: 1) hotels or resorts as the focal firms, 2) tourism companies and travel agents as distributors, and 3) hotels and resorts products suppliers such as food and beverages producers or services suppliers such as tour guides. The sample consisted of individuals impacted by the implementation of social sustainability practices, and a total of 187 valid responses were collected. Prior to distributing the questionnaire online, three managers and three employees participated in culturally adapting the translation into the Arabic language.

4.3.3 Experts-group Survey (Step 3)

A survey was conducted with a group of experts representing different tiers in the H&T SC in Egypt to determine the importance (weights) of each previously identified social sustainability practice, as established in first step. The experts-group survey is appropriate in this research as it enables anonymity of experts that encourage honesty in responses, which is required in social sustainability research due to the sensitivity of the subject. Also, it does not require face-to-face meetings allowing experts to respond liberally and not to be forced with the dominant view.

The process employed for experts' selection encompassed the identification of experts within the field of H&T followed by the issuance of invitations to participate. Subsequently, the criteria employed for selection were based on possessing professional or practical training associated with sustainability or occupying a managerial role within a tourism firm that has obtained accreditation in sustainability at either the national or international level. The final group comprised 22 experts, and their respective details are presented in Table 4-2.

Table 4-2 Experts-group Sample characteristics.

Business area	**Experts Sample**	**Location**	**Experts Sample**	**Company Type**	**Experts Sample**
hotel or resort	14	Cairo& Giza	8	national company	0
tourism company	2	Alexandria& North Coast	2	private company	12
travel agent	2	Red Sea& Sharm Elsheikh	11	multinational company	7
hotels supplier	4	Luxor& Aswan	1	family-owned business	3
Total valid	22		22		22
Profession	**Experts Sample**	**years of experience**	**Experts Sample**	**Company branches**	**Experts Sample**
manager	17	less than 1 year	2	only one branch	4
supervisor	4	from 1 to 5 years	5	from 2 to 5 branches	8
employee	1	from 6 to 10 years	6	from 6 to 10 branches	3
other	0	more than 10 years	9	more than 10 branches	7
Total valid	22		22		22

The expert's survey was carried out from June to September 2021. The 22 experts ranked their preferences for the social sustainability practices using an online survey tool (Microsoft Forms) with a set of linguistic terms that ranged from "Not Important" to "Utmost Importance". The linguistic terms were based on cardinalities up to 10 depending on the number of questions used in each social category (Appendix E).

4.3.4 Interval-Valued Pythagorean Fuzzy based on TOPSIS (Step 4)

Interval-valued Pythagorean fuzzy set (IVPFS), represented by membership and non-membership interval form is an effective and flexible way to deal with serious inexactness (Peng & Li, 2019). Let X be an ordinary finite set, the correspondent IVPFS p is defined as follows (Xiaolu Zhang, 2016):

$$P = \{\langle \chi, P(\mu_p(\chi), \nu_{p(\chi)})\rangle | \chi \in X\}$$

Where $\mu_{\rho(\chi)\subseteq[0,1]}$ and $\nu_{\rho(\chi)\subseteq[0,1]}$ are interval values, $\left[\mu_p^L(\chi), \mu_p^u(\chi)\right]$ is the interval of membership degrees, $\left[\nu_p^L(\chi), \nu_p^u(\chi)\right]$ is the interval of non-membership degrees, and they satisfy $\left(\left(\mu_p^u(\chi)\right)^2 + \left(\nu_p^u(\chi)\right)^2 \leq 1\right)$.

In this way, the original information collected was translated to IVPFS using matching linguistic terms set (Appendix E). For example, when an expert for the social practices included in society development category assigns the scale of "Utmost importance" translated to the IVPFS of ([0.70,1.00], [0.00,0.30]) signifies that the degree to which this social practice is an outstanding with respect to the others social practices falls into the interval [0.70,1.00]. In contrast, the degree to which this practice is not outstanding with respect to the others social practices falls into the interval [0.00, 0.30].

The interval-valued Pythagorean fuzzy-weighted quadratic (IVPFWQ) operator described in (Tang & Yang, 2021) is applied to the single expert framework of Hendiani, Lev, & Gharehbaghi (2021) to modify it to a multi-expert group decision making framework, so this operator in equation 1 is used for the aggregation of the data decision matrix (level of social practices adoption) with the criteria weights (social practices relative importance). The IVPFWQ operator below is used to obtain the collective interval-valued Pythagorean fuzzy preference relation by aggregating the individual IVPFS into a collective one.

$$\text{IVPFWQ}\left(\tilde{\alpha}_1, \tilde{\alpha}_2, \ldots \tilde{\alpha}_n\right) = \left(\left[\sqrt{\textstyle\sum_{i=1}^n z_i(\mu_i^-)^2}, \sqrt{\textstyle\sum_{i=1}^n z_i(\mu_i^+)^2}\right], \left[\sqrt{\textstyle\sum_{i=1}^n z_i(v_i^-)^2}, \sqrt{\textstyle\sum_{i=1}^n z_i(v_i^+)^2}\right]\right) \quad (1)$$

$\tilde{\alpha}_i = ([\mu_i^-, \mu_i^+], [v_i^-, v_i^+])$ (i=1,2,...,n) is a IVPFN, $Z = (Z_1; Z_2, \ldots, Z_n)$,which satisfies $0 \leq Z_i \leq 1$ and $\sum_{i=1}^n Z_i = 1$ is the related weighted criteria vector, and $([\mu_i^-, \mu_i^+]$ defines the degree of membership and $[v_i^-, v_i^+]$ defines the degree of non-membership.

The selection of TOPSIS in the presented SC social sustainability framework is justified by the method simplicity, computational efficiency, and clarity in measuring the relative performance of social practices.

Besides, TOPSIS is proved to be well suited for MCDM problems with substantial information requiring visualization for the best and worst alternatives (Roszkowska, 2011), which is the case in this research. The above-mentioned advantages are not all existing in the other MCDM techniques used in H&T reviewed research, such as AHP which requires more information processing for paired comparisons that would not be efficient in this research.

TOPSIS method first developed by Hwang & Yoon (1981) is based on the idea that the selected alternative should have the shortest distance from the positive ideal solution and the longest distance of the negative ideal solution (Jahanshahloo, Lotfi, & Izadikhah, 2006). The closer the distance of the social sustainable practice from the positive ideal solution and the farther its distance from the negative ideal solution, the better its ranking is. Chen (2000) extended TOPSIS method to group MCDM problems in fuzzy environment and Hendiani, Lev, & Gharehbaghi (2021) to IVPFS. The Fuzzy TOPSIS procedure used is:

1) Convert the decision matrix (social practices level of adoption) and the weight criteria vector (social practices relative importance) to IVPFS.

2) Calculate the normalized weighted decision matrix using equation 2 (Xiaolu Zhang, 2016).

$$x_\rho * x_\beta = P\left(\left[\mu_\rho^L \mu_\beta^L, \mu_\rho^U \mu_\beta^U\right], \left[\sqrt{\left(v_\rho^L\right)^2 + \left(v_\beta^L\right)^2 - \left(v_\rho^L\right)^2\left(v_\beta^L\right)^2}, \sqrt{\left(v_\rho^L\right)^2 + \left(v_\beta^L\right)^2 - \left(v_\rho^L\right)^2\left(v_\beta^L\right)^2}\right]\right) \quad (2)$$

$\chi\rho = P([\mu L\rho, \mu U\rho], [\upsilon L\rho, \upsilon U\rho])$ *and* $\chi\beta = P([\mu L\beta, \mu U\beta], [\upsilon L\beta, \upsilon U\beta])$ are two IVPFSs.

3) Calculate the separation measures of each alternative from the positive ideal solution and negative ideal solution. The distance between interval-valued Pythagorean fuzzy number IVPFN χ_ρ and positive ideal IVPFN $\theta^+ = P([1, 1], [0, 0])$ or negative ideal IVPFN $\theta^- = P([0, 0], [1, 1])$ will be calculated using the equations 3 and 4 (Xiaolu Zhang, 2016).

$$d(x_\rho, \theta^+) = \frac{1}{4}\left(1 - (\mu_\rho^L)^2 + 1 - (\mu_\rho^U)^2 + \left(v_\rho^L\right)^2 + \left(v_\rho^U\right)^2 + \left(\pi_\rho^L\right)^2 + \left(\pi_\beta^U\right)^2\right) = \frac{1}{4}\left(2 - (\mu_\rho^L)^2 - (\mu_\rho^U)^2 + \left(v_\rho^L\right)^2 + \left(v_\rho^U\right)^2 + \left(1 - (\mu_\rho^U)^2 - \left(v_\rho^U\right)^2\right) + \left(1 - (\mu_\rho^L)^2 - \left(v_\rho^L\right)^2\right)\right) = \frac{1}{2}\left(2 - (\mu_\rho^L)^2 - (\mu_\rho^U)^2\right) \quad (3)$$

$$d(x_\rho, \theta^-) = \frac{1}{4}\left((\mu_\rho^L)^2 + (\mu_\rho^U)^2 + 1 - \left(v_\rho^L\right)^2 + 1 - \left(v_\rho^U\right)^2 + \left(\pi_\rho^L\right)^2 + \left(\pi_\beta^U\right)^2\right) = \frac{1}{4}\left((\mu_\rho^L)^2 + (\mu_\rho^U)^2 + 2 - \left(v_\rho^L\right)^2 - \left(v_\rho^U\right)^2 + \left(1 - (\mu_\rho^U)^2 - \left(v_\rho^U\right)^2\right) + \left(1 - (\mu_\rho^L)^2 - \left(v_\rho^L\right)^2\right)\right) = \frac{1}{2}\left(2 - (v_\rho^L)^2 - (v_\rho^U)^2\right) \quad (4)$$

4) Calculate the relative closeness of each alternative to the positive ideal solution.

The closeness index has a value between 0 and 1 (equation 5, (Xiaolu Zhang, 2016)), and is used to rank the social sustainable practices, a large closeness index is a sign of preference for the practice by the decision maker.

$$\psi(X_\rho) = \frac{d(X_\rho, \theta^-)}{d(X_\rho, \theta^+) + d(X_\rho, \theta^-)} = \frac{\frac{1}{2}\left(2 - \left(v_\rho^L\right)^2 - \left(v_\rho^U\right)^2\right)}{\frac{1}{2}\left(2 - \left(\mu_\rho^L\right)^2 - \left(\mu_\rho^U\right)^2\right) + \frac{1}{2}\left(2 - \left(v_\rho^L\right)^2 - \left(v_\rho^U\right)^2\right)}$$

$$= \frac{2 - \left(v_\rho^L\right)^2 - \left(v_\rho^U\right)^2}{4 - \left(\mu_\rho^L\right)^2 - \left(\mu_\rho^U\right)^2 - \left(v_\rho^L\right)^2 - \left(v_\rho^U\right)^2} \quad (5)$$

5) Rank all the alternatives using the closeness index in decreasing order.

4.4 Results and Discussion

As a result of the scoping literature review process, 53 social practices were identified and classified into 8 social categories: Fair Labour Measures (A), Equal Opportunity (B), Employee Development (C), Health and Safety (D), Employee Participation and Cooperation (E), Society Development (F), Ethics and Corruption (G), and Human Rights (H) as listed in (Appendix D). As presented in Figure 4-2, the overall social sustainability practices have significant distances to the ideal expressing the poor adoption of most social sustainability practices in the Egyptian H&T SC. Analogously, He et al. (2021) revealed that in Indian resort all social practices are poorly adopted except for training and education that was moderately ranked in performance.

Equally, many reviewed studies (Alameeri et al., 2018; Babu et al., 2018; Cvelbar & Dwyer, 2013) revealed that social sustainability practices are poorly adopted compared to the other environmental and economic sustainability practices assessed in their studies.

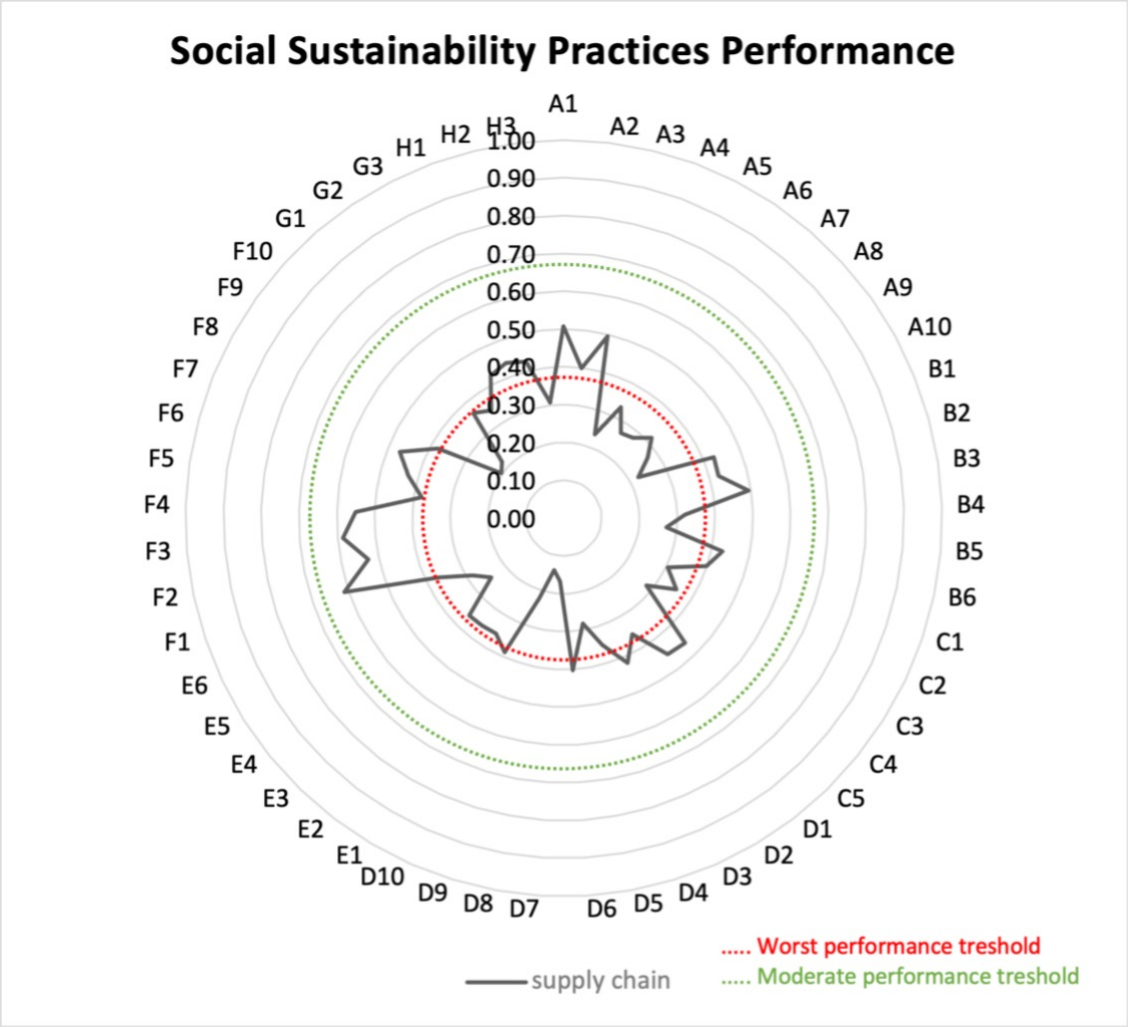


Figure 4-2 H&T SC social sustainability practices performance.

