APPLICATIONS OF DISCRETE CHOICE EXPERIMENTS TO DISCERN SOCIAL DRIVERS AFFECTING JOB DESIGN IN APPAREL SUPPLY CHAIN

KARIYAWASAM PATUWATHA WITHANAGE MADUSHAN MADHAVA JAYALATH

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Degree of Master of Science

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DECLARATION OF ORIGINALITY

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STATEMENT OF THE SUPERVISOR

The above candidate has carried out research for the Degree of Master of Science under my supervision.

Name of the supervisor: Dr. H.N. Perera

Dr. Amila Thibbotuwawa

Signature of the Supervisor: Date: 28/10/2022

Dr. H.N. Perera,
Senior Lecturer,
Dept. of Transport & Logistics Management,
Faculty of Engineering,
University of Moratuwa.

Signature of the Supervisor: Date: 28/10/2022

Dr. Amila Thibbotuwawa,
Senior Lecturer,
Dept. of Transport & Logistics Management,
Faculty of Engineering,
University of Moratuwa.

ABSTRACT

Due to increasing customer awareness and government regulations, organisations are forced to integrate social sustainability practises into their working environment. Social sustainability aspect in the apparel supply chain has become a major study area due to its impact on the global economic performance as well as its highly intensive labour work. Hence, researchers pay more attention to developing models to assess the impact of social sustainability practices on the focal company. In this study, we developed a Discrete Choice Experiment to assess social sustainability practices. The experiment was conducted among the blue collar and white collar employees in apparel supply chain to identify their preference for implementing the identified social sustainability practices. Different statistical tests related to discrete choice experiments, such as Effect Summary, Chi-square Likelihood Ratio Test, Parameter Estimates, Utility Profiler, and Effect Marginals were used to discover the employee preference towards social sustainability practices. In the next step, willingness to pay for the identified social sustainability practices and their sub-features were estimated. This explores the employee's maximum trade off for each social sustainability practice if the organisation decides to implement that practice within the organisation. Hence, organisations can identify which practice should be implemented to increase the overall utilisation of their employees, which improves the social and economic performance of the firm. The study identified providing maternity leave and proper sanitary facilities as significantly influencing factors for the behaviour of a blue collar employee among the considered social sustainability practices, while these two practices have a minor consideration from the firms' focal point of view.

Keywords:

Sustainable supply chain management, social sustainability practices, discrete choice experiment, apparel supply chain, willingness to pay

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LIST OF ABBREVIATIONS

NGO	-	Non-Governmental Organisations
UN	-	United Nations
SSC	-	Sustainable Supply Chain
SCM	-	Supply Chain Management
SSCM	-	Sustainable Supply Chain Management
SSP	-	Social Sustainability Practices
MCDA	-	Multi-Criteria Decision Analysis
LCT	-	Life Cycle Thinking
LCA	-	Life Cycle Assessment
LCC	-	Life Cycle Costing
SLCA	-	Social Life Cycle Assessment
SIA	-	Social Impact Assessment
SEIA	-	Social and socio-economic impact assessment
SEM	-	Structural Equation Modelling
DCM	-	Discrete Choice Modelling
DCA	-	Discrete Choice Analysis
DCE	-	Discrete Choice Experiment
MNL	-	Multinomial Logit Model

1. INTRODUCTION

1.1. Background of the Study

Human evolution involves a series of changes. It causes humans to adapt to the environment and fulfil their needs and wants. The industrial revolution began in Europe and transformed the economies, needs, and wants of human society. These transitions were based on large-scale industry, mechanised manufacturing, and factory systems. The manufacturing industry became more important in this industrial revolution. At present, the manufacturing industry is facing several challenges due to resource depletion, economic stagnation, government regulations, and humans pursuing higher standards of life quality. With an increasing economic growth rate, the apparel sector plays a vital role in the global manufacturing industry. The main reason behind that is that apparel consumers expect constant changes and new products due to this lessening of clothing utilisation. This fact has put additional pressure on the apparel manufacturing industry to reduce costs and shorten lead times (Masson et al., 2007). Additionally, competition in the apparel manufacturing industry has increased at the global level due to international trade and an interconnected global economy (Köksal et al., 2017). To survive in this global competition, these companies must meet customer expectations and the increasing demand for sustainable products. Designing a sustainable supply chain is the key strategy to face this competition and survive in this market for the apparel industry.

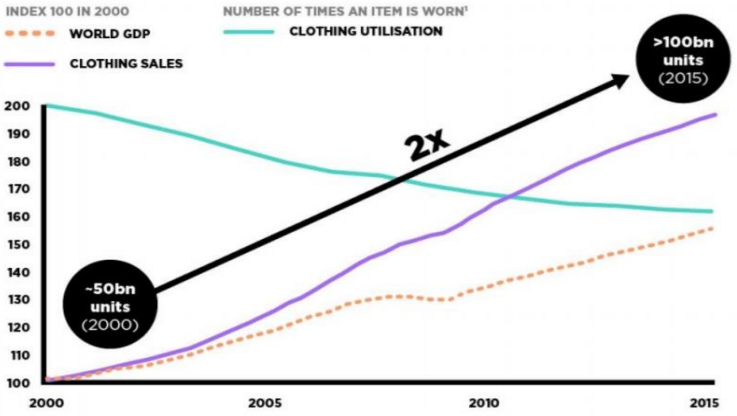


Figure 1-1: Volume sales trends (2005-2015)

Source: World Bank, World development indicators – GD (2017)

The term "sustainability" has been introduced and used with different kinds of definitions to find solutions to the challenges stated above. Initially, sustainability was described as progress that can meet present requirements without compromising future generations' ability to meet their own needs (Butlin & Browne, 1987). However this was a very macro level definition which could not specify the requirement or the resources that were needed to fulfil that need. Elkington's (1998) triple bottom line approach on sustainability included a broad perspective including issues of economic, social, and environmental performance. Considering the international supply chain view, many organizations function as networks with interdependent relationships (Vachon & Klassen, 2008). The idea of sustainable supply chain management (SSCM) came to the attention of the organization with this understanding. Hence, it has been an important study area for the researchers and for the practitioners to continuously manage a sustainable supply chain. SSCM has been defined as the "management of material, information, and capital flows while cooperating among the actors of the supply chain to achieve the sustainable development of economic, environmental, and social dimensions (Seuring & Müller, 2008). As a result, to create a sustainable supply chain, the performance on the three bottom lines, namely economic, social, and environmental, must be well balanced (Senge & Carstedt, 2001).

In particular, due to the high labour intensity of the apparel industry, social sustainability is an important aspect of the industry. The apparel sector employs more than 75 million people in globally (United Nations, 2018). Majority of these employees are low-income workers (Lopez-Acevedo & Robertson, 2013). This was a strategy used by western apparel retailers to gain the competitive advantage of low labour costs by sourcing their products from developing countries (Kunz Garner, Myrna B., 2016). These employees in the developing countries are frequently associated with poor working conditions and employee issues, especially in lower labour-cost countries (Köksal et al., 2017). To minimize the negative impact on the social pillar in terms of the employees, the apparel industries are engaging in social sustainability practices (SSP) in the aspect of working conditions and labour rights. As per the definition by Nakamba et al., (2017) social sustainability refers to the management of practices,

competences, participants and resources to address human potential and welfare both inside and outside the communities of the supply chain. In the current context, these companies are eventually forced by their consumers, employees, and governments to incorporate these socially sustainable practices to reduce the negative effects on society (Ahi & Searcy, 2015).

1.2. Motivation for the Study

Social sustainability can be associated to supply chain management products and procedures to detect socioeconomic circumstances such as welfare, wellbeing, cleanliness, wages, labour and human rights, education, and accommodation facilities of supply chain participants (V Mani et al., 2016). As a result, companies are liable for the negative effects on social and environmental aspects caused by their products, as well as the actions of stakeholders, including suppliers (Sancha et al., 2015). Recent incidents that occurred in the apparel industry, such as factory collapse happened in the Rana Plaza building in Bangladesh (Huq et al., 2016), reports of sweatshops (Crinis, 2010), use of child labour by major companies like Nike and Apple (Sancha et al., 2015) caught the attention of the government, consumers, and NGOs. Hence, it is crucial to take the necessary steps to activate SSP, focusing on the entire supply chain to reduce the negative socio-economic impact (D'Eusanio et al., 2019).

Given this context, Yawar & Seuring, (2017) suggested that, companies are in search of a framework which supports them to evaluate, understand, and assess the importance of social sustainability to their supply chains. However, most of these frameworks only consider the social dimension of the three dimensions of sustainability, while few of them combine it with the other two dimensions (D'Eusanio et al., 2019). In the literature, there is a considerable gap which addresses the combination of social and economic pillars in the apparel industry (Sudusinghe & Seuring, 2020). Therefore, this study is focusing on these two pillars of sustainability in the apparel industry.

In the apparel industry, employees can be classified into two categories: blue-collar and white-collar employees. Blue-collar professions require more hard skills than soft skills, whereas white-collar ones necessitate more soft skills (Chen et al., 2017). The objectives of the study are to identify factors that should be considered when implementing SSP in the apparel sector, compare the order of influencing factors when integrating social sustainability as per the blue-collar and white-collar employees' preferences, and investigate the direct and indirect impact of implementing SSP on the economic performance of the supply chain.

1.3. Structure of Thesis

The thesis is divided into below chapters: The second chapter will provide a detailed overview of the research domain's literature, including all key concepts such as sustainability, supply chain, and the global and local apparel industries. The research methodology development and the research questions will be elaborated upon in Chapter 2. The Chapter 3 will include a detailed comparison of potential approaches employed in previous literature in this context and the justification for the selected methodology. Furthermore, the design of the experiment and the structure of the selected methodology will be discussed in detail. Chapter 4 will lay out the detailed statistical and descriptive analysis of the observations. The major findings of the research study, managerial implications, limitations of the study and future direction will be discussed in detail under Chapter 5. As the concluding section, Chapter 6 will consist of a summary of the study.

2. LITERATURE REVIEW

2.1. Introduction to the Apparel Industry

The apparel industry is one of the best illustrations of the global supply chain (Su, 2013). The apparel industry makes a significant contribution to the world economy and international trade. Considering the labour-intensive nature of the apparel industry, they have a low fixed capital investment. Thus, they have high competitiveness and high demand for product quality (Scott, 2006). Apparel industry have become complex due to their diverse activities, globally dispersed supplier network, increasing global competition, quality and product specifications, and constantly changing consumer preferences (Kazancoglu et al., 2022; MacCarthy & Jayarathne, 2012). This industry includes several industrial segments, including sourcing fibre, fabric, apparel production, marketing, warehousing, distribution, and retail operations (Su, 2013).

Boström & Micheletti (2016) stated that due to the uncertainty of the business environment, this industry is forcing firms to improve efficiency by implementing new strategies to improve product quality at a minimum cost. They also claimed that the procedure of converting raw materials into finished garments has a significant adverse impact on the environment, including air and water pollution. Hence, the focal industry has lost its sustainable nature in the long run and has become one of the world's highest polluting industries. Adding to that, it contributes to the exploitation of human resources, especially when the production process is outsourced to developing countries with lower labour costs (Bin Shen et al., 2017).

2.1.1. Global Apparel Supply Chain

The global apparel industry provides employment opportunities for more than 72 million people worldwide. In 2022, the market value of the global market was around USD 3 trillion, equivalent to 2% of the world's Gross Domestic Product (Fashion United, 2022). In the past 50 years of the global apparel industry, the supply chains for ready-made garments have drastically shifted due to factors such as digital age technologies and spatial distribution of manufacturing operations. Furthermore, there was a decline in employment and related apparel industries in the United States from 1990 to 2011, which had a significant impact on this shift in the industry. Decline in employment in the United States has correspondingly increased employment in the apparel and textile industries in Asia and other developing regions of the world (Köksal et al., 2017). These positions were filled in China, Malaysia, Bangladesh, Sri Lanka, Indonesia, Vietnam, and the Philippines. The United States sources the majority of its apparel imports from China, Vietnam, and Bangladesh while China becoming the major apparel exporter in the world.