Comparing the collective H&T supply chain performance between all social categories, *society development (F)* is the best with an average closeness index of 0.43 and *health and safety (D)* is the worst performing with an average closeness index of 0.31. Our findings correspond with those of Lee et al. (2021) who reported that building strong ties with the local community was deemed the most important sustainability practice in Vietnamese resorts. Conversely, Cvelbar and Dwyer (2013) found that the performance of Slovenian hotels in terms of their relationship with both the local community and employees was relatively inadequate compared to other sustainability practices. Alameeri *et al.* (2018) revealed that health and safety is not highly ranked and identified low prioritization for local community-

related practices in UAE hotels, thus they recommended greater focus due to their importance in social dimension.

In terms of social practices comparison, the *organization ensure buying from women owned minority enterprises (F1)* is the best performing practice with closeness index of 0.61, whereas *the organization is ensuring women's safety at workplace (D8)* is the worst performing among all the 53 social sustainability practices with closeness index of 0.14.

The social sustainable practices implementation assessment across the SC is of most interest to SC managers, decision-makers, police makers, consumers, and society among other stakeholders in order to optimize resources or place stakeholder pressure for a full socially sustainable SC implementation. This interest is highlighted in the research conducted by Ho *et al.* (2021) which found that inter-functional coordination, as well as a focus on competitor and customer orientation for sustainability practices, is a significant concern for managers in the hospitality industry. Also, Chen and Bau (2016) highlighted the need for participation of all tourism stakeholders and to work cooperatively with local government in Taiwan for social sustainability improvements.

Figure 4-3 compare each H&T SC partners performance: the upstream suppliers which are composed of products or services suppliers, the hotels and resorts as focal firms, and the tour operators or travel agents as distributors. The closeness indices calculated are presented in Appendix F.

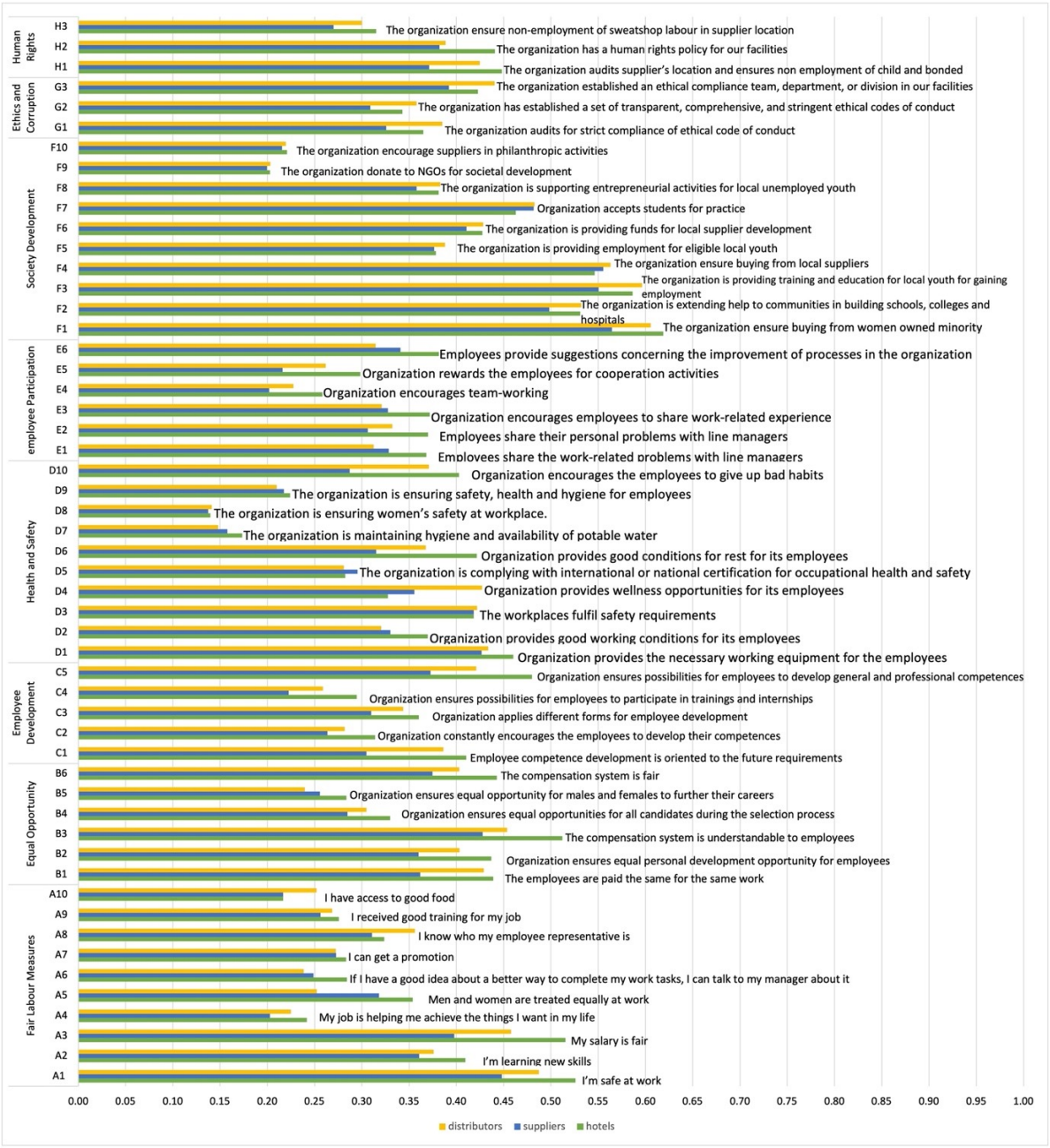


Figure 4-3 comparison of social practices closeness indices by tourism and hospitality SC entities.

In individual, hotels performance is almost the best, our results resemble to Babu *et al.* (2018) that responding managers are satisfied with social sustainability practices performance in H&T focal firms. However, our findings reveals that their performance is slightly worse than suppliers and distributors in *providing wellness opportunities for its employees (D4), fulfilling safety requirements (D3), ensuring buying from local suppliers (F4), and accepting students for practice (F7).* On the other hand, the H&T suppliers

have the worst performance in comparison to hotels and distributors in all social practices, except in *complying with international or national certification for occupational health and safety (D5) they were better than both hotels and distributors.* Our results are matching with those of Babu et al. (2018) who found that among the various social sustainability practices, tourism suppliers had the lowest level of implementation (the largest gap between importance and performance), and therefore, there is a need for these practices to be improved in the H&T SC. Likewise, the research conducted by Lu et al. (2018) in Taiwan emphasized the importance of prioritizing the social dimension as areas for improvements over environmental and economic dimensions of air transport service providers, as an important global tourism supplier. Particularly, a focus on providing professional training and development opportunities for employees, improving workplace relationships, promoting workplace safety and health.

Furthermore, our results revealed that H&T distributors performance falls between that of hotels and suppliers in most social practices. Notably, we observed that distributors are marginally better than both hotels and suppliers across all ethics and corruption practices as well as all society development practices except in *buying from women owned minority enterprises (F1).*

Lastly, the results showed discrepancies within the same social categories between its related social practices and more across different social categories as shown in (Appendix F-5). For example, society development category comprises the 4 best performing practices of all 53 assessed social practices: *buying from women owned minority enterprises (F1), providing training and education for local youth for gaining employment (F3), ensure buying from local suppliers (F4), extending help to communities in building schools, colleges and hospitals (F2)*. And the same social category comprises 2 of the worst performing practices: *donate to NGOs for societal development (F9)* ranked 51 and *encourage suppliers in philanthropic activities (F10)* ranked 50 out of the 53 assessed practices. Given the lack of empirical studies to support our findings, and the fact that research into social sustainability in supply chains is clearly in its early stages of development, it is expected to find mixed results at this point in time (Badri Ahmadi, Kusi-Sarpong, & Rezaei, 2017). Therefore, H&T SC managers guided by our assessment framework and its results, can better decide which social practices they need to focus on first and which ones they can postpone.

4.5 Conclusion

Social sustainable development pursuit a creation of well-being and healthy communities, thus assessing its implementation is of most importance to identify areas for improvement. The present study showed a detailed assessment for the level of social sustainability practices adoption in H&T SC as one of the most labour-intensive industries worldwide and one of the most vital industries in Egypt.

In conclusion, the results of this study indicate poor adoption of all social sustainability practices in the Egyptian H&T SC, with significant distances to the ideal, leaving an extensive room for improvements. This implies that Egypt's H&T SC is in an early stage of development in terms of incorporating social sustainability practices, as the primary emphasis to improve social sustainability within the Egyptian H&T SC stem from basic initiatives.

In terms of individual social categories, society development performed best while health and safety performed worst. In terms of individual social practices, buying from women-owned minority enterprises was the best performing while ensuring women's safety at the workplace was the worst. The social performance was found to vary between the H&T SC partners, with hotels having the best performance, followed by distributors and then suppliers have the worst performance. Despite the differences in performance, there were discrepancies in social practices within and across their social categories. These results suggest the need for improvement in the implementation of social sustainability practices in the H&T SC, particularly in areas such as health and safety, especially women's safety at the workplace.

The practical contribution of this study result from its usefulness for SC managers, decision-makers and policy makers to optimize resources as well as consumers and society to place stakeholder pressure for a proper socially sustainable implementation in H&T. Therefore, it is recommended that H&T SC managers and policy makers represented in the Egyptian ministry of tourism to plan social sustainability improvements based on observing social categories and practices performance with respect to SC position i.e., hotels, distributors, and suppliers. The practices that were identified as the worst performing for each SC partner are considered as the areas that require immediate attention for improvement. Moreover, Because the social practices used in the present research were identified from diverse SC existing research, the developed framework is practicality useful to be widely applied in different service SC contexts other than its proved practicality in the current H&T SC.

Furthermore, this paper extends the work of Hendiani et al. (2021) by broadening the single expert approach to a multi-expert group decision making context, thereby contributing to the development of MCDM methods. This framework deal with the shortcomings of most MCDM or MCDGM reviewed methods as it provides a distinctive and rarely applied social sustainability assessment technique in service SC under IVPFSs, which is an efficient measurement tool to describe and deal with the vagueness of MCDM information precisely. This uncertainty problem commonly occurred in sustainability development research (Rani et al., 2020). The IVPFSs are particularly useful in group decision making problems where insufficient information exists or where it is challenging for experts to express their opinions with precise values, as is the case in this research paper. Hence, this research is a valuable addition to existing sustainability assessment methods, as it opens opportunities for researchers and scholars to embrace and utilize diverse MCDM techniques. Such techniques have been overlooked in the context of H&T (Vatankhah et al., 2023) and even more from SC perspective.

One of the limitations of this study is that the findings of this research were derived from the analysis of the H&T SC within Egypt. While it is not feasible to extend these findings universally, this study encompassed crucial societal concerns that are commonly overlooked in broader H&T investigations i.e., employee-related social practices, health and safety, ethics and corruption, human rights as well as society development practices. Another research limitation pertains to the absence of a robust consensus among the group of experts involved in determining the relative importance of social practices. This lack of agreement is not uncommon, especially in the initial stages of implementing social practices, as noted by (Badri Ahmadi *et al.* (2017). Given the above limitation, future research could extend this study into the application of the Delphi method as an alternative approach, also a follow-up assessment is recommended to be undertaken after improvements to see whether the effects were as expected.

Furthermore, this study recommends future research to focus on the development of different decision-making frameworks under uncertainty for social sustainability assessments in service SCs or the combination of various MCDM techniques. Besides, future studies could compare the proposed assessment framework in this study with existing assessment models and techniques in terms of consistency and efficacy.

5. CONCLUSION

5.1 Summary of the Research Work

The findings and conclusions at the end of second, third and fourth chapter of the thesis discuss the achieved research objectives in detail. In the first chapter, we proposed three main research questions linked to nine specific research objectives. This section highlights the key conclusions related to each research question.

- *What is the current state of research on social sustainability practices within H&T SCs, and what are the key gaps in the existing literature?*

This question is answered in chapter 2, through conducting a systematic literature review for the topic. The review underlined the insufficient exploration of the social dimension of sustainability in H&T SCs existing research. Over the period spanning 2008 to the present, merely 17 studies addressed the topic, emphasizing a limited exploration of the subject. The study also highlighted that of the present date, MCDM assessment methods remain absent in the existing literature of the topic. This notable gap highlights that the area needs further exploration and scholarly attention. It was also observed that the predominant methods of the papers in this field are empirical, underscoring a lack of research relying on existing theories as theoretical lenses to better investigate the topic.

Furthermore, a noticeable observation emerges regarding the implementation of social practices within H&T SC. These practices are applied on an ad hoc basis, and a consensus on a definitive set of social indicators within H&T SC research is not achieved. In response to this gap, a comprehensive array of socially sustainable practices has been outlined though a detailed review of existing studies. These practices have been organized in 8 distinct social categories. In this categorization, a considerable emphasis placed on the 'society and community development' category, surpassing attention dedicated to the other identified categories in the existing research. Conversely, indicators related to 'human rights' appeared as the least identified within the reviewed literature. Lastly, this review provided a research agenda showing several areas requiring further development.

- *What is the current state of social sustainability implementation in H&T SCs in Egypt?*

This question is answered in chapter 3, by drawing on institutional and stakeholder theories to identify the adopted social sustainability practices in Egypt and to determine the factors affecting their implementation. From the findings of interviews conducted with the management of 2 multinational hotels in Alexandria and Cairo and a questionnaire based on literature completed by 187 practitioners (employees, supervisors and managers) from H&T SCs located in several cities in Egypt, it is evident that social sustainability practices in H&T SCs in Egypt are haphazardly implemented at the organizational level without strategic alignment across the entire supply chain. As per the perceptions of respondents from the questionnaire, the most adopted social practices are associated with 'Health and safety'. It is remarkable that the Egyptian regulations mandate the implementation of "Ethics and corruption" as well as "Human rights" practices, however, the implementation of these practices was minimal.

In the lens of institutional theory, the primary barrier impeding the implementation of social practices into the Egyptian H&T SCs is the lack of knowledge, skills and awareness regarding the importance of sustainability practices in addition to the management perceptions that sustainability practices are both costly and resource consuming. The questionnaire respondents further disclosed that SC partners in Egypt exhibit an unwillingness to cooperate with their suppliers on social sustainability implementation. This became evident as hotels managers during interviews, acknowledged their uncooperative behaviour with their suppliers resulting from their belief that social sustainability is an afterthought within their operational considerations.

The main enablers facilitating the adoption of social sustainability in H&T SCs in Egypt are linked to certifications and reporting requirements, representing a form of coercive pressure, followed by the desire to create a competitive advantage and enhance their market position, reflecting a mimetic pressure.

In the results derived from the CCA model, the enablers showed a statistically significant associations with most of the studied social sustainability practices (53 out of 62). The management encouragement to the application of innovative ideas in practicing social sustainability (mimetic pressure), the aspiration to follow company values and morals (normative pressure) and the adherence to national and international regulations (coercive pressure) emerged as the most strongly associated enablers with the studied social practices. the strength of these associations underscores the pivotal role played by institutional pressures in fostering the adoption of social sustainability practices. Cost savings and obtaining subsidies from the government shows a moderate association, primarily stemming from the prevailing management perception that social sustainability practices are costly and resource consuming activities. Additionally, throughout the

interviews, the hotels managers revealed that there is no subsidization from the government to encourage the adoption of sustainability practices in tourism organizations. This absence of support increases the challenges in achieving the desired widespread adoption of social practices. Furthermore, our findings, derived from group differences assessed through Tamhane's T2 test, indicate that hotels and resorts along with their downstream supply chain partners, including tour operators and travel agents demonstrate a significant lower level of implementation in certain fair labour measures and society development practices when compared to upstream suppliers.

- *How can a practical assessment framework be designed and applied to assess social sustainability practices adoption in H&T SCs in Egypt?*

This question is answered in the fourth chapter of the thesis, where the social sustainability assessment framework is introduced and then applied to the Egyptian H&T SCs. The framework comprises four distinct steps, each associated with a corresponding method explained in detail in the chapter. The initial step entails the identification of social sustainability practices in H&T research through a literature review, the practices identified in this step are determined in conjunction with chapter 2. The subsequent step involves identifying the existing social sustainability practices implemented in H&T SC in Egypt by a survey conducted among 187 managers, supervisors and employees in Egypt H&T SC including suppliers, hotels & resorts, travel agents & tour operators, the data utilized in this step are originated from the third chapter. Following this, the third step encompasses the elicitation of the relative importance of the identified social sustainability practices accomplished through an expert-group survey with 22 H&T SC experts in Egypt. The fourth and last step of the framework entails determining the current level of social sustainability practices adoption in Egyptian H&T SCs achieved by employing the interval valued Pythagorean fuzzy distance to ideal solution based on TOPSIS.

By applying the assessment framework to H&T SCs in Egypt, the overall results demonstrate inadequate implementation of social sustainability practices, with significant distances to the ideal. Consequently, there exists a substantial opportunity for betterment in this regard.

In assessing the performance across the eight social categories, it becomes apparent that the category of "society development" is the best, as indicated by an average closeness index of 0.43. Conversely, the category of "health and safety" is the worst, with an average closeness index of 0.31. Regarding the individual social practices, the practice of "ensuring purchasing from women-owned minority enterprises" emerges as the best performing social practice, with a closeness index of 0.61. Whereas

"ensuring women's safety in the workplace" ranks as the least performing among all the 53 social practices, exhibiting a notable low closeness index of 0.14. These findings underscore the imperative for improvements in the implementation of social practices within the H&T SC, emphasizing critical areas such as "health and safety", particularly focusing on women's safety in the workplace.

Furthermore, social performance within H&T SC partners exhibited variation, with hotels & resorts demonstrating the highest performance, followed by distributors (tour operators and travel agents) and then suppliers. Precisely, H&T suppliers exhibit the lowest performance compared to hotels and distributors across nearly all social practices. specifically, they rank the lowest in providing salaries, fostering employee competence development oriented to future requirements, ensuring opportunities for employees to develop both general and professional competencies, offering favourable conditions for employee rest, and encouraging employees to overcome bad habits.

Despite the variations in performance, notable discrepancies in social practices were identified both within and across social categories. For instance, within the "society development" social category, four practices emerge as the best performers among all 53 assessed social practices. These includes purchasing from women-owned minority enterprises, providing training and educations for local youth to facilitate employment, ensuring procurement from local suppliers, and actively contributing to community development through the construction of schools, colleges, and hospitals. Conversely, within the same social category, two practices rank among the worst performers: donating to NGOs for societal development holds the 51st position, while encouraging suppliers to engage in philanthropic activities ranks 50th among the 53 assessed practices.

5.2 Main Contributions

The contributions of this doctoral project are explained in Chapters 2, 3, and 4. This section highlights the following key contributions of the thesis:

- This dissertation provides a significant contribution by addressing multiple research gaps observed in the current literature on SSCM. Particularly, the thesis focuses on the social dimension, which is the least explored aspect of the sustainability concept within one of the most

labour-intensive industries of the service sector (hospitality and tourism), an area previously acknowledged for its limited research, emphasizing the importance and novelty of this study.

- The study contributed to the literature of social sustainability by identifying a large number of social practices reflected in 62 social indicators synthesized into 8 social categories, which guide decision makers to precisely determine the underperformed social practices in individual and in categories based on the analysis.
- One of the contributions of the thesis is capturing the adoption of social sustainability practices in Egypt's core industry, considering the "employee voice" as a key stakeholder and adopting a supply chain perspective through the lenses of institutional and stakeholder theories. Also, Egypt, as a cultural destination provides a solid foundation for future comparative analysis as it shares similar characteristics with other Mediterranean countries.
- The thesis holistic view of the interconnected network of H&T companies is crucial for ensuring social sustainability throughout the entire supply chain, it also encourages local authorities and supply chain intermediaries to be accountable in supporting local businesses, overcoming barriers, and improving current labour conditions.
- Numerous social practices addressed in this thesis align with the objectives set forth by the United Nations in their sustainable development goals and recently embraced by the Egyptian ministry of tourism. Therefore, our thesis findings hold significant relevance for stakeholders and policy makers in the Egyptian tourism sector, particularly those within the ministry of tourism and chamber of tourism establishments. These insights can serve as a foundation to design targeted awareness and training programs for H&T SCs practitioners to enforce and improve their adoption of the poor performed practices.
- The presented social sustainability assessment framework extends the one of Hendiani et al. (2021) by broadening the single expert approach to a multi-expert group decision making context, thereby contributing to the development of multi-criteria decision making methods. Also, the utilization of the proposed fuzzy TOPSIS technique for assessing sustainability within the context of multi-tier H&T SCs is a valuable addition to the existing social sustainability assessment methods since it addresses the deficiencies found in other methods. This technique offers a rarely used approach to evaluating social sustainability within the service supply chains by employing

IVPFSs as a powerful tool for accurately describing and managing the inherent ambiguity of MCDM information.

- The practical contribution of the established framework for evaluating social sustainability practices extends beyond its demonstrated practicality in the current H&T supply chain as the assessed social practices were identified from diverse supply chain existing research. Therefore, the framework can be employed in different supply chain contexts where decision makers, policymakers, and experts encounter challenges in precisely justifying their assessments.

5.3 Research Limitations and Future Research

Within the chapters of this thesis, the limitations and the future research recommendations arising from each study are detailed in the conclusion section. Hence, from the three studies presented in chapter 2,3 and 4 we emphasize the following.

In chapter 2, we provided a comprehensive research agenda table extracted from the systematically reviewed studies. From the identified future research directions, some have been addressed through the thesis objectives and research questions, while others remain unexplored. Therefore, this table could serve as a roadmap guiding social sustainability in H&T SC future research. In Chapters 3 and 4 of this thesis, a primary limitation is that our empirical studies are focused on the context of H&T SCs in Egypt. Future research could extend and enrich this study by employing a comparative analysis of social sustainability practices within H&T SCs across diverse geographical settings. This comparative exploration could encompass an in-depth investigation into the factors that either facilitate or impede the adoption of social practices, particularly in the context of developed versus developing nations. Additionally, future investigations might benefit from the incorporation of alternative theoretical perspectives beyond institutional and stakeholder theories. Such a multi-theoretical approach could yield additional theoretical insights and implications, enhancing the overall scholarly contribution of future research in this field.

Based on chapter 4 where the social sustainability assessment framework is presented and applied, there is a wide room for improvements. The main limitation of this study is resulting from the absence of a strong consensus among the group of experts involved in determining the relative importance of social practices. This lack of agreement is common in the initial stages of implementing social practices (Badri

Ahmadi *et al.* 2017). Hence, future research could extend this study by the application of the Delphi method to ensure strong consensus in determining the relative importance and to conduct further assessment after improvements to see whether the effects were as expected. It is also recommended that future research focus on the development and employment of alternative MCDM based frameworks under uncertainty for assessing social sustainability in H&T supply chain context, since this approach is missing as evident from the literature review in chapter 2, besides, this issue of uncertainty is a recurring challenge in sustainability research (Rani et al., 2020). Additionally, future studies could compare the proposed framework in this study with different assessment methods in terms of consistency and efficacy.

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APPENDIX A – SYSTEMATIC LITERATURE REVIEW DATA EXTRACTION TABLE

N	Author and Year	Study aim/purpose	Research Methodology/Approach	Conclusion/Findings
1	(Arzoumanidis & D'Eusanio, 2023)	The study aims to analyse the social footprint of the supply chain in an Italian accommodation facility and evaluate the social risks associated with the service provided.	The study examines the social impacts of the supply chain in the accommodation facility using the S-LCA methodology and the Social Hotspot Database. The primary data was collected through a questionnaire from the accommodation facility administration.	The study revealed the category that is most affected is "Health and Safety", followed by "Labour Rights and Decent Work". The third most affected category is "Governance" and the least affected category is "Human Rights".
2	(Keating, 2022)	The research aims to analyse CSR practices in the Australia-China tourism supply chain.	The research used a mixed-methods approach, Interviews were conducted with 60 stakeholders in Australia and China to study CSR in the tourism supply chain. A survey was done with 21 travel agents in China and 29 tour operators in Australia and the data was analysed using best-worst method.	The study shows that CSR commitment is important for firm performance in the Australia-China tourism supply chain. There are significant variations in CSR preferences between Australian and Chinese travel intermediaries.
3	(Thahir et al., 2022)	The objective is to determine how environmental management, social support, and financial performance affect managerial innovation and subsequently sustainable supply chain management in tourism.	Data was collected from 176 TSC actors (accommodation, transportation, excursions, and local foods and crafts producers) in Central Sulawesi, Indonesia. PLS-SEM was used to analyse the data.	The statistical analysis found that improved environmental management, social support, and financial performance can enhance sustainability of supply chain management in tourism. Also, managerial innovation plays an important role in improving the performance of sustainable supply chain management in tourism.
4	(Modica et al., 2020)	The research aims to investigates how environmental, social and economic sustainability practices in hospitality supply chain entities impact customer satisfaction, loyalty, and willingness to pay high prices.	Data from 288 tourists in South Sardinia (Italy) was used to test the model and hypothesized relationships. Structural Equation Modelling (SEM) was used to analyse data.	the social sustainability practices positively affect consumer satisfaction but not loyalty or willingness to pay higher prices. Loyalty is influenced by satisfaction as a mediator.
5	(Richards & Font, 2019)	The study analysed the opportunities and barriers faced by tour operators and ground handlers in promoting sustainable tourism products.	The study adopted an interpretivist, qualitative, exploratory methodology to comprehend the sociocultural complexities of tour operator ground agent supply chains. 13 employees from 10 UK tour operators and 15 employees from 10 international ground agents were interviewed using semi-structured interviews.	Tour operators and ground handlers require a supportive organizational culture to increase their sustainable tourism products and meet quality of service and target market needs. Motivation to consider sustainability may be lacking when services are cheap or have strict health and safety regulations unless sustainability is prioritized and marketed.