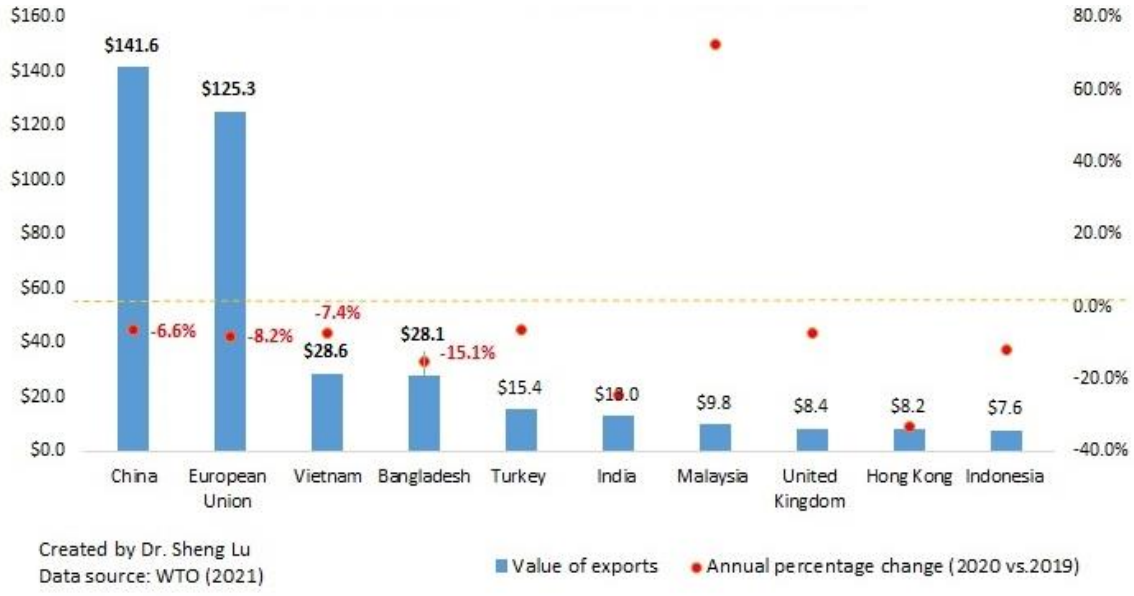


Figure 2-1: Top Ten Exporters of Clothing, 2020

Source: WTO Reports World Textiles and Apparel Trade in 2020

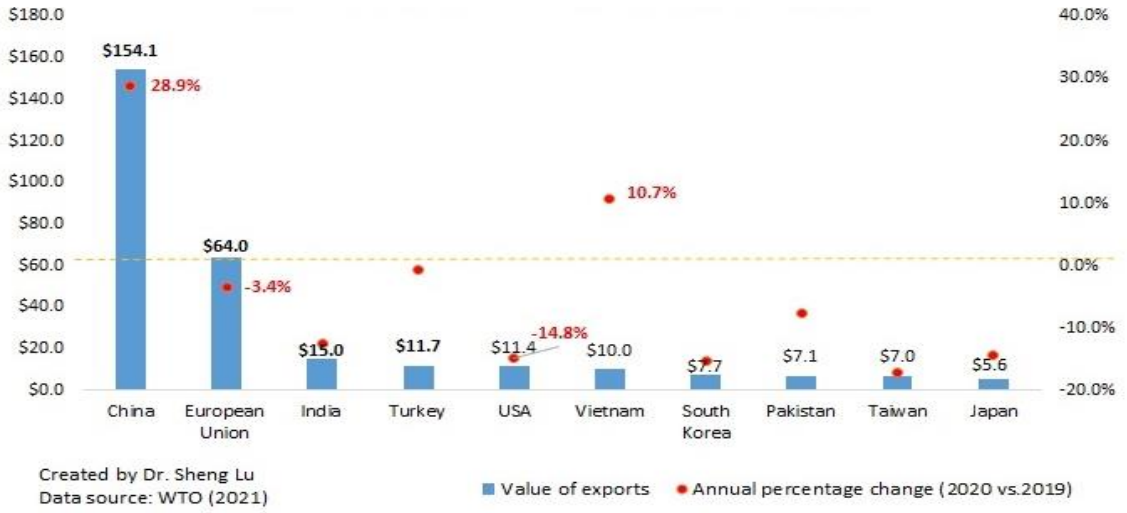


Figure 2-2: Top Ten Exporters of Textile, 2020

Source: WTO Reports World Textiles and Apparel Trade in 2020

2.2. Sustainability

The United Nations Conference on the Human Environment in Stockholm in 1972 marked the first time the idea of sustainable development gained widespread acceptance. The international community agreed that development and the environment should be handled and managed in a way that is mutually beneficial, despite the fact that the term “sustainability” was not clearly defined. This phrase gained popularity 15 years later with the publication of the Brundtland Commission's discussion of the “Our Common Future” report by the World Commission on Environment and Development (Robertson, 2018). The Brundtland Commission's report included the traditional definition of sustainable development, which is “development that satisfies present needs without compromising the capacity of future generations to fulfil their own needs.” (Butlin & Browne, 1987). The Rio Summit, which took place in Rio de Janeiro in 1992, was the initial international attempt to develop strategies and plans for moving toward a more sustainable future. Representatives from various civil organisations agreed that Sustainable Development was the solution to environmental degradation problems.

2.2.1. Triple Bottom Line of Sustainability

Several definitions for the term "sustainability" have emerged (Arowoshegbe & Emmanuel, 2016). This has led to a central concept called "the triple bottom line of sustainability". They are economic or financial considerations, community and individual well-being of humanity, and environmental protection. The concept implies the need to improve the quality of social and economic life while limiting the negative impact on the carrying capacity of the environment.

Figure 2-3: Triple bottom line of the sustainability

On the other hand, Elkington (1998) introduced the triple bottom line of sustainability as a method of measuring the sustainable performance of an organization. Traditionally, performance was only measured by considering the economic pillar (Arowoshegbe & Emmanuel, 2016). This definition went far beyond the previous definitions of "sustainable development" and "corporate social responsibility" to achieve greater prosperity in terms of finances, society, and the environment. This integrated concept compelled organizations to consider long-term benefits in terms of the triple bottom line rather than just financial objectives (Robertson, 2018).

2.2.1.1 Environmental Pillar

This pillar describes that the practices engaged in any kind of organisations should not compromise the environmental resources for future generations (Butlin & Browne, 1987). Additionally, the doings of the organisations should have a positive impact on the environment and they should be aware of the causes for the environmental issues that occurred due to their operations (Goel, 2017).

2.2.1.2 Social Pillar

Social sustainability is about fulfilling the elementary needs of humans while considering the present and future (United Nations, 2012). In the organisational context, it is about meeting employees' basic needs such as health, safety, and other benefits in the interests of the employee community. This refers to conducting business practices in a beneficial, ethical, and fair manner for the human capital and the community of the organization. The motive is to promote the concept of "giving back to the community" by creating value for the community (Arowoshegbe & Emmanuel, 2016). As an example, providing fair wages, health coverage, and safety precautions will increase the moral aspect of the employees' willingness to give back to the organization through improved performance (Arslan & Kısacık, 2017).

2.2.1.3 Economic Pillar

The economic pillar is the influence of organisational corporate practices on the overall effectiveness of the organisational economic system. (Robertson, 2018). Simply put, it is about concentrating on the economic benefit provided by the organisation to the surrounding business ecosystem in a way that benefits the organisation and promotes its ability to support future generations. It is crucial to focus on both technically and economically viable solutions for the organization to achieve economic sustainability. Concepts like collaboration, knowledge sharing and management, research and development for bringing innovation or sustainability reporting are important in the aspect of the economic pillar to meet that requirement. (Goel, 2017).

2.3. Sustainable Supply Chain

Barbosa-Póvoa (2014) defines Sustainable Supply Chain (SSC) as “a complicated network of multiple tiers that manage the product from sourcing point to the consumer point and their returns while consider the impact on the social, environmental, and economic aspects”. As a result of society's growing awareness of environmental and social problems, many companies are addressing sustainability issues through complex supply chain networks. Furthermore, governing bodies such as the United Nations (UN) require corporate bodies to ensure that their operations and attitudes are in line with global society's expectations to achieve sustainable development.

The UN Global Corporate Sustainability report identified that organisations are shifting their culture towards achieving sustainable development rather than financial development (United Nations, 2013). However, these commitments employed by organisations to ensure the sustainable development of the supply chain are failing to implement tangible measures to drive towards continuous improvement. As a result of the increasing complexity and sheer size of the global supply chain, understanding the importance of the SSC is critical in the corporate sector to improve the sustainable performance of organizations (Barbosa-Póvoa et al., 2018).

2.4. Sustainable Supply Chain Management

Supply Chain Management (SCM) has been defined as "the management of the three flows of physical, information, and financial in networks of inter and intra-organizational relationships with the aim of adding value and achieving customer satisfaction" (Mentzer et al., 2001; Perera & Perera, 2022; Stock & Boyer, 2009). SCM is a collection of supply chain actors, including suppliers, manufacturers, transporters, retailers, and customers all working together to achieve customer satisfaction at the minimum cost (Simchi-Levi et al., 2008). Most of the existing research only focused on the economic and financial performance of a business. However, businesses pay more attention to evaluate the environmental impact alongside the economic impact with the increasing complexity of the supply chains (Barbosa-Póvoa et al., 2018).

Reverse logistics operations have been integrated into the existing network to protect the environment by recycling, repairing, remanufacturing, or disposing of end-of-life products. (Barbosa-Póvoa et al., 2018). This initiative catalysed organisations to the emergence of the closed-loop supply chains (Guide & Van Wassenhove, 2002). These are logistics systems that are designed and planned to maximise value creation throughout the product's life cycle. This trend has recently expanded to include not only economic and environmental aspects, but also those presenting the supply chain and their social concerns. Later, organisations identified the impact of the supply chain on society and the environment. Hence, they rethought and redefined the concepts of SCM using the perspective of sustainability, integrating the environmental and social objectives (Beske & Seuring, 2014; Seuring & Müller, 2008). The result is the

appearance of SSCM, currently recognized as a challenging area (Koplin et al., 2007; Seuring & Müller, 2008).

2.5. Sustainable Apparel Supply Chains

The rising trend of outsourcing to developing countries, the supply chains for clothing are becoming a global network. (Bruce et al., 2004; Diabat et al., 2014). Therefore, organisations focus more on the sustainability aspect. It is important to realise how to use sustainability to integrate internationally disintegrated supply chains (Freise & Seuring, 2015). In the modern world, consumers are more aware of sustainability and there is proof that consumers are ready to pay extra for products that are more sustainable (Shen et al., 2013). Hence, most apparel organisations have taken several tactics to improve the level of sustainability in their supply chains to meet the increasing expectations of consumers and stakeholders (Bin Shen, 2014). Several issues were examined in the previous academic literature and suggested innovative strategies, product returns, supplier management, low carbon footprint in supply chains, corporate social responsibility, sustainable designs, operations, and competition to develop a sustainable apparel supply chain (Allwood et al., 2008; Choi & Chiu, 2012; Perry & Towers, 2013; Seuring & Müller, 2008; Wang & Shen, 2017).

2.5.1. Sustainability Issues in Apparel Supply Chain

In the aspect of triple bottom line, there are a number of sustainable issues that are reported in the supply chains for apparel. According to earlier research, the world's most polluting industries are those that produce clothing and textiles. (Boström & Micheletti, 2016). These challenges include several interrelated and complicated issues. Hence, this industry contributes to global discussion on issues such as climate change, water pollution, social justice and civil rights. Aside from technological advancements, practitioners and researchers have discovered that changing behaviour and practise frequently necessarily requires the more difficult process of changing values associated with production and consumption while remaining sensitive to a variety of ethnic, geographic, and political contexts (Boström & Micheletti, 2016).

There is a considerable amount of environmental impact from the textile industry. The high demand for chemicals for the purpose of growing cotton and dying textiles,

pollution of water resources due to not having a proper waste management system are some major issues as stated by Niinimäki & Hassi, (2011). Additionally, they claim that the globalised fast fashion industry, which promotes mass production, consumption, and frequent clothing replacement, has a high carbon footprint throughout the supply chain and the effect is eventually growing.

The increasing demand for fast fashion has left workers in the garment and textile supply chains in a challenging position, significantly impacting the social pillar. In most developing countries, even women and minorities are forced to accept temporary employment contracts with low wages, lengthy working days, and in dangerous and unhealthy operating environments (Boström & Micheletti, 2016; Yawar & Seuring, 2017). Moreover, due to lack of knowledge, shorter lead times, cost and competitive pressures are leading textile suppliers to disorient from being sustainable which cause for social issues (Oelze, 2017). These are some of the major sustainable issues in the apparel industry. There is a debate on the studies that have been carried out in the literature whether economic benefits can be gained by addressing these social and environmental issues (Gopalakrishnan et al., 2012).

2.6. Problem Description

2.6.1. Assessing Sustainability in Supply Chains

Since the UN, non-governmental organisations and national governments across the world are forcing the sustainable development, many frameworks and models for assessing sustainability have been developed. These frameworks address the three pillars of sustainability. A few frameworks have included a fourth dimension as "institutional" as introduced by the UN (United Nations, 2007). However, most of these frameworks primarily concerned with the environmental dimension. Additionally, most of these frameworks are on one level within an organisation. The most well-known international initiative focusing on reporting an organization's overall sustainability is the Global Reporting Initiative (Labuschagne et al., 2005). D'Eusanio et al. (2019) state that the social aspect of sustainability has been neglected in the discussion of sustainability issues compared to the other two dimensions. Further, there is a significant void in the literature that tackles the combination of social

and economic pillars and compares the two pillars in a single framework (D'Eusanio et al., 2019; Staniškienė & Stankevičiūtė, 2018). Hence, this study will focus on filling this gap in the sustainability literature by addressing how these two pillars are interrelated with each other and the importance of considering these two pillars in a single context.

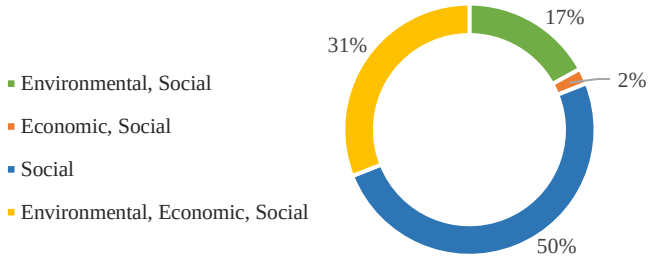


Figure 2-4: Sustainable dimensions focused on literature

Source:(D'Eusanio et al., 2019)

The employee perspective can be a major resource to improve social sustainability assessment since it provides a more realistic view than using the existing publicly available sources. Furthermore, measuring social sustainability from the perspective of employees can add value to the organisation by capturing increasing expectations from the employees and increasing transparency of processes and activities thanks to technology-based systems (Staniškienė & Stankevičiūtė, 2018). However, most of the methods developed in the literature have not taken the employee perspective when developing the framework to assess social sustainability. Frameworks developed by the Global Reporting Initiative, Labuschagne et al., (2005), Almahmoud & Doloi, (2018), Brent & Labuschagne, (2006), Hutchins & Sutherland, (2008) and Landorf, (2011), IChem, (2002), Staniškienė & Stankevičiūtė, (2018) are a few examples of the frameworks that were developed to assess the social sustainability in different industries.