6	(Babu et al., 2018)	A framework was presented for Indian hotels to enhance sustainability practices in their supply chain by analyzing the sustainability performance and their associated importance.	A questionnaire was created to gather the perceptions of hotel managers. The analysis of the perceptions of 225 hotel managers across different levels was performed using Importance Performance Analysis (IPA).	The study discovered that social factors of sustainability practices had the highest value in gap analysis, demonstrating a significant gap between importance and performance in social sustainability practices.
7	(L. Zhang & Zhang, 2018)	The objective is to investigate the links among social networks, the perception of social sustainability, and the future business intentions of small tourism companies in Lao PDR.	Data collected from 177 small tourism businesses in Lao PDR using questionnaire. The sample included accommodation, catering, retailing, and other tourism businesses. Generalized SEM was used to analyse the relationships between the variables.	Building social networks and employing local residents are important determinants for success for small tourism enterprises' social sustainability.
8	(Mandal, 2018)	The study aims to investigate the impact of Big Data Analytics (BDA) management capabilities, such as planning, investment, coordination, and control, on sustainable tourism performance. It also seeks to analyse the moderating effect of technology orientation on the relationship between BDA management capabilities and sustainable tourism supply chain performance.	The study used SEM to analyse perceptions of 212 analytics professionals from India's hospitality industry. These professionals represented 78 hotels, 82 tour operators, and 52 restaurants.	The study indicated that BDA planning, coordination, and control are important enablers for sustainable TSC performance. Additionally, technology orientation improves the contribution of BDA planning, coordination, and control as enablers.
9	(Sanfiel-Fumero et al., 2017)	A thorough analysis was conducted to evaluate corporate social responsibility implementation in the Canary Islands, Spain, with the participation of public and private agents using a TSC approach.	A questionnaire was utilized to assess implemented CSR actions. The sample included 94 managers from both hotels and non-hotel accommodations. The Mann-Whitney-Wilcoxon test was used to compare responses between the two independent groups.	Hotel and non-hotel establishments show similar levels of CSR involvement, but room for improvement exists. Destinations should prioritize sustainability policies, and all public, private institutions and social stakeholders should take a more proactive approach to CSR.
10	(Xu & Gursoy, 2015a)	A hospitality SC framework has been proposed after a thorough review of sustainability literature in the industry. The paper aims to address the antecedents, consequences, actions, evaluation mechanisms, and sustainability practices that can be adopted by all supply chain members for SSCM. The focus is on environmental, social, and economic aspects in the hospitality business.	Analysed the sustainability literature in the hospitality industry and creates a framework for sustainable hospitality supply chain management. Previous research on sustainability in the industry is also reviewed to expand on current knowledge and improve comprehension of SSCM.	Sustainable hospitality supply chain management needs participation from all SC members. Social sustainability practices in hospitality benefit customers, employees, business, and society.

11	(Xu & Gursoy, 2015b)	The objective is to determine the effects of sustainable hospitality supply chain management practices on customer attitudes and behaviours. These include satisfaction, loyalty, and willingness to pay a higher price for sustainable products and services.	A two-step SEM approach with maximum likelihood estimation was used to analyse data from 499 frequent hotel guests in the US.	The social practices in sustainable hospitality supply chain management positively affect customer satisfaction but negatively affect willingness to pay a premium. Customer satisfaction is the mediator between social practices and loyalty.
12	(Arcese et al., 2013)	This paper aims to introduce S-LCA to the tourism industry, focusing on social sustainability data. Its purpose is to provide a questionnaire that has all the required information to conduct a thorough evaluation of social impacts and then test it in Lazio region of Italy.	The study collects both qualitative and quantitative data to assess the social sustainability of tourism. A survey comprising of 28 questions was used to gather data from customers and accommodation staff.	Positive results were achieved for the "Worker" group while negative effects of indicators on "Cultural Heritage" were found. The negative effect primarily due to insufficient involvement from accommodation facilities in the tourism social network and a lack of cooperation with other organizations.
13	(da Costa & Carvalho, 2011)	The study aims to examine the sustainability of the TSC in Palmela village, Portugal using case study research approach.	The methodology consists of empirical research methods such as fieldwork, document analysis, interviews, direct observations, and physical artifacts. Additionally, interviews were conducted with accommodation and restaurant suppliers.	The paper identifies sustainable supply chain management best practices for the tourism sector.
14	(Dodds & Kuehnel, 2010)	The paper aims to conduct a case study on Canadian mass mainstream tour operators and assess their level of awareness regarding corporate social responsibility activities.	The research utilized interviews and questionnaires to collect information from Canadian mass tour operators.	The research discovered that Canadian mass tour operators are becoming more aware of CSR but have not yet put it into practice.
15	(Sigala, 2008)	The article presents a sustainable SCM model and applies it to TUI a leading tour operator known for its strong commitment to sustainability.	The study adopts a case study method to show how SCM can be used by tour operators for sustainable SCM implementation. data collected using semi-structure interviews with 2 TUI staff from Greece and Germany	The significance of measuring and sharing performance in sustainable SCM is stressed, with emphasis on standardized data, technological integration, and alignment of performance metrics among TSC members.
16	(Font et al., 2008)	Exploratory research was conducted in the tourism industry to assess the potential and challenges of applying SSCM concepts and experiences from the manufacturing sector. The research began by highlighting important SSCM issues, followed by an analysis of different tourism experiences with suppliers to gain valuable insights.	The study conducted interviews with UK and European tour operators to find evidence of good practices in SSCM. Additionally, company reports, websites, and industry literature were reviewed to gather more information on supply chain practices.	The study identifies areas for improvement in SSCM including accommodation, transport, ground handlers, excursions, activities, food, and crafts. Cooperation between companies and suppliers is crucial, and a positive workplace culture and sufficient resources are necessary for successful implementation.

17	(Schwartz et al., 2008)	Presented a framework for tour operators to improve sustainability performance through supply chain management processes. It consists of industry-relevant steps, such as engaging the business, integrating SSCM, assessing suppliers, setting priorities, and evaluating progress.	The SSCM framework underwent three phases- conceptual development, stakeholder consultation, and phased-pilot implementation. Its structure is modelled after the Deming Cycle of 'plan-do-review'.	The current focus of SSCM in tourism industry is mainly on environmental issues, neglecting socioeconomic concerns. The paper suggests that policies should also address socioeconomic concerns such as preservation of cultural identity, respect for local communities, and contribution to economic development in destinations.

APPENDIX B –INTERVIEW GUIDE FOR HOTELS

Section	Interview Question	Objective	Target Respondent	Adapted from
Background of interviewee and hotel general information	State your name and describe your position in the hotel and how long you have been working in this hotel.	Familiarization with the interviewee professional background and work experience.	All interviewees	(Bals & Tate, 2018)
	What is your professional background before being in this hotel?			
	Describe the structure of the hotel and if possible, provide the organization chart.	Understanding the hotel organizational structure and identifying the key stakeholders.	All interviewees	
	Approximately, how many employees are working in the hotel?		Human Resources manager	
	Can you discuss the stakeholders that are directly or indirectly involved in the hotel?		All interviewees	
Material/service and information flows questions	Can you discuss the process flows for materials and services (preferably in terms of plan, source, make and deliver)? can we have a SC chart?	Exploring the upstream and downstream SC structure of the hotel in terms of materials, service and information flow.	Purchasing Manager	(Bals & Tate, 2018)
	How does your management of upstream and downstream partners differ?		Purchasing Manager, Marketing Manager	
	Can you describe and discuss the flow of information both upstream and downstream?		Purchasing Manager, Marketing Manager	
	What type of information are shared between the hotel SC partners?		Purchasing Manager	
	How often is that information shared?			
	What means of communication are used?			
Social sustainability-related questions	What is social sustainability in the context of hotels? How is it important and how it can be achieved?	identify the social best practices adopted in the hotel.	All interviewees	(Cole & Aitken, 2019)
	To what extend do you work with other SC partners to achieve social sustainability? Is there a certain criterion that you can describe?	To assess the possibility for social sustainable practices integration along the SC.	Purchasing manager, Marketing manager	
	How social sustainability can be extended in the hotel SC? What are the challenges in measuring the results?			
	How involved are the suppliers and the downstream partners in the social measures of their SC?			

	What have been the frustration and gaps in the pursuit of social sustainability in your SC?	To identify the main barriers for social sustainability adoption in the hotel SC.		
	What are the benefits and gains to the hotel and its SC partners involved in social sustainability?	To identify the main enablers for social sustainability adoption in the hotel SC.		
	How the social sustainability improvement of your SC partners is important to the hotel?	To assess the possibility for social sustainable practices integration along the SC.		
	how the internal stakeholders i.e. employees and managers are getting involved in social sustainability?		Human Resources Manager	
	How external stakeholders i.e. government, NGOs and society are getting involved in social sustainability?		All Interviewees	
	Is sustainability reporting in the hotel is only used as a public relations tool?	To identify the main barriers and the enablers for social sustainability adoption in hospitality SCs.	Marketing Manager	
Wrap-up	From your perspective, is there anything relevant to the research that we should have asked about?	To insure completeness and clarity of the information provided related to the topic under analysis.	All Interviewees	Bals & Tate, 2018)
	As additional questions arise, can we follow-up with you?			

APPENDIX C – SOCIAL SUSTAINABILITY PRACTICES, ENABLERS, AND BARRIERS OF SUSTAINABILITY ADOPTION, DESCRIPTIVE STATISTICS AND CCA COEFFICIENTS

Literature	Category	Code	Practice designation	Mean	Std. Deviation	CCA coefficient
1,2, 3,4,9,11,13,16,18,19,29,31	Fair labour measures	A1	My salary is fair	2.53	1.21	0.4186
		A2	My housing is good	3.17	1.17	0.3645
		A3	I am safe at work	2.36	1.37	0.5638
		A4	I am learning new skills	3.39	1.28	0.4328
		A5	I know who my employee representative is	3.33	1.42	0.4285
		A6	Men and women are treated equally at work	3.16	1.47	0.4268
		A7	I have time to talk to my co-workers	3.45	1.24	0.2218
		A8	If I have a good idea about a better way to complete my work tasks, I can talk to my manager about it.	3.72	1.39	0.3925
		A9	I have access to good food	2.86	1.47	0.3731
		A10	The employer helps families get the things they need example: school for kids.	2.14	1.25	0.3627
		A11	I can get a promotion.	2.89	1.34	0.4313
		A12	I received good training for my job.	2.88	1.45	0.5723
		A13	My job is helping me achieve the things I want in my life	2.73	1.37	0.4695
3,16,18,29,32	Equal opportunity	B1	The compensation system is understandable to employees.	1.90	1.20	0.4866
		B2	The compensation system is fair.	1.89	1.23	0.4164
		B3	The employees are paid the same for the same work.	1.97	1.28	0.3075
		B4	Organization ensures equal personal development opportunity for employees.	2.53	1.37	0.6766
		B5	Organization ensures equal opportunities for all candidates during the selection process.	2.65	1.44	0.5979
		B6	Organization ensures equal opportunity for males and females to further their careers	3.01	1.48	0.6334
2,3,4,7,10,11,12,16,18,29, 30,31,32	Employee's development	C1	Organization ensures possibilities for employees to develop general and professional competences.	2.70	1.44	0.7233
		C2	Employee competence development is oriented to the future requirements	2.73	1.40	0.7349
		C3	Organization applies different forms for employee development.	2.61	1.42	0.7074
		C4	Organization constantly encourages the employees to develop their competences.	2.64	1.43	0.6401
		C5	Organization ensures possibilities for employees to participate in trainings and internships	2.86	1.44	0.6300
2, 3,4,8,9,15,16,17,18,28, 30	Health and safety	D1	Organization provides the necessary working equipment for the employees	3.03	1.44	0.6659
		D2	The workplaces fulfil safety requirements.	3.27	1.43	0.6255

		D3	Organization encourages the employees to give up bad habits.	2.93	1.48	0.6613
		D4	Organization provides good conditions for rest for its employees	2.73	1.36	0.6415
		D5	Organization provides wellness opportunities for its employees	3.33	1.48	0.3868
		D6	Organization provides good working conditions for its employees	2.83	1.33	0.7039
		D7	The organization is complying with international or national certification for occupational health and safety	3.27	1.44	0.5842
		D8	The organization is ensuring safety, health, and hygiene for employees	3.38	1.41	0.6702
		D9	The organization is ensuring women's safety at workplace	3.54	1.36	0.6593
		D10	The organization is maintaining hygiene and availability of potable water	3.40	1.48	0.5732
1,3,4,9,11,13,16,18,19,30	Employee's participation and cooperation	E1	Employees share their personal problems with line managers	3.01	1.42	0.5506
		E2	Employees share the work-related problems with line managers	3.39	1.32	0.5382
		E3	Employees provide suggestions concerning the improvement of processes in the organization	3.30	1.39	0.5965
		E4	Organization encourages employees to share work-related experience	3.11	1.38	0.7013
		E5	Organization encourages team-working.	3.26	1.41	0.6719
		E6	Organization rewards the employees for cooperation activities	2.74	1.48	0.7535
1,2,3,6,7,10,11,12,13,14,16,17,18,19,29,32,33,34,35	Society development	F1	The organization ensure buying from women owned minority enterprises	2.66	1.32	0.6859
		F2	The organization ensure buying from local suppliers	3.53	1.20	0.2875
		F3	The organization is extending help to communities in building schools, colleges, and hospitals	2.05	1.31	0.6404
		F4	The organization is providing training and education for local youth for gaining employment	2.45	1.43	0.6692
		F5	Organization accepts students for practice	2.95	1.47	0.3124
		F6	The organization is providing funds for local supplier development	2.02	1.28	0.6211
		F7	The organization is supporting entrepreneurial activities for local unemployed youth	2.15	1.33	0.7689
		F8	The organization is funding the construction of health centres or hospitals and conducting health camps	2.03	1.34	0.7149
		F9	The organization is funding the construction of community centres for social well-being of people	1.84	1.19	0.6639
		F10	The organization donates to religious organizations	2.02	1.26	0.5574
		F11	The organization engage in volunteer activities at local charities	2.10	1.32	0.5183
		F12	The organization donate to NGO' and for societal development	1.95	1.26	0.5526
		F13	The organization encourage suppliers in philanthropic activities.	2.03	1.25	0.5753

		F14	The organization is extending help in sustainable farming	1.98	1.32	0.6022
		F15	The organization is constructing potable drinking water facilities for communities	1.83	1.19	0.5936
		F16	The organization is providing employment for eligible local youth.	2.74	1.41	0.5004
3,16,18	Ethics and corruption	G1	The organization established an ethical compliance team, department, or division in our facilities.	2.52	1.49	0.7706
		G2	The organization audits for strict compliance of ethical code of conduct.	2.80	1.51	0.7748
		G3	The organization has established a set of transparent, comprehensive, and stringent ethical codes of conduct	2.72	1.52	0.7757
2, 3,5,16,18,29	Human rights	H1	The organization has a human rights policy for our facilities.	2.76	1.45	0.7889
		H2	The organization audits supplier's locations and ensures non employment of child and bonded labour.	2.39	1.51	0.7656
		H3	The organization ensure non-employment of sweatshop labour in supplier location.	2.23	1.42	0.7733
Literature	**Category**	**Code**	**Enablers and Barriers Designation**	**Mean**	**Std. Deviation**	**CCA Coefficient**
11,15,19,20, 21,22,23	Competitive advantage and market position	enabler1	My workplace management applies social sustainable practices to create a competitive advantage and enhance market position.	2.83	1.50	0.8577
2,4,6,7,21,22	National and international regulations	enabler2	My workplace management applies social sustainable practices to comply with national or international regulations.	2.77	1.44	0.8661
4,7,18,21,24, 25	Buyer Pressure	enabler3	My workplace management applies social sustainable practices due to the buyer pressure.	2.57	1.35	0.7777
2,4,6,7,11,20 ,21,23,25	NGOs and society and consumer pressure	enabler4	My workplace management applies social sustainable practices due to society and consumer pressure.	2.73	1.38	0.7174
6,15,18,21,2 2,23,24	Economic Incentive and cost savings	enabler5	My workplace management applies social sustainable practices to save costs or get subsidizations.	2.80	1.42	0.5947
6,15,18,20,2 1,22	Internal Leadership	enabler6	My workplace management applies social sustainable practices due to top management interest in social sustainability.	2.72	1.45	0.8255
11,15,18,21, 22,25	Company values and morals	enabler7	My workplace management applies social sustainable practices to comply with company values and morals.	2.72	1.41	0.8891
6,18,22,24,2 6	Sustainable certification, reporting needs, transparency, and integrity of reporting.	enabler8	My workplace management applies social sustainable practices to get sustainability certifications and for reporting needs.	2.99	1.48	0.7201

6,13,18,20,24,25	SC partners, stakeholder collaboration, information sharing, incentive alignment and fair compensation between SC partners.	enabler9	My workplace management collaborates with other SC partners to apply social sustainable practices.	2.62	1.40	0.8330
13,20,23	Innovation in sustainability.	enabler10	My workplace management encourages the application of innovative ideas in social sustainable practices	2.66	1.43	0.9280
2,6,10,16,20,21,23,24, 27	Lack of knowledge, skills, and awareness.	barrier1	my workplace management lack knowledge, skills, and awareness regarding the importance of applying sustainability practices.	2.98	1.48	-0.0021
6,10,21,27	Social-related barriers and uncooperative culture as well as conflict of SC partners' interest.	barrier2	My workplace employees and SC partners are resisting the cooperation in socially sustainable practices	2.68	1.34	0.3831
16,20,21,23	High economic cost and lack of resources.	barrier3	My workplace management see that sustainable practices are costly and resource consuming activities.	3.10	1.38	-0.1784
16,20,23	Uncertainty of outcomes.	barrier4	My workplace management see that it is difficult to calculate the benefits attributed to sustainable practices adopted.	2.99	1.37	-0.1370
16,21,23	Lack of political support, legislation and regulation enforcement.	barrier5	My workplace did not get any financial support from the government to adopt sustainable practices.	2.99	1.49	0.3174

Notes: 1- (Aimagambetov et al., 2017) 2- (Alameeri et al., 2018) 3- (Arcese et al., 2013) 4- (Babu et al., 2018) 5- (Darcy, 2010) 6- (Dodds & Kuehnel, 2010) 7- (Høgevold et al., 2015) 8- (Hussain et al., 2019) 9- (Iraldo, Testa, Lanzini, & Battaglia, 2017) 10- (Jones et al., 2016) 11- (Karavasilis et al., 2015) 12- (Khatter, McGrath, Pyke, White, & Lockstone-Binney, 2019) 13- (Năstase, Chaşovschi, Popescu, & Scutariu, 2010) 14- (Qiu Zhang et al., 2017) 15- (Richards & Font, 2019) 16- (Sajjad et al., 2018) 17- (Sörensson & von Friedrichs, 2013) 18- (Xu & Gursoy, 2015a) 19- (L. Zhang & Zhang, 2018) 20- (Aragon-Correa, Martin-Tapia, & de la Torre-Ruiz, 2015) 21- (Jia et al., 2018) 22- (Legrand et al., 2013) 23- (Novacka et al., 2019) 24- (magnus bostrom, michael gilek, eva hedenstrom, 2014) 25- (Sigala, 2014) 26- (Kim et al., 2017) 27- (Melissen, Koens, Brinkman, & Smit, 2016) 28- (C. L. Chen & Bau, 2016) 29- (Lee et al., 2021) 30- (Lu et al., 2018) 31- (Cvelbar & Dwyer, 2013) 32- (He et al., 2021) 33- (Hughes & Scheyvens, 2016) 34- (Raub & Martin-Rios, 2019) 35- (Turker & Ozdemir, 2020)

APPENDIX D – H&T SOCIAL SUSTAINABILITY PRACTICES DESIGNATION

Literature	Social Category	Code	Practice designation
1,2, 3,4,9,11,13, 16,18,19,29, 31	Fair Labour Measures	A1	I'm safe at work
		A2	I'm learning new skills
		A3	My salary is fair
		A4	My job is helping me achieve the things I want in my life
		A5	Men and women are treated equally at work
		A6	If I have a good idea about a better way to complete my work tasks, I can talk to my manager about it
		A7	I can get a promotion
		A8	I know who my employee representative is
		A9	I received good training for my job
		A10	I have access to good food
3,16,18,29,3 2	Equal Opportunity	B1	The employees are paid the same for the same work
		B2	Organization ensures equal personal development opportunity for employees
		B3	The compensation system is understandable to employees
		B4	Organization ensures equal opportunities for all candidates during the selection process
		B5	Organization ensures equal opportunity for males and females to further their careers
		B6	The compensation system is fair
2,3,4,7,10,1 1,12,16,18,2 9,30,31,32	Employee's Development	C1	Employee competence development is oriented to the future requirements
		C2	Organization constantly encourages the employees to develop their competences
		C3	Organization applies different forms for employee development
		C4	Organization ensures possibilities for employees to participate in trainings and internships
		C5	Organization ensures possibilities for employees to develop general and professional competences
2, 3,4,8,9,15,1 6,17,18,28, 30	Health and Safety	D1	Organization provides the necessary working equipment for the employees
		D2	Organization provides good working conditions for its employees
		D3	The workplaces fulfil safety requirements
		D4	Organization provides wellness opportunities for its employees
		D5	The organization is complying with international or national certification for occupational health and safety
		D6	Organization provides good conditions for rest for its employees
		D7	The organization is maintaining hygiene and availability of potable water
		D8	The organization is ensuring women's safety at workplace.
		D9	The organization is ensuring safety, health and hygiene for employees
		D10	Organization encourages the employees to give up bad habits
1,3,4,9,11,1 3,16,18,19,3 0	Employee's Participation and Cooperation	E1	Employees share the work-related problems with line managers
		E2	Employees share their personal problems with line managers
		E3	Organization encourages employees to share work-related experience
		E4	Organization encourages team-working
		E5	Organization rewards the employees for cooperation activities
		E6	Employees provide suggestions concerning the improvement of processes in the organization
1,2, 3,6,7,10,11,	Society Development	F1	The organization ensure buying from women owned minority enterprises
		F2	The organization is extending help to communities in building schools, colleges and hospitals

12,13,14,16, 17,18,19, 29,32,33,34, 35		F3	The organization is providing training and education for local youth for gaining employment
		F4	The organization ensure buying from local suppliers
		F5	The organization is providing employment for eligible local youth
		F6	The organization is providing funds for local supplier development
		F7	Organization accepts students for practice
		F8	The organization is supporting entrepreneurial activities for local unemployed youth
		F9	The organization donate to NGOs for societal development
		F10	The organization encourage suppliers in philanthropic activities
3,16,18	Ethics and Corruption	G1	The organization audits for strict compliance of ethical code of conduct
		G2	The organization has established a set of transparent, comprehensive, and stringent ethical codes of conduct
		G3	The organization established an ethical compliance team, department, or division in our facilities
2, 3,5,16,18,29	Human Rights	H1	The organization audits supplier's location and ensures non employment of child and bonded labour.
		H2	The organization has a human rights policy for our facilities
		H3	The organization ensure non-employment of sweatshop labour in supplier location

Notes: 1- (Aimagambetov et al., 2017) 2- (Alameeri et al., 2018) 3- (Arcese et al., 2013) 4- (Babu et al., 2018) 5- (Darcy, 2010) 6- (Dodds & Kuehnel, 2010) 7- (Høgevold et al., 2015) 8- (Hussain et al., 2019) 9- (Iraldo et al., 2017) 10- (Jones et al., 2016) 11- (Karavasilis et al., 2015) 12- (Khatter et al., 2019) 13- (Năstase et al., 2010) 14- (Qiu Zhang et al., 2017) 15- (Richards & Font, 2019) 16- (Sajjad et al., 2018) 17- (Sörensson & von Friedrichs, 2013) 18- (Xu & Gursoy, 2015a) 19- (L. Zhang & Zhang, 2018) 20- (Aragon-Correa et al., 2015) 21- (Jia et al., 2018) 22- (Legrand et al., 2013) 23- (Novacka et al., 2019) 24- (magnus bostrom, michael gilek, eva hedenstrom, 2014) 25- (Sigala, 2014) 26- (Kim et al., 2017) 27- (Melissen et al., 2016) 28- (C. L. Chen & Bau, 2016) 29- (Lee et al., 2021) 30- (Lu et al., 2018) 31- (Cvelbar & Dwyer, 2013) 32- (He et al., 2021) 33- (Hughes & Scheyvens, 2016) 34- (Raub & Martin-Rios, 2019) 35- (Turker & Ozdemir, 2020)

APPENDIX E – IVPFS AND MATCHING LINGUISTIC TERMS FOR PERFORMANCES AND WEIGHTS OF THE CRITERIA.

Performance Status	IVPFS
1 - strongly agree	[0.80,1.00],[0.00,0.20]
2 - agree	[0.60,0.80],[0.20,0.40]
3 - I am not sure	[0.40,0.60],[0.40,0.60]
4 - disagree	[0.20,0.40],[0.60,0.80]
5 - strongly disagree	[0.00,0.20],[0.80,1.00]

Social Category	Importance Weights	IVPFS
Fair Labour Measures	1 - Utmost Importance	[0.90,1.00],[0.00,0.10]
	2 - Very High Importance	[0.80,0.90],[0.10,0.20]
	3 - High Importance	[0.70,0.80],[0.20,0.30]
	4 - Above Average Importance	[0.60,0.70],[0.30,0.40]
	5 - Average Importance	[0.50,0.60],[0.40,0.50]
	6 - Below Average Importance	[0.40,0.50],[0.50,0.60]
	7 - Low Importance	[0.30,0.40],[0.60,0.70]
	8 - Very Low Importance	[0.20,0.30],[0.70,0.80]
	9 - Certainly Low Importance	[0.10,0.20],[0.80,0.90]
	10 - Not Important	[0.00,0.10],[0.90,1.00]
Equal Opportunity	1 - Utmost Importance	[0.85,1.00],[0.00,0.15]
	2 - High Importance	[0.65,0.85],[0.10,0.20]
	3 - Fairly High Importance	[0.40,0.65],[0.20,0.50]
	4 - Fairly Low Importance	[0.25,0.40],[0.50,0.65]
	5 - Weak Importance	[0.15,0.25],[0.65,0.75]
	6 - Not Important	[0.00,0.15],[0.85,1.00]
Employee Development	1 - Utmost Importance	[0.80,1.00],[0.00,0.20]
	2 - High Importance	[0.60,0.80],[0.20,0.40]
	3 - Average Importance	[0.40,0.60],[0.40,0.60]
	4 - Low Importance	[0.20,0.40],[0.60,0.80]
	5 – Not Important	[0.00,0.20],[0.80,1.00]
Health and Safety	1 - Utmost Importance	[0.90,1.00],[0.00,0.10]
	2 - Very High Importance	[0.80,0.90],[0.10,0.20]
	3 - High Importance	[0.70,0.80],[0.20,0.30]
	4 - Above Average Importance	[0.60,0.70],[0.30,0.40]
	5 - Average Importance	[0.50,0.60],[0.40,0.50]
	6 - Below Average Importance	[0.40,0.50],[0.50,0.60]
	7 - Low Importance	[0.30,0.40],[0.60,0.70]
	8 - Very Low Importance	[0.20,0.30],[0.70,0.80]
	9 - Certainly Low Importance	[0.10,0.20],[0.80,0.90]
	10 - Not Important	[0.00,0.10],[0.90,1.00]
Employee's Participation and Cooperation	1 - Utmost Importance	[0.85,1.00],[0.00,0.15]