Table 2-1: Available Frameworks for Sustainability Measurements

Framework	Focused Sustainability Aspect				Focused Industry
	Social	Economic	Environment	Institutional	
Global Reporting Initiative (GRI), 2002	✓	✓	✓	-	Appropriate for multiple industries and cultural contexts
Framework of the UN Commission on Sustainable Development , 2007	✓	✓	✓	✓	For the evaluation of governmental progress towards sustainable development goals
Sustainability Metrics of the Institution of Chemical Engineers, 2002	✓	✓	✓	-	Sustainability of operations within the process industry
Brent & Labuschagne, 2006; Labuschagne et al., 2005	✓	✓	✓	-	To evaluate the organization's and its operational activities' long-term viability, particularly for project evaluation.
Almahmoud & Doloi, 2018	✓	-	-	-	Suitable for assessing the social sustainability of construction industry projects
Hutchins & Sutherland, 2008	✓	-	-	-	Appropriate for assessing the social

					sustainability of the supply chain
Landorf, 2011	✓	-	-	-	Appropriate for assessing sustainability in cultural urban environments
Staniškienė & Stankevičiūtė, 2018	✓	-	-	-	Suitable to assess social sustainability CSR-committed organisation

2.6.2. Defining Research Objectives and Questions

The literature review of this study highlights that the social and economic sustainability aspects are rarely investigated together. Yawar & Seuring (2017) suggested that there is a research gap on how employee practises affect the supply chain, and how social sustainability practises can be promoted through technological and capacity building. Moreover, little attention has been paid to study the impact of social sustainability practises on the economic prosperity of the apparel industry (Sudusinghe & Seuring, 2020). Hence, we defined the following research questions in order to seek solutions to the above defined research gaps identified through the literature.

RQ 1. *What are the factors that should be considered when promoting social sustainability practices by the focal company?*

RQ 2. *What is the preference of blue-collar and white-collar employees for implementing socially sustainable practices?*

RQ 3. *How can social sustainability practices be promoted through technical and financial investments to improve the social and economic performance of the firm?*

3. METHODOLOGY

3.1. Methodologies used in the Sustainable Supply Chain Management Literature

In the previous literature in the field of SSCM, several studies were conducted to determine how to incorporate sustainable practises into the supply chain and business decision-making. As per the literature review by Seuring & Müller (2008) on SSCM, mainly five methodologies have been identified that have been used in this domain. They are theoretical and conceptual papers, case studies, surveys, modelling papers and literature reviews. According to the literature review by D'Eusanio et al., (2019) on social sustainability and supply chain management, main approaches used for assessing social sustainability are life cycle thinking, statistical approaches, multi-criteria decision making methods, social indicators, statistical approaches, social impact assessment, socio economic impact assessment, corporate social responsibility, interviews, surveys and questionnaires.

From these approaches, corporate social responsibility, interviews, surveys and questionnaires were used as approaches for the data collection process. In the data collection process interviews, questionnaires, and surveys were used as direct methods. These methods are considered a fundamental component of social sciences as they collect the choices of respondents (May, 2011). In the interview process, information is collected on the argument researchers are focusing on by interviewing the respondents. Then, the surveys allow the collection of the primary data from the respondents through formal questions. In this process, the structure of the questions should be developed aligned to the research objectives and the target population. Further, questionnaires are used as a method of data collection by using exact questions when there is a lack of personal contacts to be used in the data collection process (Gillham, 2008; Lietz, 2010). As an indirect method, corporate social responsibility, initiated by Global Reporting Initiative was used to reprocess useful information to evaluate social performance (GRI, 2002). This method was used by firms to report their economic, environmental and social practices. Specifically, to analyse the social

dimension with indicators such as labour practices, human rights, decent work and product responsibility (Zhu & Hu, 2017).

In the data analysis process, multi- criteria decision analysis, social and socio-economic impact assessment, life cycle thinking, statistical approaches and social indicators were employed in the domain of SSCM. The Multi-Criteria Decision Analysis (MCDA) employs a variety of methods and techniques. These can be combined with various methodologies to assess contradictory criteria in decision-making. As a result, researchers and decision makers use this approach to evaluate alternatives based on multiple criteria (Ilgin et al., 2015). Cruz & Liu (2011) used multi-criteria decision-making to identify the relationships between different tiers and stakeholders in a supply chain, such as suppliers, manufacturers, and retailers. Seuring (2013) reviewed a few strategies for SSCM. Among these methods, MCDM is one that has been recognised and has been utilised as a model for maximising trade-offs or determining the best course of action.

The concept "Life Cycle Thinking" (LCT) refers to an exploratory idea that takes into account all aspects of a production system, such as products, services, or processes, from the extraction of raw materials to their disposal. LCT includes Life Cycle Assessment (LCA). The International Organization for Standardization (ISO) developed this method to assess the possible future effects of products and services (Agyekum et al., 2017). Life Cycle Costing (LCC) is another LCT method that addresses the economic dimension of sustainability by analysing costs that occur during the life cycle of the product or service under consideration (Parent et al., 2012). The other method is the Social Life Cycle Assessment (SLCA). This method is used to assess the positive and negative social and socio-economic characteristics of a certain product or process from a LCT point of view (Wu et al., 2014). Smith and David (2014) evaluated the social performance of small and medium-sized European food and beverage businesses. They conducted this study by taking into account the social issues of local community workers and supply chain partners. Furthermore, Zimmer et al. (2017) used SLCA in a case-study approach to assess the social risk of the German automotive industry's global supply chain.

Statistical approaches are primarily used to determine the relationship among the examined aspects of the sustainable perspective. There are two approaches mainly as descriptive and inferential statistics. Zailani et al. (2012) investigated on how the SSCM practices can affect the performance of the supply chain in terms of social and economic. A regression and a factorial analysis were used in this study. Through the methodology they proven that SSCM practices have a positive effect on the sustainable supply chain performance in terms of economic and social aspect. Freise & Seuring (2015) carried out research in the apparel industry to explore social risks and ways to manage those. A conceptual model was developed and tested through an empirical study. Results of the study has showed that there is a high statistical significance on the conceptual model. As the conclusion of the study, it was statistically proven that the primary motivator for risk management in environmental and social issues is the stakeholder pressure and incentives.

Social indicators were another method used to assess the performance of the sustainable performance of the supply chains. In this method indicators were used to find appropriate evidence (Kühnen & Hahn, 2018). This approach has been thought to be an efficient analysis tool, allowing for the examination of various social issues associated with various supply chain parties. Hutchins & Sutherland (2008) proposed that indicators such as labour equity, parameters related to health and safety can be used in assessing the performance of SSCM. Husgafvel et al. (2014) measured the sustainability of steel production in the process industry using social indicators. Further, Ahi & Searcy, (2015); Brent & Labuschagne, (2006); Staniškienė & Stankevičiūtė, (2018) have incorporated sustainability indicators in their studies to assess the performance of the SSCM.

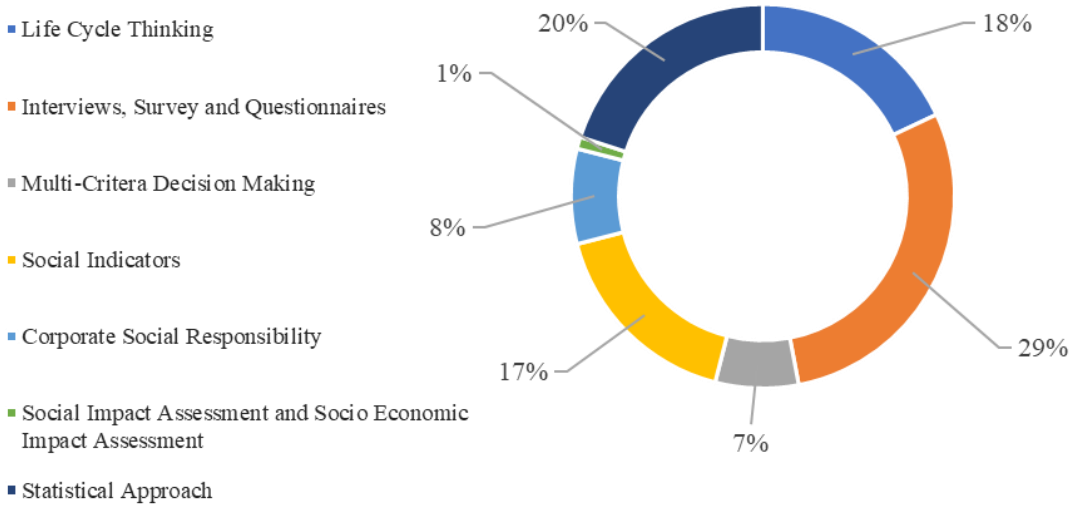


Figure 3-1: Approaches focused on the social sustainability literature

Source: D'Eusanio et al., (2019)

The social and socioeconomic impact assessment (SEIA) is a method for recognising and managing social and economic issues associated with project practices. This approach takes into account the needs, interests, and perceptions of the selected population as well as the project's relevant entities (Arora & Tiwari, 2007). Esteves & Barclay (2011) used SEIA in the steel extraction industry to improve the social benefits by the projects. A similar approach to SEIA is Social Impact Assessment (SIA). This approach enables support for the local community, and relevant parties, as well as understanding how adjustments should take place to bring improved solutions that can respond to changes caused by the project (Esteves et al., 2012). Among the methods used for data interpretation, SIA, SEIA and life cycle thinking were used heavily in the studies of this domain as per the literature review by D'Eusanio et al. (2019). However, there is a vacuum in the studies that used SIA and SEIA in the literature, as identified in the literature study. According to the literature, the reason for this void is that these approaches are only applicable to assessing and managing the long-term performance of projects, rather than an entire industry or supply chain.

Table 3-1: Methodologies used in the Sustainable Supply Chain Management

Reference	Methodology	Description
Multi- Criteria Decision Analysis	Ilgin et al., (2015), Cruz & Liu (2011)	To evaluate alternatives based on multiple criteria
Social and Socio-Economic Impact Assessment		To identify and address social and economic concerns related to project practises
Social Impact Assessment	Esteves et al., (2012)	To understand how the changes should occur to bring improved solutions to that can answer to the changes occurred due to the project
Life Cycle Assessment	Agyekum et al., (2017)	To assess the potential environmental impacts of products and services
Life Cycle Costing	Parent et al., (2012).	To examine the costs that arise during a product's or service's life cycle.
Social Life Cycle Assessment	Wu et al., (2014), Zimmer et al. (2017), Smith and David (2014)	To evaluate a product's or process's positive and undesirable social and socioeconomic characteristics.
Statistical Approaches	Zailani et al. (2012)	To define the relation between the analysed features
Social Indicators	Kühnen & Hahn, (2018), Hutchins & Sutherland (2008), Ahi & Searcy, (2015), Brent & Labuschagne, (2006)	To assess the performance of the sustainable performance

To achieve the research objectives defined in the Literature Review section, the most feasible method for the data collection process is using the interviews, surveys and questionnaires. The main reason is that, through these methods employee perspective towards the SSP can be captured directly using these methods. Since this study tries to investigate the social sustainability of the apparel industry, employee perspective, responses and opinions can provide more realistic and accurate information to the study (Staniškienė & Stankevičiūtė, 2018).

For the data analysis step in the study, MCDA and statistical approaches were shortlisted as the preferred data analysis approaches to achieve the defined objectives of the study. MCDA is a popular approach used in the area of social sustainable supply chain management. Chavosh Nejad et al. (2021) evaluated the social sustainability in

the digital management process of the financial industry using an AHP-based multi-criteria model. Marta & Giulia (2020) applied multi criteria evaluation to address the social sustainability in urban development. Sierra et al. (2018) also applied a similar method to evaluate the social sustainability of the infrastructure. When it comes to statistical approaches, there are several statistical methods used to identify the relationship between SSP and dimensions. Sudusinghe & Seuring (2020) used Structural Equation Modelling (SEM) as the data analysis method to measure and analyse the relationship between the social sustainability dimensions of the apparel industry. Further, SEM approach is used by Masocha (2019) to examine the relationship between social sustainability, financial performance, customer and employee satisfaction. However, Tsuda, M. and Takaoka, (2006) suggested to use stated preferences methods such as conjoint analysis and contingent valuation to evaluate the social sustainability aspect involved with the happiness index. Choice based Conjoint analysis also known as Discrete Choice Modelling (DCM), in other words Discrete Choice Experiment approach has not applied in the social sustainability supply chain management by the previous scholars. Only available study in the sustainability context using the Discrete Choice Analysis approach is the study conducted by Ciliberti et al., (2020) according to our knowledge. This approach is a suitable approach given the study objectives. Among these statistical approaches of SEM, DCM and MCDA, DCA was selected as the preferred method for the data analysis and data interpretation considering the criteria as shown in Figure 3-2.