	2 - High Importance	[0.65,0.85],[0.10,0.20]
	3 - Fairly High Importance	[0.40,0.65],[0.20,0.50]
	4 - Fairly Low Importance	[0.25,0.40],[0.50,0.65]
	5 - Weak Importance	[0.15,0.25],[0.65,0.75]
	6 - Not Important	[0.00,0.15],[0.85,1.00]
Society Development	1 - Utmost Importance	[0.90,1.00],[0.00,0.10]
	2 - Very High Importance	[0.80,0.90],[0.10,0.20]
	3 - High Importance	[0.70,0.80],[0.20,0.30]
	4 - Above Average Importance	[0.60,0.70],[0.30,0.40]
	5 - Average Importance	[0.50,0.60],[0.40,0.50]
	6 - Below Average Importance	[0.40,0.50],[0.50,0.60]
	7 - Low Importance	[0.30,0.40],[0.60,0.70]
	8 - Very Low Importance	[0.20,0.30],[0.70,0.80]
	9 - Certainly Low Importance	[0.10,0.20],[0.80,0.90]
	10 - Not Important	[0.00,0.10],[0.90,1.00]
Ethics and Corruption	1 - Utmost Importance	[0.70,1.00],[0.00,0.30]
	2 - Important	[0.40,0.70],[0.30,0.60]
	3 - Not Important	[0.00,0.40],[0.60,1.00]
Human Rights	1 - Utmost Importance	[0.70,1.00],[0.00,0.30]
	2 - Important	[0.40,0.70],[0.30,0.60]
	3 - Not Important	[0.00,0.40],[0.60,1.00]

APPENDIX F – THE STATUS OF PERFORMANCE (DECISION MATRIX) AND WEIGHTS OF CRITERIA IN IVPF FORM

Appendix F-1: The status of performance (decision matrix) and weights of criteria in IVPF form for the overall supply chain

Social Category/ CI Average	Code	Weights of criteria	Performance	Weighted Performance	CI
Fair Labour Measures 0.33	A1	([0.75,0.85],[0.27,0.35])	([0.59,0.78],[0.39,0.55])	([0.46,0.68],[0.43,0.59])	0.51
	A2	([0.74,0.84],[0.21,0.3])	([0.41,0.58],[0.54,0.72])	([0.32,0.5],[0.56,0.74])	0.40
	A3	([0.77,0.87],[0.28,0.35])	([0.55,0.73],[0.39,0.56])	([0.45,0.66],[0.44,0.6])	0.49
	A4	([0.32,0.4],[0.73,0.82])	([0.53,0.71],[0.44,0.61])	([0.18,0.29],[0.78,0.89])	0.24
	A5	([0.5,0.59],[0.49,0.59])	([0.47,0.64],[0.52,0.7])	([0.26,0.41],[0.65,0.79])	0.33
	A6	([0.46,0.56],[0.5,0.6])	([0.38,0.53],[0.61,0.79])	([0.18,0.31],[0.72,0.86])	0.27
	A7	([0.34,0.43],[0.64,0.74])	([0.5,0.68],[0.46,0.64])	([0.17,0.29],[0.73,0.85])	0.28
	A8	([0.53,0.62],[0.5,0.59])	([0.44,0.61],[0.55,0.72])	([0.24,0.38],[0.68,0.82])	0.32
	A9	([0.38,0.46],[0.66,0.75])	([0.51,0.69],[0.48,0.65])	([0.2,0.32],[0.74,0.86])	0.27
	A10	([0.24,0.32],[0.72,0.82])	([0.52,0.69],[0.47,0.64])	([0.12,0.21],[0.8,0.91])	0.22
Equal Opportunity 0.39	B1	([0.51,0.67],[0.48,0.61])	([0.66,0.84],[0.32,0.47])	([0.34,0.58],[0.54,0.7])	0.43
	B2	([0.55,0.71],[0.38,0.52])	([0.56,0.75],[0.41,0.57])	([0.32,0.54],[0.52,0.7])	0.42
	B3	([0.6,0.75],[0.37,0.49])	([0.67,0.85],[0.3,0.45])	([0.42,0.67],[0.44,0.6])	0.49
	B4	([0.38,0.52],[0.58,0.71])	([0.55,0.73],[0.44,0.6])	([0.22,0.39],[0.67,0.82])	0.32
	B5	([0.38,0.5],[0.63,0.75])	([0.5,0.67],[0.5,0.67])	([0.19,0.34],[0.73,0.86])	0.27
	B6	([0.43,0.61],[0.45,0.6])	([0.67,0.86],[0.3,0.45])	([0.3,0.54],[0.51,0.68])	0.43
Employee Development 0.36	C1	([0.54,0.72],[0.4,0.57])	([0.53,0.71],[0.44,0.61])	([0.3,0.53],[0.55,0.75])	0.40
	C2	([0.35,0.52],[0.58,0.77])	([0.55,0.73],[0.44,0.6])	([0.2,0.39],[0.67,0.85])	0.30
	C3	([0.42,0.6],[0.5,0.68])	([0.55,0.73],[0.43,0.59])	([0.24,0.45],[0.61,0.8])	0.35
	C4	([0.41,0.57],[0.61,0.79])	([0.52,0.69],[0.47,0.64])	([0.22,0.41],[0.7,0.87])	0.28
	C5	([0.67,0.86],[0.26,0.41])	([0.54,0.72],[0.45,0.61])	([0.38,0.64],[0.47,0.67])	0.46
Health and Safety 0.32	D1	([0.8,0.9],[0.19,0.27])	([0.49,0.66],[0.5,0.67])	([0.4,0.6],[0.52,0.69])	0.45
	D2	([0.46,0.55],[0.49,0.59])	([0.51,0.69],[0.45,0.63])	([0.24,0.39],[0.61,0.76])	0.36
	D3	([0.78,0.88],[0.18,0.26])	([0.45,0.62],[0.54,0.71])	([0.35,0.54],[0.56,0.74])	0.42
	D4	([0.58,0.68],[0.39,0.48])	([0.45,0.61],[0.55,0.73])	([0.22,0.37],[0.66,0.82])	0.35
	D5	([0.41,0.5],[0.58,0.67])	([0.45,0.62],[0.54,0.71])	([0.18,0.31],[0.73,0.86])	0.28
	D6	([0.56,0.65],[0.4,0.5])	([0.53,0.71],[0.44,0.61])	([0.31,0.48],[0.54,0.7])	0.40
	D7	([0.33,0.39],[0.77,0.87])	([0.44,0.6],[0.56,0.74])	([0.15,0.24],[0.85,0.94])	0.17
	D8	([0.13,0.22],[0.8,0.9])	([0.4,0.56],[0.58,0.76])	([0.05,0.12],[0.87,0.96])	0.14
	D9	([0.28,0.36],[0.68,0.78])	([0.43,0.59],[0.55,0.73])	([0.12,0.22],[0.79,0.9])	0.22
	D10	([0.61,0.71],[0.42,0.5])	([0.51,0.68],[0.49,0.66])	([0.33,0.5],[0.59,0.74])	0.39
Employee's Participation and Cooperation 0.33	E1	([0.63,0.78],[0.4,0.5])	([0.42,0.59],[0.55,0.73])	([0.28,0.48],[0.63,0.79])	0.35
	E2	([0.58,0.72],[0.48,0.59])	([0.49,0.66],[0.49,0.67])	([0.29,0.49],[0.63,0.78])	0.36
	E3	([0.45,0.63],[0.39,0.56])	([0.47,0.64],[0.5,0.68])	([0.22,0.42],[0.59,0.78])	0.36

	E4	([0.28,0.4],[0.64,0.76])	([0.45,0.62],[0.53,0.71])	([0.13,0.26],[0.75,0.88])	0.25
	E5	([0.33,0.45],[0.62,0.76])	([0.54,0.72],[0.46,0.62])	([0.18,0.34],[0.7,0.85])	0.29
	E6	([0.52,0.71],[0.31,0.49])	([0.44,0.61],[0.54,0.72])	([0.24,0.45],[0.58,0.77])	0.37
Society Development 0.44	F1	([0.79,0.88],[0.23,0.3])	([0.75,0.84],[0.21,0.3])	([0.59,0.76],[0.3,0.4])	0.61
	F2	([0.61,0.71],[0.41,0.5])	([0.81,0.9],[0.17,0.24])	([0.5,0.64],[0.44,0.54])	0.53
	F3	([0.71,0.81],[0.24,0.33])	([0.77,0.87],[0.2,0.28])	([0.54,0.7],[0.31,0.42])	0.59
	F4	([0.75,0.85],[0.23,0.31])	([0.66,0.76],[0.28,0.37])	([0.49,0.63],[0.37,0.48])	0.55
	F5	([0.4,0.48],[0.6,0.7])	([0.74,0.84],[0.22,0.31])	([0.29,0.4],[0.63,0.73])	0.38
	F6	([0.41,0.51],[0.54,0.64])	([0.81,0.91],[0.16,0.24])	([0.34,0.46],[0.56,0.66])	0.43
	F7	([0.53,0.62],[0.44,0.53])	([0.72,0.82],[0.24,0.33])	([0.37,0.5],[0.49,0.6])	0.47
	F8	([0.35,0.45],[0.61,0.71])	([0.8,0.89],[0.18,0.25])	([0.28,0.4],[0.62,0.73])	0.38
	F9	([0.21,0.27],[0.81,0.91])	([0.81,0.91],[0.16,0.23])	([0.17,0.25],[0.82,0.92])	0.20
	F10	([0.13,0.22],[0.79,0.89])	([0.81,0.91],[0.16,0.24])	([0.1,0.2],[0.8,0.9])	0.22
Ethics and Corruption 0.38	G1	([0.47,0.75],[0.39,0.7])	([0.53,0.71],[0.47,0.64])	([0.25,0.53],[0.58,0.84])	0.37
	G2	([0.43,0.7],[0.44,0.77])	([0.55,0.72],[0.46,0.62])	([0.24,0.5],[0.6,0.87])	0.34
	G3	([0.49,0.78],[0.31,0.6])	([0.58,0.76],[0.43,0.59])	([0.28,0.59],[0.51,0.76])	0.42
Human Rights 0.39	H1	([0.52,0.8],[0.32,0.6])	([0.6,0.78],[0.41,0.57])	([0.31,0.63],[0.5,0.75])	0.44
	H2	([0.57,0.86],[0.29,0.56])	([0.53,0.71],[0.46,0.62])	([0.3,0.61],[0.53,0.76])	0.43
	H3	([0.24,0.53],[0.51,0.88])	([0.62,0.81],[0.38,0.53])	([0.15,0.43],[0.61,0.91])	0.31

CI Average = closeness index average, calculated for the social category based on its practices. CI= Closeness Index

Appendix F-2: The status of performance (decision matrix) and weights of criteria in IVPF form for hotels