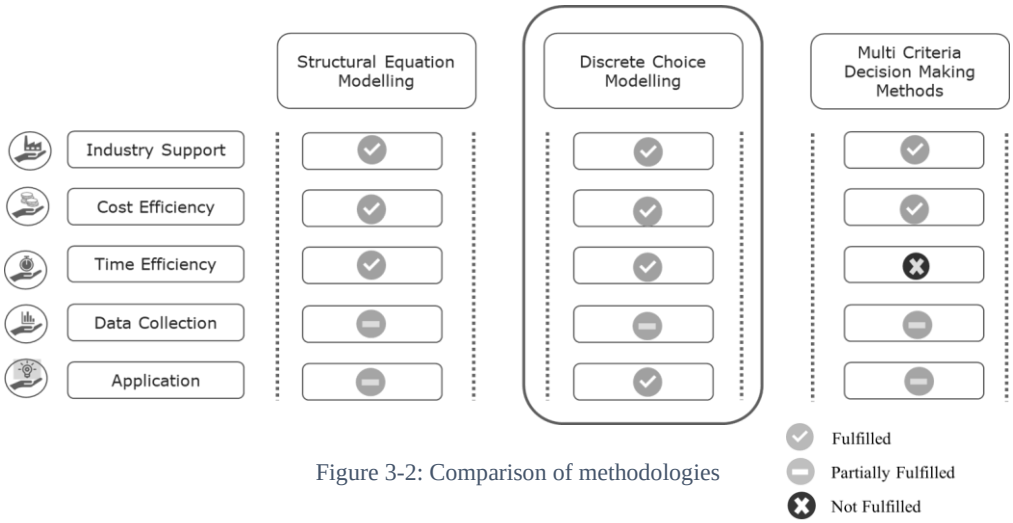


Figure 3-2: Comparison of methodologies

3.2. Discrete Choice Experiment

Discrete Choice Experiment (DCE) were introduced by McFadden (1974) and it is a quantitative method to evaluate different factors that influence job choices, as well as a way to elicit stated preference for product and service attributes (Bredikhina, 2019; Rockers et al., 2012). DCEs are an evaluation technique among several stated preference methods, and it is considered one of the most frequently applied approaches (Johnson et al., 2013). DCE has grown in popularity over the last few decades because it is a more time and cost-effective alternative to revealed preferences experiments, which are based on real data obtained from exchanges observed in the real context. DCE provides quantitative indication of the relative importance and trade-off between hypothetical product or service attributes or characteristics. The choice models such as DCE rely on the assumption, that responders make trade-offs between attributes and their levels to maximize the utility of the selected choice (Kolstad, 2010). Further, Rockers et al. (2012) state that researchers and policy makers identified this as a very attractive method compared to traditional qualitative assessments since it is applicable to hypothetical products or services.

DCEs are considered as a behavioural economic approach to assess the preferences of individuals systematically. DCEs have been extensively applied in the research areas of marketing (Chandukala et al., 2008), transport modelling (Hensher et al., 2011; König & Grippenkoven, 2019), sustainability in maritime sector and environment (Franchi & Vanelslander, 2021; Hoyos, 2010), food industry (Sporleder et al., 2014; Tanner et al., 2021) and health economics (Kolstad, 2010; Raghunandan et al., 2021) among many other research areas. In a DCE, participants are presented with two or more alternatives, namely “choice set” and characteristics, features or factors of each alternative are presented with the choice set, termed as “attributes” and “levels”. These choice sets are systematically developed to analyse the choice patterns of the participants (Foreman et al., 2021; Rose & Bliemer, 2009).

3.2.1. Utility Theory

The random utility theory of behaviour was the foundation of DCE. According to this method, each choice alternative recognised by the participants has a latent "utility,"

and each respondent will always select the option with the highest utility. As per Louviere et al. (2010) utility is a latent variable and it is not possible to observe it directly. Further, they explain that by applying DCEs, choice patterns of the respondents of the study can be observed and it will lead to systematically derived measures of utilities. The random utility theory's fundamental axiom is:

$$U_{ni} = V_{ni} + \varepsilon_{ni}$$

where U_{ni} is the systematic, comprehensible component of utility that person *n* associates with alternative *i*, V_{ni} is the random component of utility that person *n* associates with alternative *i*, and $\varepsilon_{ni}$is the latent, unobservable utility.

The random utility model can be used for the analysis of DCE data. In random utility model, individual *n* is assumed to select between *j* alternative choices, choosing the choice which accompanying with the highest utility, benefit, or satisfaction. Hence, the individual *n* choose choice *i* over choice *j* if and only if,

$$U_{ni} > U_{nj} \qquad \forall i \neq j \in$$

where *U* is the utility for a specified job.

The random utility model supposes that there are two parts to the utilities associated with a particular decision. The random component ε_{ni} , is a function of unobserved choice attributes and individual-level variation in preferences, while the deterministic component V_{ni} is a function of *m* job attributes ($x_1, x_2, \ldots\ldots, x_m$), which are observed. The following are examples of how to specify the utility (U) of an associated personal decision:

$$U_n = V_n + \varepsilon_n = \alpha_1 + \beta_1 x_{1n} + \beta_2 x_{2n} + \ldots + \beta_m x_{mni} + \varepsilon_{ni} \qquad (1)$$

Where the betas (*β)* offer a quantitative interpretation of the degree of preference for each level of an attribute, trade-offs, and monetary values.

The DCE data can be modelled within a probabilistic framework to estimate coefficients in equation (1) since, the utility of any given choice is not directly observable. That would be, when an individual *n* is given a choice between two jobs,

the probability (*P*) that individual *n* would pick choice *i* over choice *j* can be approximated as;

$$P_{ni} = \Pr[\, U_{ni} > U_{nj}] \qquad \forall i \neq j \in$$

3.2.2. Multinomial Logit Model

The Multinomial Logit Model (MNL) is considered as the most familiar and simplest DCM (Franchi & Vanelslander, 2021). Lancsar et al. (2017) state, MNL provides an opportunity to introduce key specifications and issues in estimating the theoretical foundations of decision-making in choice models. Further, MNL can be used to explain the observed choices by means of characteristics of the explanatory variables (Mariel et al., 2021). This model is used for response variables situations in situations where regular linear regression does not operate correctly.

Given the flexibility of the logit approach, which is preferred in the DCE literature, an assumption has been made about the distribution of the error term ε_{ni}, which has a logistic distribution. (Clark et al., 2014; Franchi & Vanelslander, 2021; Kolstad, 2010).

Considering the multinomial logit model and using the equation (1) below equation can be derived.

$$P_{ni} = \Pr[\, V_{ni} + \varepsilon_{ni} > V_{nj} + \varepsilon_{nj}] \qquad \forall i \neq j \in$$

$$P_{ni} = \Pr[\, \varepsilon_{nj} < \varepsilon_{ni} + V_{ni} - V_{nj}] \qquad \forall i \neq j \in$$

As per the logit model introduced by McFadden (1974), the probability of choosing a choice *i* can be defined as;

$$P = \frac{\exp(V_i)}{\sum_{j=1}^{N} \exp(V_i)}$$

The coefficients generated from the MNL model can be used for two main purposes. The first one is to determine the importance of the attribute by its statistical significance. The second is the direction of the coefficient, as indicated by the sign of the estimated coefficient, because it checks the theoretical accuracy of the model. These two purposes are very important. However, the real value of using DCEs is to

examine the trade-offs that participants in the DCEs are willing to undertake among the considered attributes, as well as the probability of selecting the given options. Because such data does not exist in the real world and this type of information is difficult to absorb from group discussions, interviews, ranking, or rating exercises when new policies are implemented (Rockers et al., 2012).

3.3. Design of the Discrete Choice Model

DCE is a systematic experiment which consist with several steps. The main steps as per the user guide developed by Rockers et al., (2012) are as per the Figure 3-3.

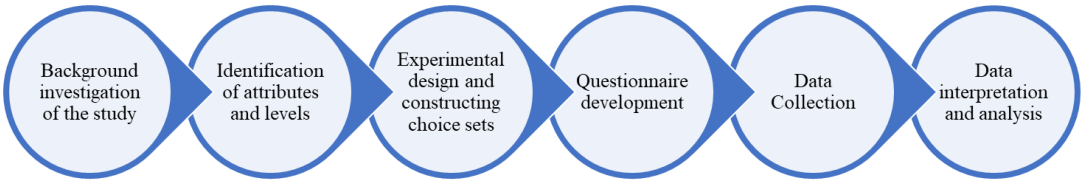


Figure 3-3: Steps of designing the Discrete Choice Model

3.3.1. Background Investigation

As the first step of the background investigation, an extensive literature study was conducted to understand the social sustainable aspect of the apparel sector. As the second step, unstructured interviews were conducted with industry-related personnel to identify the practices implemented in the industry at present to promote social sustainability. The second step was carried out via telephone conversations and one to one interview sessions. Through these unstructured interviews, 12 SSP were refined as per Table 3-2.

Table 3-2: Social Sustainability Practices refined through discussions with industry-relate personnel

Currently Practising Social Sustainability Practices in Apparel Industry
1. Increase the availability of safety equipment
2. Providing opportunities for training and upgrading qualifications (being eligible for promotion)
3. Workload balance
4. Providing enough infrastructure facilities
5. Providing enough sanitary facilities
6. Providing enough basic Salary and allowances
7. Providing transportation facilities
8. Providing maternity leaves
9. Providing meal facilities
10. Providing health care and medical facilities
11. Organizing CSR/ motivational events (birthdays, labour days, women's day, outings)
12. Providing awarding schemes for special achievements

After identifying the SSP through the discussions, again a literature study was carried out to validate the identified SSPs. SSPs refined through the literature review are as per Table 3-3. This method was suggested by Franchi & Vanelslander (2021) to identify a set of agreed number of attributes to use in DCE. This method uses both Top-down and Bottom-up approach as explained by Franchi & Vanelslander (2021). In here Top-down approach means identifying a set of attributes through a literature review referring to publications, reports, and standards. The Bottom-up approach includes collecting a set of attributes from the suggestions given by the sector stakeholders' as per their perceptions about the current issues and practises in which they are involved daily. For this study, we took a hybrid approach to restrict the final set of selected SSPs to be used as the attributes in the DCE.

Table 3-3: Social Sustainability Practices refined through literature review

Social Sustainability Practices practised in the industry	Reference
1. Workload level balancing	(Liyanage & Galhena, 2014)
2. Awarding Scheme	(Diabat et al., 2014)
3. Training and education programs for employees	(Jakhar, 2015; Yawar & Seuring, 2017)
4. Providing healthy food at affordable rate	(Venkatesh Mani et al., 2016)
5. Elimination of forced labour practices	(Welmilla, 2020)
6. Wages and benefits negotiations	(Dissanayake et al., 2016)
7. Childcare services and maternity benefits	(Venkatesh Mani et al., 2016)
8. Providing sustainable transportation facilities	(F. Huq et al., 2014)
9. Providing quality essential health care services	(F. Huq et al., 2014)
10. Access to proper sanitation and hygiene facilities	(Chen et al., 2017; Staniškienė & Stankevičiūtė, 2018)
11. Programs for women empowerment	(Ashby et al., 2013)
12. Workplace management and culture	(Chen et al., 2017; F. Huq et al., 2014)
13. Introducing state of the art technologies and machineries	(Liu et al., 2019)

3.3.2. Identification of Attributes and Levels

As Sudusinghe & Seuring (2020) suggested, social sustainability dimension was assigned to each social sustainability practice to use in the DCE in a suitable manner. In their study, they identified 11 social sustainable dimensions covering the SSP used in a focal company. However, in this study we only focus on SSP that relates to white-collar and blue-collar employees. Hence, we used the social sustainable dimension criteria suggested by Sudusinghe & Seuring (2020) to restrict the final set of refined attributes.

After identifying the SSP mentioned in the literature and the practical scenarios in the industry, a pool of SSP that can be used in the DCE is summarized as per Table 3-4.

Table 3-4: Summary of the identified social sustainability practices through literature and industry personal

Social Sustainability Practices practised in the industry	Description		
	Interviews	Literature	Social Sustainability Dimension
1. Workload level balancing	Yes	Yes	Bonded Labour Conditions
2. Awarding Scheme	Yes	Yes	Improved Wage Conditions
3. Training and education programs for employees	Yes	Yes	Education Benefits
4. Providing healthy food at affordable rate	Yes	Yes	Health and Safety Improvement
5. Elimination of forced labour practices	No	Yes	Bonded Labour Conditions
6. Wages and benefits negotiations	Yes	Yes	Improved Wage Conditions
7. Childcare services and maternity benefits	Yes	Yes	Workers' and Employees' Conditions
8. Providing sustainable transportation facilities	Yes	Yes	Workers' and Employees' Conditions
9. Providing quality essential health care services	Yes	Yes	Social Sustainability Practices Benefiting towards Society
10. Access to proper sanitation and hygiene facilities	Yes	Yes	Social Sustainability Practices Benefiting towards Society
11. Programs for women empowerment	Yes	Yes	Gender Related Equity Improvement
12. Workplace Management and Culture	No	Yes	Improved Labour Conditions
13. Introducing state of the art technologies and machineries	Yes	Yes	Improved Labour Conditions

3.3.3. Design the Experiment and Choice Sets

This section configures the experiment with the required attribute levels and experiment design, which includes the steps of generating attributes and levels, generating choice options, and designing choice sets.

3.3.3.1 Generate Attributes and Levels

After the background investigation for the DCE, the initial step for developing the DCE design is to define the attributes and levels. These attributes should be able to influence the participants' choice when selecting the choice option among the given choice sets. Further, these attributes should be common across the given choice options, relevant to the research objectives and should be applicable in the practical context (Hensher et al., 2005). However, the number of attributes must be limited for a practical DCE design and many previous studies used less than 8 attributes, with most having six attributes and four attribute levels (Johnson et al., 2013; Marshall et al., 2010). Hence from the 13 SSPs identified in the background investigation, they should be refined to design a feasible choice experiment. Hence, exclusion criteria were applied to select the most appropriate SSPs as the attributes to be considered in the DCE.

The refining method of identified SSP as per Table 3 is as per below.

Step 1. Check whether SSP is validated through both top-down and bottom-up approach, if not it is neglected and not selected for the final pool of attributes

Step 2. Check the assigned social sustainability dimension of each SSP. If there are more than one SSP in the same SSD, considering the generalizability and applicability in the practical context most appropriate SSP was selected referring to the literature review and the inputs from the industry personals

Considering the above refining method, selected pool of SSPs as attributes for the DCE is as per Table 3-5.

Table 3-5: Summary of the selected social sustainability practices for the DCE

Social Sustainability Practices practised in the industry	Description		
	Interviews	Literature	Social Sustainability Dimension
Workload level balancing	Yes	Yes	Bonded Labour Conditions
Training and education programs for employees	Yes	Yes	Education Benefits
Providing healthy food at affordable rate	Yes	Yes	Health and Safety Improvement
Wages and benefits negotiations	Yes	Yes	Improved Wage Conditions
Childcare services and maternity benefits	Yes	Yes	Workers' and Employees' Conditions
Access to proper sanitation and hygiene facilities	Yes	Yes	Social Sustainability Practices Benefiting towards Society
Programs for women empowerment	Yes	Yes	Gender Related Equity Improvement
Introducing state of the art technologies and machineries	Yes	Yes	Improved Labour Conditions

After finalizing the attributes levels were defined as per the elaborations given from the industry personals for each attribute.

- Workload
- Training and Upgrading Qualifications (being eligible for **promotion**)

- Providing meal facilities
- Basic salary
- Providing maternity leaves
- Sanitary facilities
- CSR Events (Birthdays, Labour Days, Women's Day, Outings)
- Availability of safety equipment and state of the art technologies and machineries

The levels were defined for each attribute as per the Table 3-6.

Table 3-6: Attributes and levels of DCE

Attributes	Level 1	Level 2	Level 3	Level 4
Workload	**Normal:** Daily targets can be achieved by an average skilled person	**Heavy:** Daily targets are difficult to achieved by an average skilled person		
Training and Upgrading Qualifications (being eligible for **promotion**)	Exam Based Evaluation+ Practical Evaluation	Past Performance Evaluation+ Practical Evaluation		
Providing meal facilities	Free Breakfast + Free Lunch	Free Breakfast + Paid Lunch	Paid Breakfast + Free Lunch	Paid Breakfast + Paid Lunch
Basic salary	20000 LKR	25000 LKR		
Providing maternity leaves	Yes	No		
Sanitary facilities	The place has proper sanitation facilities for both genders.	The place has poor sanitation facilities for both genders.		
CSR Events (Birthdays, Labour Days, Women's Day, Outings)	Yes	No		
Availability of **safety equipment and state of the art technologies and machineries**	Sufficient	Insufficient		

3.3.3.2 Generate Choice Options

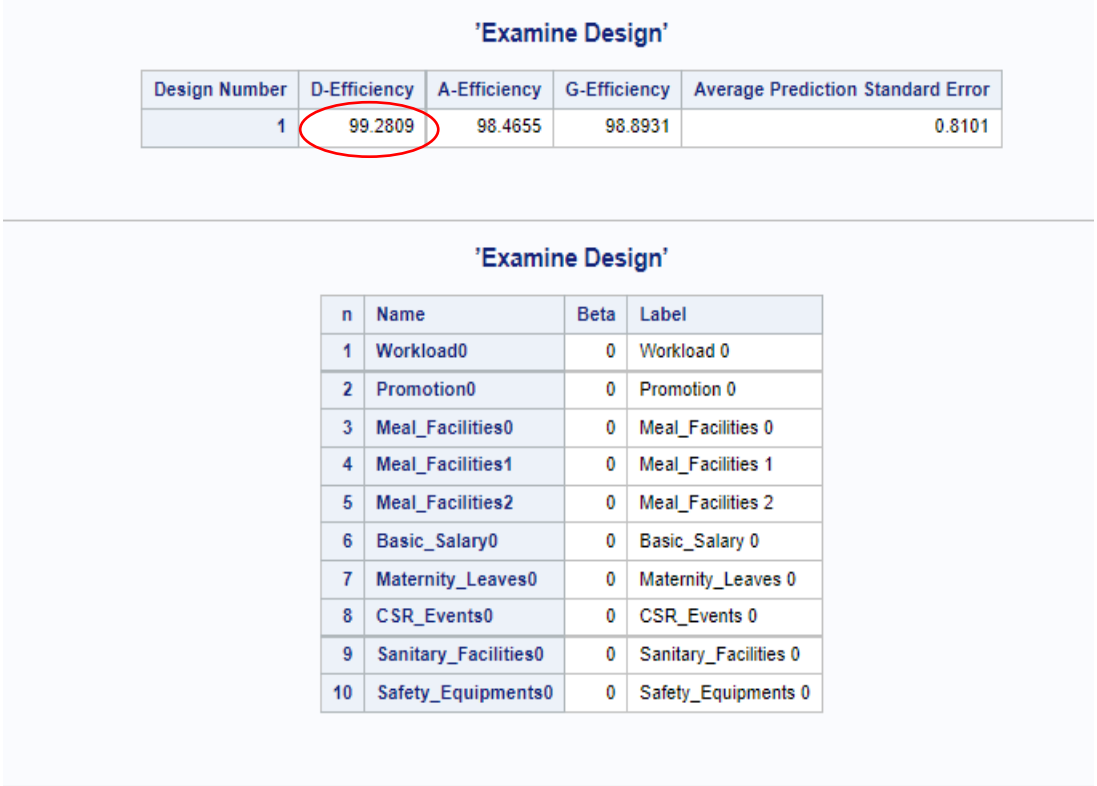
In particular, alternative choice options must be defined to make the experiment more authentic. Moreover, these alternative choice options can be numerous, and including all of them in the experiment is difficult. There are two options available in the past literature to generate choice options. The first option is to consider the alternatives with unlabelled names that are not defined by their actual names. It is only defined by the attributes and the levels of those attributes (Kupfer, 2012). The other alternative is to proceed with labelled alternatives while attribute levels do not vary as significantly as in the unlabelled experiment in order to keep the experiment as realistic as possible. Considering these two options, it was decided to go with the unlabelled alternatives option, which does not provide a specific name for the given choice alternative. This strategy gives the advantage of using several combinations and variations of attributes and levels. This ensure the study is more casual and more probabilistic for the participants. In this research, study will be based on two separate alternatives considered as *"Job A"* and *"Job B"*.

3.3.3.3 Designing the Choice Sets

Once finalizing the attributes and levels, we developed the hypothetical job profiles with the combination of the attributes and levels. The combinations that can be derived from the final pool of attributes and levels normally end up with too many choice sets, which takes more time and effort to complete the DCE for the participants. That is known as full factorial design and it accounts all possible combinations of attributes and levels. As an example, in this study there are 7 attributes with 2 levels and one attribute with 4 levels. Considering there are two alternatives presented as choice sets for the participants, there are 130 816 $[(2^7 \times 4) \times \{(2^7 \times 4)-1\}/2]$ possible job profile choice sets in the full factorial design. Due to cognitive fatigue when responding to a larger number of choices the participant will become bored and unmotivated. As per the study carried out by de Bekker-Grob et al. (2012) the mean number of choice sets that used in DCEs is 14, while it has a range from 12 to 18 (Kruk et al., 2010).

Orthogonal designs are more commonly used to reduce a full factorial design into a manageable experimental design known as a fractional factorial design. These

orthogonal designs are based on orthogonal arrays and have orthogonality and level balance properties. Here, orthogonal arrays denote that the attributes under consideration are statistically independent, and level balance denotes that the levels of attributes show up an equal amount of times in the experimental design. However, when using statistically efficient designs, orthogonality is not applied (Rockers et al., 2012). Statistical efficiency is expressed in terms of D-efficiency, that can be interpreted as minimising the covariance matrix's determinant. Hence, we designed a D-efficient model using SAS Macros in the online platform "SAS OnDemand for Academics". The number of choice sets were 8 and the D-efficiency is 99.2809 in experiment model.



'Examine Design'

Design Number	D-Efficiency	A-Efficiency	G-Efficiency	Average Prediction Standard Error
1	99.2809	98.4655	98.8931	0.8101

'Examine Design'

n	Name	Beta	Label
1	Workload0	0	Workload 0
2	Promotion0	0	Promotion 0
3	Meal_Facilities0	0	Meal_Facilities 0
4	Meal_Facilities1	0	Meal_Facilities 1
5	Meal_Facilities2	0	Meal_Facilities 2
6	Basic_Salary0	0	Basic_Salary 0
7	Maternity_Leaves0	0	Maternity_Leaves 0
8	CSR_Events0	0	CSR_Events 0
9	Sanitary_Facilities0	0	Sanitary_Facilities 0
10	Safety_Equipments0	0	Safety_Equipments 0

Figure 3-4: Output experimental model of SAD OnDemand platform

Attribute levels of the experiment design was coded as below.

- Workload – Normal = 0, Heavy = 1

- Promotion – Exam Based Evaluation+ Practical Evaluation = 0, Past Performance Evaluation+ Practical Evaluation = 1
- Providing Meal Facilities – Free Breakfast + Free Lunch = 0, Free Breakfast + Paid Lunch = 1, Paid Breakfast + Free Lunch = 2, Paid Breakfast + Paid Lunch = 3
- Basic Salary and Allowances – 20000 LKR = 0, 25000 LKR = 1
- Providing maternity Leaves - Yes = 0, No = 1
- Sanitary Facilities – Proper sanitation facilities = 0, Poor sanitation facilities = 1
- CSR Events (Birthdays, Labour Days, Women's day, Outings) – Yes = 0, No = 1
- Availability of safety equipment and state of the art technologies and machineries – Sufficient = 0 Insufficient = 1

Figure 3-5 presents the choice sets design for the choice experiment, and Table 3-7 presents the level balance of the design. Since all choices in the designed model are 16, the probability of being chosen for each attribute is calculated.

Block	Set	Alt	Workload	Promotion	Meal_Facilities	Basic_Salary	Maternity_Leaves	CSR_Events	Sanitary_Facilities	Safety_Equipments
1	1	1	0	0	1	0	0	1	0	1
		2	0	0	1	1	1	0	0	0

Block	Set	Alt	Workload	Promotion	Meal_Facilities	Basic_Salary	Maternity_Leaves	CSR_Events	Sanitary_Facilities	Safety_Equipments
1	2	1	0	0	3	0	0	1	1	0
		2	0	0	3	1	1	0	1	1

Block	Set	Alt	Workload	Promotion	Meal_Facilities	Basic_Salary	Maternity_Leaves	CSR_Events	Sanitary_Facilities	Safety_Equipments
1	3	1	0	1	0	0	1	0	0	0
		2	0	1	0	1	0	1	0	1

Block	Set	Alt	Workload	Promotion	Meal_Facilities	Basic_Salary	Maternity_Leaves	CSR_Events	Sanitary_Facilities	Safety_Equipments
1	4	1	0	1	2	0	1	0	1	1
		2	0	1	2	1	0	1	1	0

Block	Set	Alt	Workload	Promotion	Meal_Facilities	Basic_Salary	Maternity_Leaves	CSR_Events	Sanitary_Facilities	Safety_Equipments
1	5	1	1	0	0	0	1	0	1	1
		2	1	0	0	1	0	1	1	0

Block	Set	Alt	Workload	Promotion	Meal_Facilities	Basic_Salary	Maternity_Leaves	CSR_Events	Sanitary_Facilities	Safety_Equipments
1	6	1	1	0	1	0	1	1	1	0
		2	1	0	1	1	0	0	1	1

Block	Set	Alt	Workload	Promotion	Meal_Facilities	Basic_Salary	Maternity_Leaves	CSR_Events	Sanitary_Facilities	Safety_Equipments
1	7	1	1	1	2	0	0	0	0	0
		2	1	1	2	1	1	1	0	1

Block	Set	Alt	Workload	Promotion	Meal_Facilities	Basic_Salary	Maternity_Leaves	CSR_Events	Sanitary_Facilities	Safety_Equipments
1	8	1	1	1	3	0	0	1	0	1
		2	1	1	3	1	1	0	0	0

Figure 3-5: Output of choice experiment design

Table 3-7: Level balance for design

Attribute and Levels	Number of Appearances	Chance of being chosen
Workload		
Normal	8	0.5
Heavy	8	0.5
Promotion		
Exam Based Evaluation+ Practical Evaluation	8	0.5
Past Performance Evaluation+ Practical Evaluation	8	0.5
Providing Meal Facilities		
Free Breakfast + Free Lunch	4	0.25
Free Breakfast + Paid Lunch	4	0.25
Paid Breakfast + Free Lunch	4	0.25
Paid Breakfast + Paid Lunch	4	0.25
Basic Salary		
20000 LKR	8	0.5
25000 LKR	8	0.5
Providing Maternity Leaves		
ML_Yes	8	0.5
ML_No	8	0.5
Providing Sanitary Facilities		
Proper sanitation facilities	8	0.5
Poor sanitation facilities	8	0.5
CSR Events (Birthdays, Labour Days, Women's day, Outings)		
CSR_Yes	8	0.5
CSR_No	8	0.5
Availability of State of the Art equipment		
Sufficient	8	0.5
Insufficient	8	0.5

3.3.4. Questionnaire Design

To conduct the DCE a questionnaire was developed using "Microsoft Forms". This platform can be accessed through the Microsoft Office 365 package. When developing the questionnaire, we used the process as per Figure 3-6.

Information regarding the questionnaire

1. The target population of the study was blue-collar and white-collar employees of the apparel sector.
2. The questionnaire was developed with three languages namely, English, Sinhala and Tamil.
3. Participants were offered two warm up choice questions prior to the experiment.
4. After the DCE choice sets, one choice set was repeated to verify the rational behaviour of the respondent.
5. In the final stage, demographic data of the participant were obtained.

A pilot study was carried out in a small and medium scale apparel manufacturing company on their premises. The purpose of the pilot survey was to determine whether the respondents could comprehend the questionnaire and provide thoughtful responses. A stratified sampling was applied in the data collection process. A sample of the choice set presented in the questionnaire is as per the Figure 3-7.