Social Category	Code	Weights of Criteria	Performance	Weighted Performance	CI
Fair Labour Measures	A1	([0.75,0.85],[0.27,0.35])	([0.61,0.8],[0.35,0.51])	([0.46,0.68],[0.43,0.59])	0.53
	A2	([0.74,0.84],[0.21,0.3])	([0.43,0.6],[0.53,0.71])	([0.32,0.5],[0.56,0.74])	0.41
	A3	([0.77,0.87],[0.28,0.35])	([0.58,0.77],[0.36,0.52])	([0.45,0.66],[0.44,0.6])	0.52
	A4	([0.32,0.4],[0.73,0.82])	([0.55,0.73],[0.42,0.59])	([0.18,0.29],[0.78,0.89])	0.24
	A5	([0.5,0.59],[0.49,0.59])	([0.52,0.69],[0.48,0.65])	([0.26,0.41],[0.65,0.79])	0.35
	A6	([0.46,0.56],[0.5,0.6])	([0.4,0.56],[0.59,0.77])	([0.18,0.31],[0.72,0.86])	0.28
	A7	([0.34,0.43],[0.64,0.74])	([0.5,0.68],[0.45,0.63])	([0.17,0.29],[0.73,0.85])	0.28
	A8	([0.53,0.62],[0.5,0.59])	([0.45,0.62],[0.53,0.71])	([0.24,0.38],[0.68,0.82])	0.32
	A9	([0.38,0.46],[0.66,0.75])	([0.52,0.7],[0.47,0.64])	([0.2,0.32],[0.74,0.86])	0.28
	A10	([0.24,0.32],[0.72,0.82])	([0.49,0.66],[0.5,0.67])	([0.12,0.21],[0.8,0.91])	0.22
Equal Opportunity	B1	([0.51,0.67],[0.48,0.61])	([0.67,0.86],[0.29,0.44])	([0.34,0.58],[0.54,0.7])	0.44
	B2	([0.55,0.71],[0.38,0.52])	([0.58,0.77],[0.38,0.54])	([0.32,0.54],[0.52,0.7])	0.44
	B3	([0.6,0.75],[0.37,0.49])	([0.7,0.89],[0.26,0.4])	([0.42,0.67],[0.44,0.6])	0.51
	B4	([0.38,0.52],[0.58,0.71])	([0.57,0.75],[0.42,0.58])	([0.22,0.39],[0.67,0.82])	0.33
	B5	([0.38,0.5],[0.63,0.75])	([0.51,0.69],[0.47,0.64])	([0.19,0.34],[0.73,0.86])	0.28
	B6	([0.43,0.61],[0.45,0.6])	([0.7,0.89],[0.26,0.4])	([0.3,0.54],[0.51,0.68])	0.44
Employee Development	C1	([0.54,0.72],[0.4,0.57])	([0.55,0.73],[0.42,0.58])	([0.3,0.53],[0.55,0.75])	0.41
	C2	([0.35,0.52],[0.58,0.77])	([0.57,0.75],[0.4,0.57])	([0.2,0.39],[0.67,0.85])	0.31
	C3	([0.42,0.6],[0.5,0.68])	([0.56,0.75],[0.41,0.57])	([0.24,0.45],[0.61,0.8])	0.36
	C4	([0.41,0.57],[0.61,0.79])	([0.54,0.72],[0.43,0.6])	([0.22,0.41],[0.7,0.87])	0.29
	C5	([0.67,0.86],[0.26,0.41])	([0.57,0.75],[0.41,0.57])	([0.38,0.64],[0.47,0.67])	0.48
Health and Safety	D1	([0.8,0.9],[0.19,0.27])	([0.5,0.67],[0.49,0.66])	([0.4,0.6],[0.52,0.69])	0.46
	D2	([0.46,0.55],[0.49,0.59])	([0.53,0.71],[0.42,0.59])	([0.24,0.39],[0.61,0.76])	0.37
	D3	([0.78,0.88],[0.18,0.26])	([0.45,0.62],[0.54,0.72])	([0.35,0.54],[0.56,0.74])	0.42
	D4	([0.58,0.68],[0.39,0.48])	([0.39,0.55],[0.58,0.77])	([0.22,0.37],[0.66,0.82])	0.33
	D5	([0.41,0.5],[0.58,0.67])	([0.45,0.62],[0.54,0.72])	([0.18,0.31],[0.73,0.86])	0.28
	D6	([0.56,0.65],[0.4,0.5])	([0.56,0.74],[0.4,0.57])	([0.31,0.48],[0.54,0.7])	0.42
	D7	([0.33,0.39],[0.77,0.87])	([0.45,0.62],[0.54,0.72])	([0.15,0.24],[0.85,0.94])	0.17
	D8	([0.13,0.22],[0.8,0.9])	([0.4,0.56],[0.58,0.76])	([0.05,0.12],[0.87,0.96])	0.14
	D9	([0.28,0.36],[0.68,0.78])	([0.43,0.6],[0.54,0.72])	([0.12,0.22],[0.79,0.9])	0.22
	D10	([0.61,0.71],[0.42,0.5])	([0.53,0.71],[0.46,0.63])	([0.33,0.5],[0.59,0.74])	0.40
Employee's Participation and Cooperation	E1	([0.63,0.78],[0.4,0.5])	([0.45,0.62],[0.53,0.7])	([0.28,0.48],[0.63,0.79])	0.37
	E2	([0.58,0.72],[0.48,0.59])	([0.51,0.68],[0.47,0.64])	([0.29,0.49],[0.63,0.78])	0.37
	E3	([0.45,0.63],[0.39,0.56])	([0.49,0.67],[0.48,0.65])	([0.22,0.42],[0.59,0.78])	0.37
	E4	([0.28,0.4],[0.64,0.76])	([0.47,0.65],[0.51,0.68])	([0.13,0.26],[0.75,0.88])	0.26

	E5	([0.33,0.45],[0.62,0.76])	([0.57,0.75],[0.41,0.58])	([0.18,0.34],[0.7,0.85])	0.30
	E6	([0.52,0.71],[0.31,0.49])	([0.47,0.64],[0.51,0.69])	([0.24,0.45],[0.58,0.77])	0.38
Society Development	F1	([0.79,0.88],[0.23,0.3])	([0.76,0.86],[0.2,0.28])	([0.59,0.76],[0.3,0.4])	0.62
	F2	([0.61,0.71],[0.41,0.5])	([0.81,0.91],[0.16,0.24])	([0.5,0.64],[0.44,0.54])	0.53
	F3	([0.71,0.81],[0.24,0.33])	([0.77,0.87],[0.2,0.28])	([0.54,0.7],[0.31,0.42])	0.59
	F4	([0.75,0.85],[0.23,0.31])	([0.65,0.75],[0.29,0.38])	([0.49,0.63],[0.37,0.48])	0.55
	F5	([0.4,0.48],[0.6,0.7])	([0.73,0.83],[0.23,0.32])	([0.29,0.4],[0.63,0.73])	0.38
	F6	([0.41,0.51],[0.54,0.64])	([0.81,0.91],[0.16,0.23])	([0.34,0.46],[0.56,0.66])	0.43
	F7	([0.53,0.62],[0.44,0.53])	([0.7,0.8],[0.26,0.34])	([0.37,0.5],[0.49,0.6])	0.46
	F8	([0.35,0.45],[0.61,0.71])	([0.8,0.9],[0.17,0.24])	([0.28,0.4],[0.62,0.73])	0.38
	F9	([0.21,0.27],[0.81,0.91])	([0.82,0.92],[0.16,0.23])	([0.17,0.25],[0.82,0.92])	0.20
	F10	([0.13,0.22],[0.79,0.89])	([0.81,0.91],[0.15,0.23])	([0.1,0.2],[0.8,0.9])	0.22
Ethics and Corruption	G1	([0.47,0.75],[0.39,0.7])	([0.53,0.7],[0.47,0.64])	([0.25,0.52],[0.59,0.84])	0.36
	G2	([0.43,0.7],[0.44,0.77])	([0.55,0.72],[0.46,0.62])	([0.24,0.5],[0.6,0.87])	0.34
	G3	([0.49,0.78],[0.31,0.6])	([0.57,0.75],[0.43,0.59])	([0.28,0.59],[0.51,0.76])	0.42
Human Rights	H1	([0.52,0.8],[0.32,0.6])	([0.61,0.8],[0.39,0.54])	([0.32,0.64],[0.49,0.74])	0.45
	H2	([0.57,0.86],[0.29,0.56])	([0.56,0.74],[0.43,0.6])	([0.32,0.63],[0.51,0.75])	0.44
	H3	([0.24,0.53],[0.51,0.88])	([0.64,0.82],[0.35,0.5])	([0.15,0.44],[0.59,0.91])	0.32

CI= Closeness Index

Appendix F-3: The status of performance (decision matrix) and weights of criteria in IVPF form for suppliers

Social Category	Code	Weights Of Criteria	Performance	Weighted Performance	CI
Fair Labour Measures	A1	([0.75,0.85],[0.27,0.35])	([0.21,0.4],[0.28,0.5])	([0.16,0.34],[0.39,0.58])	0.45
	A2	([0.74,0.84],[0.21,0.3])	([0.34,0.51],[0.59,0.77])	([0.25,0.42],[0.61,0.8])	0.36
	A3	([0.77,0.87],[0.28,0.35])	([0.42,0.59],[0.54,0.72])	([0.32,0.51],[0.59,0.76])	0.40
	A4	([0.32,0.4],[0.73,0.82])	([0.42,0.59],[0.54,0.72])	([0.13,0.23],[0.82,0.92])	0.20
	A5	([0.5,0.59],[0.49,0.59])	([0.42,0.59],[0.54,0.72])	([0.21,0.35],[0.68,0.83])	0.32
	A6	([0.46,0.56],[0.5,0.6])	([0.35,0.5],[0.65,0.83])	([0.16,0.28],[0.75,0.9])	0.25
	A7	([0.34,0.43],[0.64,0.74])	([0.48,0.66],[0.48,0.66])	([0.16,0.28],[0.74,0.86])	0.27
	A8	([0.53,0.62],[0.5,0.59])	([0.44,0.61],[0.56,0.73])	([0.23,0.37],[0.7,0.84])	0.31
	A9	([0.38,0.46],[0.66,0.75])	([0.44,0.61],[0.51,0.69])	([0.17,0.28],[0.76,0.88])	0.26
	A10	([0.24,0.32],[0.72,0.82])	([0.49,0.66],[0.5,0.67])	([0.12,0.21],[0.8,0.91])	0.22
Equal Opportunity	B1	([0.51,0.67],[0.48,0.61])	([0.51,0.69],[0.47,0.64])	([0.26,0.46],[0.63,0.79])	0.36
	B2	([0.55,0.71],[0.38,0.52])	([0.46,0.63],[0.53,0.71])	([0.25,0.44],[0.62,0.8])	0.36
	B3	([0.6,0.75],[0.37,0.49])	([0.55,0.73],[0.43,0.6])	([0.33,0.55],[0.55,0.71])	0.43
	B4	([0.38,0.52],[0.58,0.71])	([0.45,0.62],[0.52,0.7])	([0.17,0.32],[0.72,0.86])	0.28
	B5	([0.38,0.5],[0.63,0.75])	([0.44,0.61],[0.53,0.71])	([0.17,0.3],[0.76,0.89])	0.26
	B6	([0.43,0.61],[0.45,0.6])	([0.53,0.71],[0.43,0.6])	([0.23,0.43],[0.59,0.77])	0.37
Employee Development	C1	([0.54,0.72],[0.4,0.57])	([0.4,0.56],[0.61,0.79])	([0.22,0.4],[0.69,0.86])	0.30
	C2	([0.35,0.52],[0.58,0.77])	([0.5,0.66],[0.55,0.71])	([0.18,0.34],[0.73,0.89])	0.26
	C3	([0.42,0.6],[0.5,0.68])	([0.48,0.65],[0.53,0.7])	([0.2,0.39],[0.68,0.85])	0.31
	C4	([0.41,0.57],[0.61,0.79])	([0.44,0.59],[0.61,0.79])	([0.18,0.33],[0.78,0.93])	0.22
	C5	([0.67,0.86],[0.26,0.41])	([0.45,0.6],[0.58,0.76])	([0.3,0.52],[0.62,0.8])	0.37
Health and Safety	D1	([0.8,0.9],[0.19,0.27])	([0.48,0.64],[0.54,0.72])	([0.38,0.58],[0.57,0.74])	0.43
	D2	([0.46,0.55],[0.49,0.59])	([0.47,0.64],[0.51,0.69])	([0.21,0.35],[0.66,0.81])	0.33
	D3	([0.78,0.88],[0.18,0.26])	([0.44,0.61],[0.53,0.71])	([0.34,0.53],[0.56,0.74])	0.42
	D4	([0.58,0.68],[0.39,0.48])	([0.45,0.62],[0.55,0.72])	([0.26,0.42],[0.63,0.79])	0.36
	D5	([0.41,0.5],[0.58,0.67])	([0.46,0.63],[0.51,0.68])	([0.19,0.31],[0.71,0.84])	0.30
	D6	([0.56,0.65],[0.4,0.5])	([0.38,0.54],[0.59,0.78])	([0.21,0.35],[0.68,0.84])	0.32
	D7	([0.33,0.39],[0.77,0.87])	([0.37,0.54],[0.59,0.77])	([0.12,0.21],[0.86,0.95])	0.16
	D8	([0.13,0.22],[0.8,0.9])	([0.37,0.53],[0.58,0.77])	([0.05,0.12],[0.87,0.96])	0.14
	D9	([0.28,0.36],[0.68,0.78])	([0.42,0.59],[0.56,0.74])	([0.12,0.21],[0.8,0.91])	0.22
	D10	([0.61,0.71],[0.42,0.5])	([0.32,0.48],[0.63,0.82])	([0.19,0.34],[0.71,0.87])	0.29
Employee's Participation and Cooperation	E1	([0.63,0.78],[0.4,0.5])	([0.36,0.53],[0.58,0.77])	([0.23,0.41],[0.66,0.83])	0.33
	E2	([0.58,0.72],[0.48,0.59])	([0.42,0.58],[0.58,0.76])	([0.25,0.42],[0.7,0.85])	0.31
	E3	([0.45,0.63],[0.39,0.56])	([0.42,0.59],[0.56,0.74])	([0.19,0.37],[0.65,0.83])	0.33
	E4	([0.28,0.4],[0.64,0.76])	([0.32,0.48],[0.63,0.82])	([0.09,0.19],[0.8,0.93])	0.20
	E5	([0.33,0.45],[0.62,0.76])	([0.39,0.55],[0.62,0.8])	([0.13,0.25],[0.79,0.92])	0.22

	E6	([0.52,0.71],[0.31,0.49])	([0.38,0.55],[0.57,0.76])	([0.2,0.39],[0.63,0.82])	0.34
Society Development	F1	([0.79,0.88],[0.23,0.3])	([0.66,0.76],[0.28,0.38])	([0.52,0.67],[0.36,0.47])	0.56
	F2	([0.61,0.71],[0.41,0.5])	([0.72,0.81],[0.22,0.31])	([0.44,0.57],[0.46,0.57])	0.50
	F3	([0.71,0.81],[0.24,0.33])	([0.69,0.79],[0.26,0.35])	([0.49,0.64],[0.35,0.47])	0.55
	F4	([0.75,0.85],[0.23,0.31])	([0.67,0.77],[0.28,0.37])	([0.5,0.65],[0.36,0.47])	0.56
	F5	([0.4,0.48],[0.6,0.7])	([0.72,0.82],[0.24,0.32])	([0.29,0.4],[0.63,0.73])	0.38
	F6	([0.41,0.51],[0.54,0.64])	([0.73,0.83],[0.23,0.31])	([0.3,0.42],[0.57,0.68])	0.41
	F7	([0.53,0.62],[0.44,0.53])	([0.76,0.86],[0.2,0.28])	([0.4,0.54],[0.47,0.58])	0.48
	F8	([0.35,0.45],[0.61,0.71])	([0.68,0.78],[0.28,0.37])	([0.24,0.35],[0.65,0.75])	0.36
	F9	([0.21,0.27],[0.81,0.91])	([0.77,0.87],[0.19,0.27])	([0.16,0.23],[0.82,0.92])	0.20
	F10	([0.13,0.22],[0.79,0.89])	([0.76,0.86],[0.21,0.3])	([0.1,0.19],[0.8,0.9])	0.22
Ethics and Corruption	G1	([0.47,0.75],[0.39,0.7])	([0.45,0.61],[0.54,0.72])	([0.21,0.46],[0.63,0.87])	0.33
	G2	([0.43,0.7],[0.44,0.77])	([0.45,0.62],[0.52,0.7])	([0.19,0.43],[0.64,0.89])	0.31
	G3	([0.49,0.78],[0.31,0.6])	([0.53,0.71],[0.49,0.65])	([0.26,0.55],[0.56,0.8])	0.39
Human Rights	H1	([0.52,0.8],[0.32,0.6])	([0.51,0.67],[0.53,0.7])	([0.26,0.54],[0.6,0.82])	0.37
	H2	([0.57,0.86],[0.29,0.56])	([0.44,0.62],[0.52,0.69])	([0.25,0.53],[0.57,0.8])	0.38
	H3	([0.24,0.53],[0.51,0.88])	([0.52,0.69],[0.5,0.67])	([0.13,0.37],[0.67,0.93])	0.27