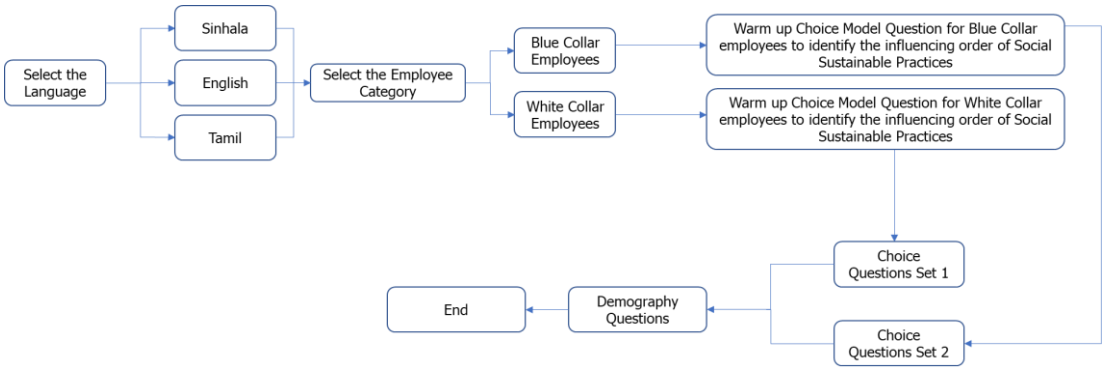


Figure 3-6: Questionnaire design process

	Job A	Job B
Workload	Normal	Normal
Promotion	Exam Based Evaluation+ Practical Evaluation	Exam Based Evaluation+ Practical Evaluation
Providing Meal Facilities	Free Breakfast + Paid Lunch	Free Breakfast + Paid Lunch
Basic Salary	20000 LKR	25000 LKR
Providing Maternity Leaves	Yes	No
CSR Events (Birthdays, Labour Days, Womens day, Outings)	No	Yes
Sanitary Facilities	Proper sanitation facilities	Proper sanitation facilities
Availability of Safety Equipment	Insufficient	Sufficient

Figure 3-7: Example of a choice set

4. RESULTS AND ANALYSIS

In this section results of the choice experiment will be presented in three main sub-sections. They are descriptive statistics of the respondents, performed statistical tests for the DCE analysis and the willingness to pay calculations.

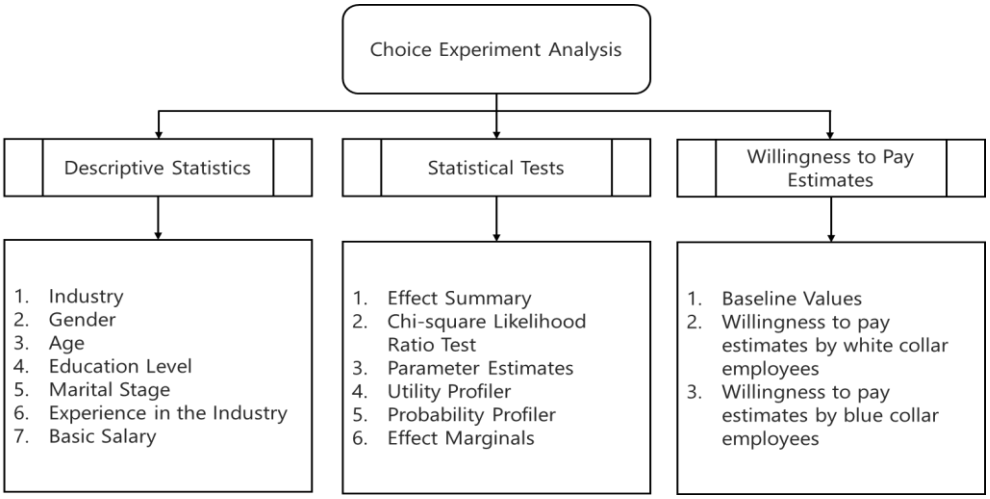


Figure 4-1: Summary of the DCE Analysis

4.1. Socio Economic Characteristics of the Respondents

This section provides a summary of the socio-economic characteristics of the respondents who participated in the choice experiment. The experiment was carried out from February to July 2022. In total, there were 96 responses. From the 96 responses, 54 were from blue collar employees. and the remaining 42 responses were from white collar employees. 9 responses were unusable for the study due to failing the choice consistency test. This is simply a two similar choice questions to check whether respondent give a similar answer to both questions. This test was used to check the rational behaviour of the respondents throughout the experiment. Further, another 10 responses were ignored, considering their applicability to the study scope. In all, 77 responses were usable for the study. Of these, 46 responses are from blue collar employees and 31 responses are from white collar employees.

Table 4-1: Descriptive statistics summary

Description	N		%	
	White Collar	Blue Collar	White Collar	Blue Collar
Industry				
Apparel Industry	31	46		
Gender				
Male	19	18	61.29	39.13
Female	12	28	38.71	60.87
Total	31	46	100	100
Age				
18-24 Years	3	12	9.68	26.09
25-34 Years	16	25	51.61	54.35
35-44 Years	8	4	25.81	8.70
45-54 Years	4	3	12.90	6.52
Above 55 Years	0	2	0.00	4.35
Total	31	46	100	100
Education Level				
Ordinary Level	0	41	0.00	89.13
Advanced Level	8	5	21.62	10.87
Bachelor's Degree	19	0	62.16	0
Master's Degree	4	0	16.22	0
Total	31	46	100	100
Marital Status				
Single	17	18	54.84	39.13
Couple without Children	3	3	9.68	6.52
Couple with Children	11	25	35.48	54.35
Total	31	46	100	100
Experience in the Industry				
Below 2 Years	7	15	22.58	32.61
2-6 Years	12	18	38.71	39.13
6-10 Years	7	7	22.58	15.22
10+ Years	5	6	16.13	13.04
Total	31	46	100	100
Monthly Basic Salary				
Below 25 000 LKR	1	24	3.23	52.17
25 000- 35000 LKR	1	22	3.23	47.83
35-000- 45 000 LKR	5	0	16.13	0
45 000- 55 000 LKR	6	0	19.35	0
Above 55 000 LKR	18	0	58.06	0
Total	31	46	100	100

4.1.1. Gender

From the total sample, 37 employees are male respondents, and the remaining 40 employees are female respondents. Out of these employees, there is a higher proportion of male employees who work in the white collar employee category (61.29% of respondents from the sample), while there is a higher proportion of female

employees who work in the blue collar employee category (60.87% of respondents from the sample). A high number of female employees in the blue collar employee category can be seen in most of the apparel industries in Sri Lanka. Hence, the sample represents the current movements of the employee society in the apparel sector.

4.1.2. Age and Education Level

The majority of the respondents are in the age group of 25–34 years (53.25%). In the subcategories of white collar and blue collar employee categories, the same behaviour can be seen. However, in the white collar employee category, the second highest employee percentage, 25.81%, is from the age category of 35-44 years. This behaviour is changing when it comes to the blue collar employee category. The second highest employee percentage in the blue collar employee category is from the age category of 18–24 years.

When it comes to the education level of the white collar employees, 61.29% of the sample have a bachelor's degree. That is the most common level of education in the white collar category. In the blue collar employee category, 89.13% of the employees have completed the General Certificate of Education – Ordinary Level (G.C.E. (O/L)). This is considered the minimum level of education qualification in Sri Lanka. According to this sample, a greater number of employees are directly employed in the apparel sector after completing G.C.E. (O/L) education. From the blue collar employees, only 10.87% have completed the General Certificate of Education – Advanced Level (G.C.E. (A/L)) educational qualification and it is the highest educational qualification they have achieved as per this sample. This situation has a direct impact on the increment of the blue collar employee percentage in the age category of 18–24 years since most of them are employed right after they complete their secondary and post-secondary education levels.

4.1.3. Marital Status

Out of the sample, most respondents are married and have children. As a percentage, this is 46.75%. However, in the white collar employee category, 54.84% of employees are single, while 54.35% of blue collar employees are married and have children.

Considering the age category, blue collar employees tend to get married and have children respect to white collar employees as per this sample.

4.1.4. Experience in the Industry and Basic Salary

Within the sample, most white collar employees have around 2–6 years of experience, while an equal percentage (22.58%) of employees have experience of less than 2 years and 6–10 years of experience. In the blue collar employee sample, most of the employees have around 2–6 years of experience. The second highest category is the employees who have less than 2 years of experience in the employee category of blue collar employees. 58.06% of the white collar employees have a monthly basic salary of more than 55 000 LKR, while 52.17% of the blue collar employees have a monthly basic salary of less than 25 000 LKR. The highest basic salary received by blue collar employees lies in the range of 25 000 – 35 000 LKR. This amount is almost half of the basic salary received by the white collar employees.

4.2. Analysis of the Discrete Choice Experiment

The basic analysis tool of DCM, the MNL is used to examine and analyse the preferences of choice responses from 50 blue collar employees and 37 white collar employees. SAS JMP PRO v16.2 was used to analyse and interpret the results of the DCE.

4.2.1. Effect Summary

First interpretation of the data was obtained by using the analysis tool option of the choice model in the JMP PRO. This is known as the "*Effect Summary*". This visualises the effects of the developed model and lists the estimated effects of the model. This output is a plot of the *Log-Worth* values for these estimated effects. This output includes the following columns.

- Source: Visualise the model effects, sorted according to the ascending order of p-values
- Log-Worth: Present the Log-Worth for each model effect, defined as log10 (p-value). This scales the p-values to make them suitable for graphing. Furthermore, a value greater than 2 is significant at the 0.01 level.

- P-Value: The p-value for each model effect is shown in this column. This is the p-value associated with the significance test shown in the Likelihood Ratio Tests report. It is also understood as the likelihood of discovering the observed effect. Classically, $p < 0.05$, $p < 0.01$ and $p < 0.001$ levels are used. Most authors use the terms "statistically significant" as $p < 0.05$ and "statistically highly significant" as $p < 0.001$ interchangeably. According to the effect summary, output attributes with p-values less than 0.05 are significant. The attributes that appear at the top of the effect summary table are more significant than those listed at the bottom.

4.2.1.1 Effect Summary for the Blue Collar Employees

As per Table 4-2, statistically highly significant ($p < 0.001$) attributes as per the blue collar employee preferences are;

- Maternity Leaves
- Sanitary Facilities
- Workload
- Basic Salary

The other attributes surpass the boundary. Further, Meal Facilities has a p-value of 0.02017 which is less than 0.05. As a result, given the p-value, it is also classified as statistically significant. Given the earlier assumptions, the remaining attributes cannot be considered statistically significant. This explains the main social sustainability aspects blue collar employees consider when selecting a job profile in a respective organisation in the apparel or textile industry.

Table 4-2: Effect Summary for the blue collar employees

Source	Logworth	PValue
Maternity Leaves	43.676	0.00000
Sanitary Facilities	22.062	0.00000
Workload	8.460	0.00000
Basic Salary	3.217	0.00061
Meal Facilities	1.695	0.02017
Promotion	1.155	0.06997
State of the Art Technologies	1.130	0.07420
CSR Events	0.000	1.00000

4.2.1.2 Effect Summary for the White Collar Employees

As per Table 4-3, statistically highly significant ($p < 0.001$) attributes as per the blue collar employee preferences are;

- CSR Events
- Sanitary Facilities
- Maternity Leaves
- Basic Salary
- Meal Facilities
- Workload

Above are the only attributes within the boundary of a statistically significant parameter. The remaining two attributes, which are State of the Art Technologies used to improve safety within the workspace and considering Promotions for the employees are not significant as per the white collar employee preference. Hence, from the selected 8 attributes, white collar employees consider above mentioned 6 attributes mainly when designing a job role for an employee to reflect SSP of the respective apparel or textile organisation.

Table 4-3: Effect Summary for the white collar employees

Source	Logworth	PValue
CSR Events	24.726	0.00000
Sanitary Facilities	6.824	0.00000
Maternity Leaves	4.338	0.00005
Basic Salary	3.854	0.00014
Meal Facilities	3.813	0.00015
Workload	3.640	0.00023
State of the Art Technologies	0.000	1.00000
Promotion	0.000	1.00000

4.2.1.3 Comparison of the Effect Summary

As per Table 4-4, Sanitary Facilities, Basic Salary, Meal Facilities and State of the Art Technologies have similar relative importance over the considered attributes among both types of employees. As a special case, CSR events have become the most

important attribute when a white collar employee designs a job, while blue collar employees consider it as the least important factor.

Table 4-4: Comparison of attributes for employee type

Attribute	Rank	
	Blue Collar Employees	White Collar Employees
CSR Events	8	1
Sanitary Facilities	2	2
Maternity Leaves	1	3
Basic Salary	4	4
Meal Facilities	5	5
Workload	3	6
State of the Art Technologies	7	7
Promotion	6	8

4.2.2. Chi-square Likelihood Ratio Test

The likelihood ratio tests are used to compute the overall significance as well as the relative importance of the eight attributes and attribute levels. This is another test for determining the significance of the attributes. The Chi-square Likelihood Ratio test is useful for validating the results obtained from the model's effect summary output.

4.2.2.1 Chi-square Likelihood Ratio Test for the Blue Collar Employees

As per the results of Chi-square Likelihood Ratio Test for the blue collar employees shown in Table 4-5, the results received in the effect summary is validated as accurate. That is, Maternity Leaves, Sanitary Facilities, Workload, Basic Salary and Meal facilities are significant as per the preferences received by the blue collar employees.

Table 4-5: Chi-square Likelihood Ratio test for the blue collar employees

Source	L-R ChiSquare	DF	Prob>ChiSq
Workload	34.901	1	<.0001*
Meal Facilities	9.818	3	0.0202*
Basic Salary	11.756	1	0.0006*
Maternity Leaves	195.399	1	<.0001*
Sanitary Facilities	96.556	1	<.0001*
CSR Events	0.000	1	1.0000
State of the Art Technologies	3.188	1	0.0742
Promotion	3.284	1	0.0700

4.2.2.2 Chi-square Likelihood Ratio Test for the White Collar Employees

According to the results of the Chi-square Likelihood Ratio Test for white collar employees provided in Table 4-6, the results received in the effect summary are valid. That is, according to the preferences received by white collar employees, CSR events, Sanitary Facilities, Maternity Leaves, Basic Salary, Meal Facilities and Workload are significant.