CI= Closeness Index

Appendix F-4: The status of performance (decision matrix) and weights of criteria in IVPF form for Distributors

Social Category	Code	Weights Of Criteria	Performance	Weighted Performance	CI
Fair Labour Measures	A1	([0.75,0.85],[0.27,0.35])	([0.31,0.54],[0.2,0.37])	([0.24,0.46],[0.33,0.49])	0.49
	A2	([0.74,0.84],[0.21,0.3])	([0.36,0.53],[0.57,0.75])	([0.27,0.45],[0.59,0.78])	0.38
	A3	([0.77,0.87],[0.28,0.35])	([0.48,0.66],[0.44,0.62])	([0.37,0.58],[0.5,0.67])	0.46
	A4	([0.32,0.4],[0.73,0.82])	([0.51,0.68],[0.48,0.65])	([0.16,0.27],[0.8,0.9])	0.22
	A5	([0.5,0.59],[0.49,0.59])	([0.27,0.44],[0.64,0.83])	([0.14,0.26],[0.74,0.89])	0.25
	A6	([0.46,0.56],[0.5,0.6])	([0.3,0.45],[0.66,0.85])	([0.14,0.25],[0.76,0.91])	0.24
	A7	([0.34,0.43],[0.64,0.74])	([0.49,0.66],[0.49,0.66])	([0.17,0.28],[0.74,0.86])	0.27
	A8	([0.53,0.62],[0.5,0.59])	([0.14,0.29],[0.34,0.59])	([0.08,0.18],[0.58,0.76])	0.36
	A9	([0.38,0.46],[0.66,0.75])	([0.5,0.68],[0.49,0.66])	([0.19,0.31],[0.75,0.87])	0.27
	A10	([0.24,0.32],[0.72,0.82])	([0.61,0.79],[0.37,0.53])	([0.14,0.26],[0.77,0.88])	0.25
Equal Opportunity	B1	([0.51,0.67],[0.48,0.61])	([0.66,0.84],[0.32,0.47])	([0.33,0.56],[0.55,0.72])	0.43
	B2	([0.55,0.71],[0.38,0.52])	([0.53,0.7],[0.45,0.62])	([0.29,0.5],[0.57,0.74])	0.40
	B3	([0.6,0.75],[0.37,0.49])	([0.58,0.76],[0.37,0.53])	([0.34,0.57],[0.51,0.67])	0.45
	B4	([0.38,0.52],[0.58,0.71])	([0.51,0.69],[0.48,0.65])	([0.19,0.35],[0.7,0.84])	0.30
	B5	([0.38,0.5],[0.63,0.75])	([0.45,0.61],[0.58,0.75])	([0.17,0.3],[0.77,0.9])	0.24
	B6	([0.43,0.61],[0.45,0.6])	([0.6,0.78],[0.37,0.53])	([0.26,0.47],[0.56,0.73])	0.40
Employee Development	C1	([0.54,0.72],[0.4,0.57])	([0.52,0.7],[0.47,0.64])	([0.28,0.5],[0.59,0.78])	0.39
	C2	([0.35,0.52],[0.58,0.77])	([0.49,0.66],[0.49,0.66])	([0.17,0.34],[0.71,0.88])	0.28
	C3	([0.42,0.6],[0.5,0.68])	([0.55,0.72],[0.46,0.62])	([0.23,0.43],[0.64,0.82])	0.34
	C4	([0.41,0.57],[0.61,0.79])	([0.46,0.63],[0.53,0.7])	([0.19,0.36],[0.74,0.9])	0.26
	C5	([0.67,0.86],[0.26,0.41])	([0.49,0.66],[0.51,0.68])	([0.33,0.57],[0.55,0.74])	0.42
Health and Safety	D1	([0.8,0.9],[0.19,0.27])	([0.46,0.63],[0.52,0.7])	([0.37,0.57],[0.55,0.72])	0.43
	D2	([0.46,0.55],[0.49,0.59])	([0.45,0.62],[0.53,0.71])	([0.21,0.34],[0.68,0.82])	0.32
	D3	([0.78,0.88],[0.18,0.26])	([0.45,0.62],[0.53,0.71])	([0.35,0.54],[0.55,0.73])	0.42
	D4	([0.58,0.68],[0.39,0.48])	([0.6,0.78],[0.44,0.59])	([0.35,0.53],[0.56,0.7])	0.43
	D5	([0.41,0.5],[0.58,0.67])	([0.45,0.62],[0.54,0.72])	([0.18,0.31],[0.73,0.86])	0.28
	D6	([0.56,0.65],[0.4,0.5])	([0.47,0.64],[0.51,0.68])	([0.26,0.42],[0.62,0.77])	0.37
	D7	([0.33,0.39],[0.77,0.87])	([0.39,0.54],[0.62,0.8])	([0.13,0.21],[0.87,0.95])	0.15
	D8	([0.13,0.22],[0.8,0.9])	([0.41,0.58],[0.57,0.75])	([0.06,0.13],[0.87,0.96])	0.14
	D9	([0.28,0.36],[0.68,0.78])	([0.42,0.58],[0.58,0.76])	([0.11,0.21],[0.8,0.91])	0.21
	D10	([0.61,0.71],[0.42,0.5])	([0.48,0.65],[0.51,0.69])	([0.3,0.46],[0.63,0.78])	0.37
Employee's Participation and Cooperation	E1	([0.63,0.78],[0.4,0.5])	([0.32,0.49],[0.6,0.79])	([0.2,0.38],[0.68,0.85])	0.31
	E2	([0.58,0.72],[0.48,0.59])	([0.44,0.61],[0.53,0.71])	([0.26,0.44],[0.67,0.82])	0.33
	E3	([0.45,0.63],[0.39,0.56])	([0.39,0.55],[0.57,0.75])	([0.17,0.35],[0.65,0.84])	0.32
	E4	([0.28,0.4],[0.64,0.76])	([0.39,0.56],[0.58,0.76])	([0.11,0.22],[0.78,0.91])	0.23
	E5	([0.33,0.45],[0.62,0.76])	([0.5,0.66],[0.52,0.69])	([0.16,0.3],[0.74,0.88])	0.26
	E6	([0.52,0.71],[0.31,0.49])	([0.34,0.5],[0.61,0.8])	([0.18,0.36],[0.66,0.85])	0.31

Society Development	F1	([0.79,0.88],[0.23,0.3])	([0.73,0.83],[0.22,0.31])	([0.58,0.74],[0.31,0.42])	0.61
	F2	([0.61,0.71],[0.41,0.5])	([0.82,0.91],[0.16,0.24])	([0.5,0.65],[0.44,0.54])	0.53
	F3	([0.71,0.81],[0.24,0.33])	([0.79,0.89],[0.19,0.27])	([0.56,0.72],[0.31,0.42])	0.60
	F4	([0.75,0.85],[0.23,0.31])	([0.68,0.78],[0.25,0.34])	([0.51,0.66],[0.34,0.45])	0.56
	F5	([0.4,0.48],[0.6,0.7])	([0.78,0.88],[0.19,0.27])	([0.31,0.43],[0.62,0.72])	0.39
	F6	([0.41,0.51],[0.54,0.64])	([0.82,0.92],[0.16,0.23])	([0.34,0.47],[0.56,0.66])	0.43
	F7	([0.53,0.62],[0.44,0.53])	([0.77,0.87],[0.21,0.29])	([0.41,0.54],[0.47,0.58])	0.48
	F8	([0.35,0.45],[0.61,0.71])	([0.82,0.91],[0.16,0.24])	([0.29,0.41],[0.62,0.73])	0.38
	F9	([0.21,0.27],[0.81,0.91])	([0.82,0.92],[0.15,0.23])	([0.17,0.25],[0.82,0.92])	0.20
	F10	([0.13,0.22],[0.79,0.89])	([0.81,0.91],[0.17,0.25])	([0.1,0.2],[0.8,0.9])	0.22
Ethics and Corruption	G1	([0.47,0.75],[0.39,0.7])	([0.57,0.75],[0.44,0.6])	([0.27,0.56],[0.56,0.82])	0.39
	G2	([0.43,0.7],[0.44,0.77])	([0.58,0.76],[0.43,0.59])	([0.25,0.53],[0.59,0.86])	0.36
	G3	([0.49,0.78],[0.31,0.6])	([0.61,0.79],[0.39,0.55])	([0.3,0.61],[0.49,0.74])	0.44
Human Rights	H1	([0.52,0.8],[0.32,0.6])	([0.59,0.77],[0.44,0.6])	([0.31,0.61],[0.53,0.77])	0.42
	H2	([0.57,0.86],[0.29,0.56])	([0.47,0.64],[0.51,0.69])	([0.27,0.55],[0.57,0.8])	0.39
	H3	([0.24,0.53],[0.51,0.88])	([0.6,0.78],[0.41,0.56])	([0.15,0.41],[0.62,0.92])	0.30

CI= Closeness Index

Appendix F-5: Closeness index and rank comparison between supply chain partners

		Supply Chain		Hotels		Suppliers		Distributors	
Social Category	**Code**	**CI**	**Rank**	**CI**	**Rank**	**CI**	**Rank**	**CI**	**Rank**
Fair Labour Measures	A1	0.51	5	0.53	5	0.45	6	0.49	5
	A2	0.40	20	0.41	21	0.36	19	0.38	24
	A3	0.49	6	0.52	6	0.40	11	0.46	7
	A4	0.24	47	0.24	47	0.20	49	0.22	48
	A5	0.33	34	0.35	32	0.32	28	0.25	43
	A6	0.27	45	0.28	41	0.25	43	0.24	46
	A7	0.28	42	0.28	43	0.27	38	0.27	39
	A8	0.32	36	0.32	36	0.31	30	0.36	28
	A9	0.27	43	0.28	45	0.26	41	0.27	40
	A10	0.22	48	0.22	50	0.22	46	0.25	44
Equal Opportunity	B1	0.43	13	0.44	14	0.36	18	0.43	11
	B2	0.42	16	0.44	15	0.36	20	0.40	17
	B3	0.49	7	0.51	7	0.43	7	0.45	8
	B4	0.32	35	0.33	34	0.28	37	0.30	35
	B5	0.27	44	0.28	42	0.26	42	0.24	45
	B6	0.43	12	0.44	12	0.37	15	0.40	18
Employee Development	C1	0.40	21	0.41	20	0.30	34	0.39	21
	C2	0.30	38	0.31	38	0.26	40	0.28	37
	C3	0.35	31	0.36	31	0.31	31	0.34	29
	C4	0.28	41	0.29	40	0.22	44	0.26	42
	C5	0.46	9	0.48	8	0.37	16	0.42	16
Health and Safety	D1	0.45	10	0.46	10	0.43	8	0.43	10
	D2	0.36	29	0.37	28	0.33	24	0.32	32
	D3	0.42	18	0.42	19	0.42	9	0.42	15
	D4	0.35	32	0.33	35	0.36	22	0.43	13
	D5	0.28	40	0.28	44	0.30	35	0.28	38
	D6	0.40	19	0.42	18	0.32	29	0.37	26
	D7	0.17	52	0.17	52	0.16	52	0.15	52
	D8	0.14	53	0.14	53	0.14	53	0.14	53
	D9	0.22	49	0.22	48	0.22	45	0.21	50
	D10	0.39	22	0.40	22	0.29	36	0.37	25
Employee's Participation and Cooperation	E1	0.35	30	0.37	29	0.33	25	0.31	34
	E2	0.36	28	0.37	27	0.31	33	0.33	30
	E3	0.36	27	0.37	26	0.33	26	0.32	31
	E4	0.25	46	0.26	46	0.20	50	0.23	47
	E5	0.29	39	0.30	39	0.22	47	0.26	41
	E6	0.37	26	0.38	23	0.34	23	0.31	33
Society Development	F1	0.61	1	0.62	1	0.56	1	0.61	1
	F2	0.53	4	0.53	4	0.50	4	0.53	4

	F3	0.59	2	0.59	2	0.55	3	0.60	2
	F4	0.55	3	0.55	3	0.56	2	0.56	3
	F5	0.38	23	0.38	25	0.38	14	0.39	20
	F6	0.43	14	0.43	16	0.41	10	0.43	12
	F7	0.47	8	0.46	9	0.48	5	0.48	6
	F8	0.38	24	0.38	24	0.36	21	0.38	23
	F9	0.20	51	0.20	51	0.20	51	0.20	51
	F10	0.22	50	0.22	49	0.22	48	0.22	49
Ethics and Corruption	G1	0.37	25	0.36	30	0.33	27	0.39	22
	G2	0.34	33	0.34	33	0.31	32	0.36	27
	G3	0.42	17	0.42	17	0.39	12	0.44	9
Human Rights	H1	0.44	11	0.45	11	0.37	17	0.42	14
	H2	0.43	15	0.44	13	0.38	13	0.39	19
	H3	0.31	37	0.32	37	0.27	39	0.30	36

CI= Closeness Ind