Table 4-6: Chi-square Likelihood Ratio test for the white collar employees

Source	L-R ChiSquare	DF	Prob>ChiSq
Workload	13.577	1	0.0002*
Meal Facilities	20.206	3	0.0002*
Basic Salary	14.504	1	0.0001*
Maternity Leaves	16.608	1	<.0001*
Sanitary Facilities	27.589	1	<.0001*
CSR Events	108.709	1	<.0001*
State of the Art Technologies	0.000	1	1.0000
Promotion	0.000	1	1.0000

4.2.3. Parameter Estimates

The *"Parameter Estimates"* are the model's second computed result. The standard errors of the utility coefficients related with the attribute levels considered in the model and coefficients are estimated in this output. These coefficients are also referred to as *"part-worth utilities"*. These coefficients can be positive or negative. These are the utility formula parameters in *Equation 1*. The last level of each attribute is not displayed in the output table, since it is not independent of the others. All parameter estimates for a given attribute will sum up to zero. Hence, the last level will be the additive inverse of the sum of the other levels.

Parameter estimates for the attribute levels for the blue and white collar employees are as per Table 4-7.

Table 4-7: Parameter estimates for blue and white collar employees

Term	Blue Collar		White Collar	
	Estimate	Std Error	Estimate	Std Error
Workload[Normal]	1.24053102	0.2749290664	0.61941316	0.2305808602
Meal Facilities[Free Breakfast + Free Lunch]	0.73907972	0.3246518138	1.06922821	0.4075747892
Meal Facilities[Paid Breakfast + Free Lunch]	0.39983552	0.4376921323	0.38301655	0.5013945336
Meal Facilities[Free Breakfast + Paid Lunch]	0.00169910	0.3055004219	-0.18242015	0.5013945336
Basic Salary	0.00014710	0.0000455170	0.00029534	0.0001094504
Maternity Leaves[Yes]	2.13183969	0.2907829095	0.99010040	0.2985685960
Sanitary Facilities[Proper]	2.09667768	0.4655587930	0.90845208	0.2305808602
CSR Events[Yes]	1.69514307	0.3874281637	1.93020830	0.4184877891
State of the Art Technologies[Sufficient]	-0.19585353	0.1137923804	0.65331515	0.2002095586
Promotion[Past Performance + Practical Evaluation]	0.50315040	0.3857512973	0.14135917	0.4184877891

4.2.4. Utility Profiler

The utility profiler tells the value of the utility for different settings of the attribute levels that are used in job profile designing. This tool helps to visualize how the utility changes systematically when the attribute level changes.

4.2.4.1 Utility Profiler Graphs for Blue Collar Employees

This tool helps to understand the maximum utility received by a blue collar employee and what contributing attribute levels are required to achieve that maximum utility. The maximum utility can be achieved by the combination of the below attribute levels with the continuous variable of the Basic Salary level.

Maximum utility for a blue collar employee is received when a job is designed with a normal workload, free breakfast with free lunch, a basic salary of 25 000 LKR, provides maternity leaves and proper sanitary facilities, has CSR events, not providing sufficient state of the art technologies to improve safety and considers past performance evaluation with practical evaluation for the promotion process.

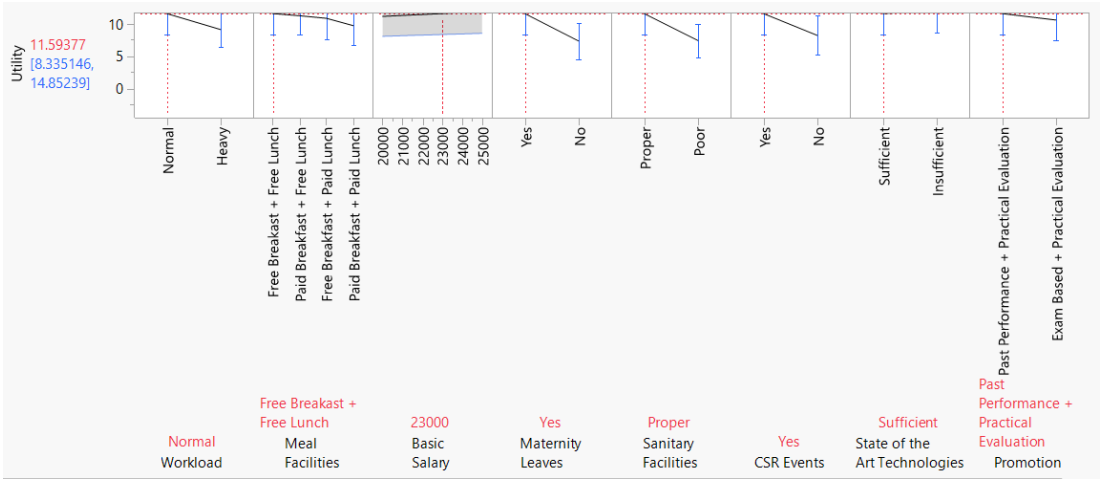


Figure 4-2: Utility profiler graphs for blue collar employees

4.2.4.2 Utility Profiler for the White Collar Employees

Figure 4-3 shows that the utility obtained by a blue collar employee as per the preference of a white collar employee when job designing for a blue collar employee. This means how a white collar employee designs a job for a blue collar employee to maximize blue collar employee's utility as per the opinion of the white collar employee. Combining the attribute levels given below with the continuous variable of Basic Salary level gives the maximum utility for a blue collar employee as per the white collar employee's opinion.

A blue collar employee receives the most utility when a job is designed with a normal workload, free breakfast with free lunch, a basic salary of 25 000 LKR, provides maternity leaves, proper sanitary facilities, launches CSR events, provides sufficient state-of-the-art technologies to improve safety, and considers past performance evaluation with practical evaluation for the promotion process.

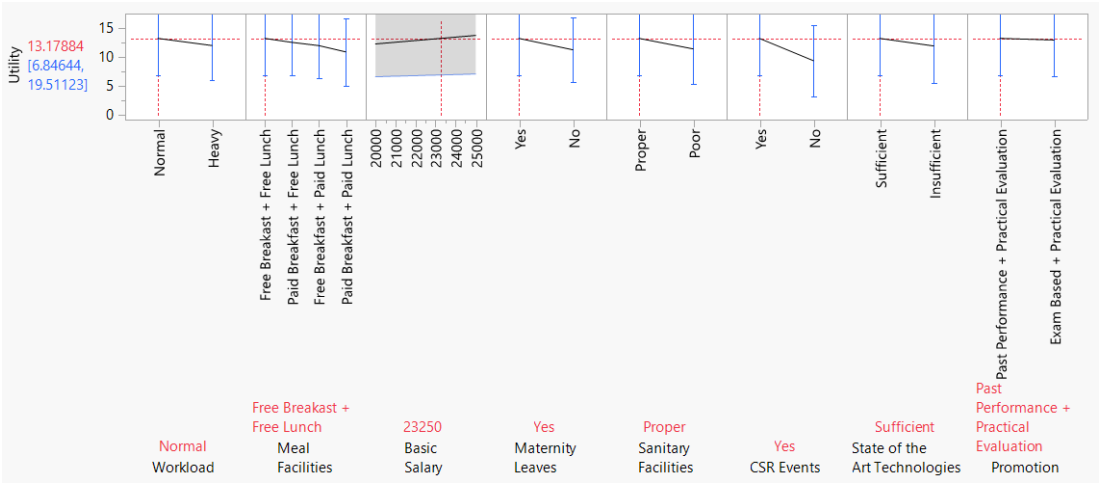


Figure 4-3: Utility profiler graphs for white collar employees

4.2.4.3 Comparison of the Utility Profiler

As per the two outputs of the utility profiler of blue and white collar employees, there is a clear difference in the availability of sufficient or insufficient state of the art technologies to improve safety. Further, the utility of blue collar employees is less impacted by the availability of sufficient or insufficient state of the art technologies for their safety. However, white collar employees consider that factor provides a considerable utility for blue collar employees since there is an increment of the maximum utility as per Figure 4-3. When consider about the promotional criteria, blue collar employees receive high utility when there is a job designed with the promotional criteria with the combination of past performance and practical evaluation. However, when designing a job profile, white-collar employees place less emphasis on promotional criteria than blue-collar employees.

4.2.5. Probability Profiler

This tool is used to visualize the probability of choosing between two alternatives, which enables the researcher to compare the choice probabilities among the number of potential options. In this study, it will be potential job profiles designed with different attribute levels. This allows us to understand the probability of selecting a certain job profile with different attribute levels by the employees.

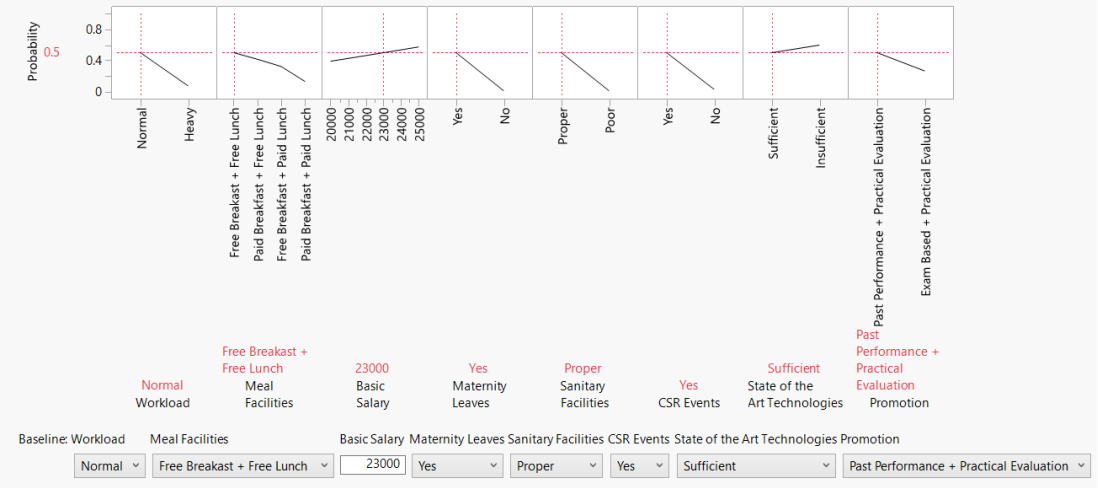


Figure 4-4: Probability profiler for the blue collar employees

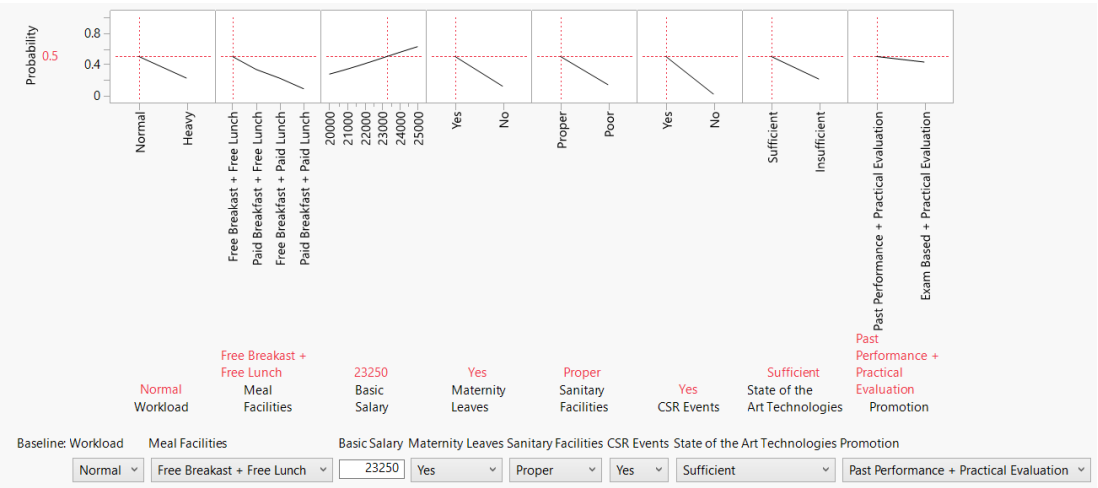


Figure 4-5: Probability profiler for the white collar employees

4.2.6. Effect Marginals

The Effect Marginal output of the model depicts the marginal probabilities and utilities for each main effect in the model. The marginal probability is the likelihood that an individual chooses attribute A over attribute B while all other attributes are at their mean or default levels. Figure 4-6 and Figure 4-7 visualize the marginal effects of the blue and white collar employees for attributes, respectively.

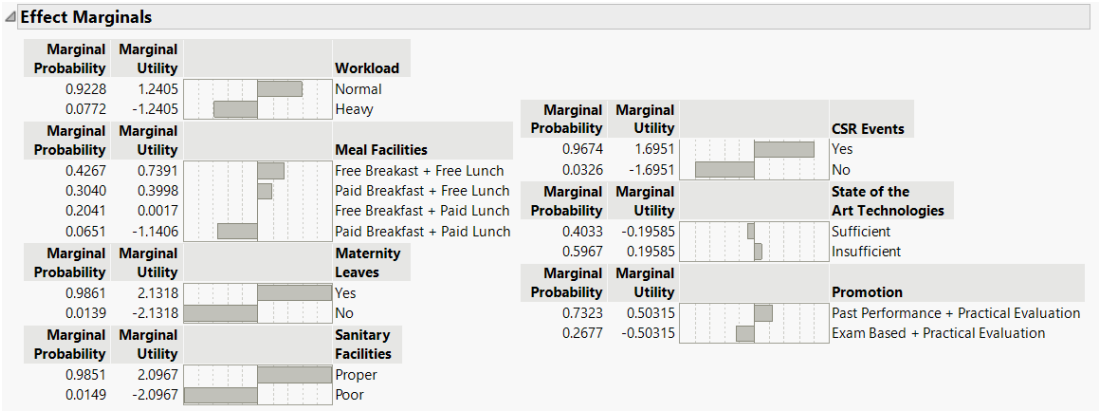


Figure 4-6: Effect marginals for the blue collar employees

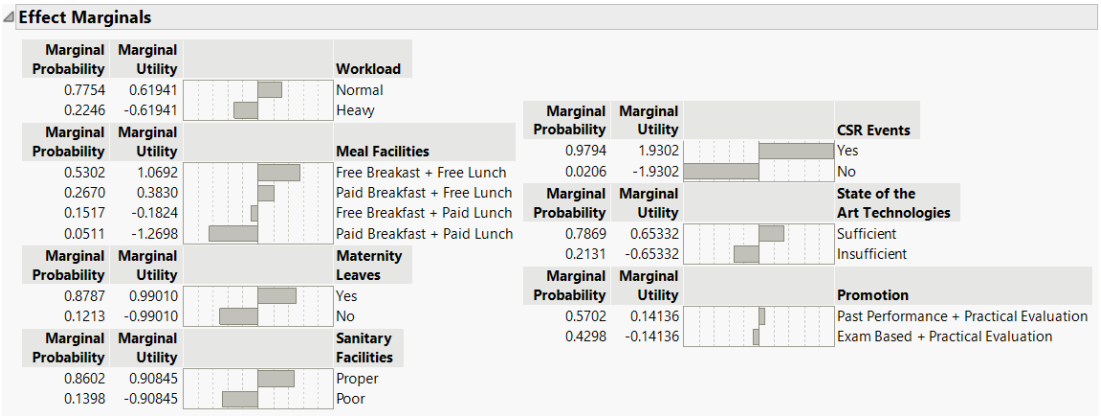


Figure 4-7: Effect marginals for the white collar employees

4.3. Calculation of Willingness to Pay Estimates

Willingness to Pay (WTP) is considered as the maximum price a consumer or customer is willing to offer for a product or service. In DCE, it allows the researcher to find out the maximum price that the respondents are willing to trade off for a certain attribute level considered in the experiment. Hence, it is very important for policy makers and decision makers to understand consumer behaviour make necessary changes to improve future considerations. In this experiment we included one cost attribute, which is a continuous variable to estimate the maximum trade off an employee is willing to pay for a certain social sustainability practice. Table 4-8 and Table 4-9 describe the WTP estimates for blue collar employees and white collar employees willing to pay for a certain attribute level. Baseline values to estimate the WTP were taken as per Figure 4-8.

Willingness to Pay

Factor	Baseline Value
Workload	Normal
Meal Facilities	Free Breakast + Free Lunch
Basic Salary	20000
Maternity Leaves	Yes
Sanitary Facilities	Proper
CSR Events	Yes
State of Art Technologies	Sufficient
Promotion	Past Performance + Practical Evaluation

Figure 4-8: Baseline Values for Willingness to pay estimates

Table 4-8: Willingness to pay estimates by blue collar employees

Factor	Feature Setting	Price Change	Std Error	Lower 95%	Upper 95%	New Price
Workload	Normal	0				20000
Workload	Heavy	16866.99	2.361797	16862.36	16871.62	36866.99
Meal Facilities	Free Breakfast + Free Lunch	0	2.361797	-4.62904	4.629036	20000
Meal Facilities	Paid Breakfast + Free Lunch	2306.282	1.504025	2303.334	2309.23	22306.28
Meal Facilities	Free Breakfast + Paid Lunch	5012.93	1.229015	5010.522	5015.339	25012.93
Meal Facilities	Paid Breakfast + Paid Lunch	12778.71	2.423181	12773.96	12783.46	32778.71
Maternity Leaves	Yes	0	2.423181	-4.74935	4.749348	20000
Maternity Leaves	No	28985.75	3.606067	28978.68	28992.82	48985.75
Sanitary Facilities	Proper	0	3.606067	-7.06776	7.067762	20000
Sanitary Facilities	Poor	28507.66	3.994369	28499.84	28515.49	48507.66
CSR Events	Yes	0	3.994369	-7.82882	7.82882	20000
CSR Events	No	23048.16	3.261878	23041.77	23054.56	43048.16
State of the Art Technologies	Sufficient	0	3.261878	-6.39316	6.393163	20000
State of the Art Technologies	Insufficient	-2662.94	0.607547	-2664.13	-2661.75	17337.06
Promotion	Past Performance + Practical Evaluation	0	0.607547	-1.19077	1.190771	20000
Promotion	Exam Based + Practical Evaluation	6841.129	2.080787	6837.051	6845.207	26841.13

Table 4-9: Willingness to pay estimates by white collar employees

Factor	Feature Setting	Price Change	Std Error	Lower 95%	Upper 95%	New Price
Workload	Normal	0				20000
Workload	Heavy	4194.513	1.524888	4191.524	4197.502	24194.51
Meal Facilities	Free Breakfast + Free Lunch	0	1.524888	-2.98873	2.988725	20000
Meal Facilities	Paid Breakfast + Free Lunch	2323.428	1.294941	2320.89	2325.966	22323.43
Meal Facilities	Free Breakfast + Paid Lunch	4237.927	1.811009	4234.377	4241.476	24237.93
Meal Facilities	Paid Breakfast + Paid Lunch	7919.744	2.80118	7914.254	7925.234	27919.74
Maternity Leaves	Yes	0	2.80118	-5.49021	5.490212	20000
Maternity Leaves	No	6704.715	1.543854	6701.69	6707.741	26704.72
Sanitary Facilities	Proper	0	1.543854	-3.0259	3.025898	20000
Sanitary Facilities	Poor	6151.813	1.927981	6148.034	6155.592	26151.81
CSR Events	Yes	0	1.927981	-3.77877	3.778774	20000
CSR Events	No	13070.89	4.327396	13062.41	13079.38	33070.89
State of the Art Technologies	Sufficient	0	4.327396	-8.48154	8.48154	20000
State of the Art Technologies	Insufficient	4424.089	1.614037	4420.925	4427.252	24424.09
Promotion	Past Performance + Practical Evaluation	0	1.614037	-3.16346	3.163455	20000
Promotion	Exam Based + Practical Evaluation	957.2494	2.202275	952.933	961.5658	20957.25

The comparison of the WTP estimates for each attribute level for blue and white collar employees is as per Table 4-10. This allow us to understand how the two types of employees are willing to trade off for each attribute level used in the DCE in monetary terms.

Table 4-10: Comparison of the WTP estimates

Factor	Feature Setting	Willingness to Pay Estimates (LKR)		Difference (LKR)
		Blue Collar Employee	White Collar Employee	
Workload	Normal	20000	20000	
Workload	Heavy	36866.98998	24194.51295	12672.47703
Meal Facilities	Free Breakfast + Free Lunch	20000	20000	
Meal Facilities	Paid Breakfast + Free Lunch	22306.28191	22323.42796	-17.14604863
Meal Facilities	Free Breakfast + Paid Lunch	25012.93048	24237.92678	775.0037019
Meal Facilities	Paid Breakfast + Paid Lunch	32778.71343	27919.74401	4858.969427
Maternity Leaves	Yes	20000	20000	
Maternity Leaves	No	48985.74742	26704.7154	22281.03201
Sanitary Facilities	Proper	20000	20000	
Sanitary Facilities	Poor	48507.66404	26151.81318	22355.85086
CSR Events	Yes	20000	20000	
CSR Events	No	43048.163	33070.89395	9977.269052
State of Art Technologies	Sufficient	20000	20000	
State of Art Technologies	Insufficient	17337.06011	24424.08885	-7087.028741
Promotion	Past Performance + Practical Evaluation	20000	20000	
Promotion	Exam Based + Practical Evaluation	26841.12901	20957.24941	5883.8796

As per Table 4-10, blue collar employees' most WTP estimates are higher than the WTP estimates of white collar employees, other than the use of state of the art technologies to improve the safety of the employees. That means blue collar employees' expected level of trade off price is higher than white collar employees' expectations. The highest difference in the WTP estimates is in the maternity leaves. That explains why blue collar employees are willing to offer a significantly higher price than white collar employees expect. In the real context, there is a high proportion of female employees who are working as machine operators in the apparel sector. Most of these blue collar employee job offers are contract based jobs, and these blue collar

female employees have more chances of being dismissed from their employment by these companies after being pregnant. Hence, these employees give priority to maternity leaves while organisations tend to neglect this issue. Further, blue collar employees WTP estimate is higher when it comes to the sanitary facilities than the white collar employee estimate. This explains that blue collar employees prefer better hygiene at the workplace than the white collar employee believes. Then the difference of WTP estimates are as follows; Workload balancing, availability of CSR events, availability of meal facilities and transparent eligibility criteria for promotion from the point of blue collar employees. Hence, firms should initiate technical and financial investments to integrate the SSP in job designing in apparel and textile sector as per the descending order of difference of WTP estimates to improve the maximum utility of the blue collar employees.

5. DISCUSSION

5.1. Findings

After identifying the social sustainable practices that can be implemented to improve the social performance of the organisation, DCE was employed to identify the preference of blue collar and white collar employees towards each social sustainable practice. Through the use of *Effect Summary, Chi-square Likelihood Ratio Test, Parameter Estimates, Utility Profiler* and *Effect Marginals* the preference order was computed with relevant statistical evidence. The study showed that blue collar employees have a high preference towards maternity leaves, sanitary facilities, workload, basic salary level, and meal facilities. Further, results show that blue collar employees do not pay much attention to promotion, state of the art technologies or CSR activities. On the other hand, white collar employees have a high preference towards CSR events, sanitary facilities, maternity leaves, basic salary, workload, and meal facilities when they design a job role for blue collar employees.

Subsequently, willingness to pay for each sustainable practice was estimated using baseline values and the basic salary attribute. In that analysis, organisations can identify the trade off price that employees are willing to pay for each social sustainable practice. It will enable the organisation to understand the investments that they should make while considering the investments they should make to improve the social and economic performance of the firm. The study identified that providing maternity leave and proper sanitary facilities increases the overall utility of blue collar employees significantly, and these practices bear a minor consideration from an organisational standpoint. Additionally, blue collar employees do not pay much attention to their safety or in updating their day-to-day manual work with state of the art equipment. However, companies are willing to invest in state of the art equipment to improve the safety and work environment of their employees. This study is, to the best of our knowledge, the first study based on Discrete Choice Experiment to evaluate employee preference on implementing social sustainable practices in a focal apparel company. Thus, we believe our study sheds light on the benefits of understanding the relationship

of employee preferences, social sustainable practices, and trade off of the investments that should be considered by the focal company.

5.2. Managerial Implications

The discrete choice model developed in this study is helpful in identifying the probability of accepting a job role that integrates social sustainable practices by blue collar employees. Hence, it will assist the focal company to understand the willingness to accept a developed job role by the blue collar employees with the cost to company. Further, this model helps estimate the value of a job role in the apparel sector, which is integrated with social sustainable practices. Those involved in the recruitment process and social sustainability development process can gain insights through this study to make better decisions to improve the social and economic performance of the respective firm.

5.3. Limitations and Future Research Directions

The findings of our research were subjected to the attributes of an Asian developing country since our data collection is limited to Sri Lanka. Therefore, we suggest further investigations in other regions to generalize the findings as well as to report systematic differences. It would be useful to further develop stated preference models with gender based analysis to analyse the implication of social sustainable practices, since this is the first study in this context according to our knowledge. A simulation-based study integrated with DCE is suggested to identify the net present value of the economic performance of the organisation considering the investments made to improve social performance.

6. CONCLUSION

In the apparel sector, blue collar employees play a major role in the manufacturing process. Presently, there is pressure on apparel organisation to improve their social sustainability aspects due to the increasing awareness of consumers and legal regulations. Hence, organisations implement SSP with the motivation of improving the social and economic performance of the organisation. It is important to identify what are the main expectations of the employees who are in the manufacturing process when implementing the SSP. This study was carried out to assess the SSP of the apparel industry. In this industry, blue collar employees are more significant since this industry is more labour intensive. Thus, Blue collar employees' preference on implementing SSP is important. However, this was not explored in the previous literature.

The study identified the factors that should be considered when promoting SSP and SSP that can be implemented in the focal company through a combination of a top down and bottom up approaches, which is grounded on top of a literature review and discussion with stakeholders. To execute the experiment, eight SSP were identified using a literature review and discussions carried with industry personnel. Then a discrete choice experiment was employed to identify the preference of the blue collar employees and white collar employees towards the selected SSP. The SAS JMP PRO v16.2 was used to analyse the discrete choice experiment results.

According to the study, blue-collar employees place a high importance on maternity leaves, sanitary facilities, workload, a basic salary level, and meal facilities. Results also indicate that blue-collar employees do not give much consideration to promotion, employing state of the art technologies, or CSR initiatives. On the other hand, when creating a job role for blue collar employees, white collar employees place a high value on CSR activities, sanitary facilities, maternity leaves, basic salary, workload, and meal facilities.

In the latter part, willingness to pay estimates were calculated for each of the attribute levels designed in the SSP. This is useful to identify the maximum trade off employees

are willing to offer for each social sustainability practices in monetary terms. It is useful for the organisation to identify the most influential SSP to deploy to improve the social and economic performance of the firm. There is a significant amount of difference between the willingness to pay estimates of blue and white collar employees in the factors of providing maternity leaves and providing proper sanitary facilities. Hence, to increase the maximum utility of blue collar workers, firms should start making technical and financial investments to integrate the SSP in job designing in the apparel and textile sector in the descending order of difference of WTP estimates.

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