MAKERERE UNIVERSITY

MAKERERE UNIVERSITY BUSINESS SCHOOL

ENVIRONMENTAL MANAGEMENT PRACTICES, INTELLECTUAL CAPITAL, AND SUSTAINABILITY PERFORMANCE OF MANUFACTURING FIRMS IN UGANDA.

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A DISSERTATION SUBMITTED TO MAKERERE UNIVERSITY BUSINESS SCHOOL (FACULTY OF GRADUATE STUDIES AND RESEARCH) IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER OF SCIENCE IN ACCOUNTING AND FINANCE OF MAKERERE UNIVERSITY

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PLAN A

DECLARATION

I hereby declare that to the best of my knowledge and belief, this research study is original and has never been published and /or submitted for any other degree award to any other University before.

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APPROVAL

This research dissertation has been submitted with our approval as university supervisors.

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DEDICATION

I dedicate this research to Emilia Kahimakazi Tumushabe.

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I wish to register my profound gratitude to my research supervisors who guided, instructed, and motivated me. My thesis would be impossible without your supervision.

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LIST OF ABBREVIATIONS

ISO	International Organisation for Standardisation
ACCA	Association of Chartered Certified Accountants
ANOVA	Analysis of Variance
CIA	Certified Internal Auditor
CPA	Certified Public Accountant
CVI	Content validity index
DV	Dependent Variable
EFA	Exploratory factor analysis
EMP	Environmental Management Practices
EMS	Environmental Management System
GRI	Global Reporting Initiative
HRM	Human resource management
IV	Independent Variable
KMO	Kaiser–Meyer–Olkin
NEMA	National Environmental Management Authority
PM	Particulate matter
RBV	Resource Based View
SME	Small and Medium-sized Enterprises
SPSS	Statistical Package for the Social Sciences
UBOS	Uganda Bureau of Statistics
VIF	Variance Inflation Factor

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ABSTRACT

The purpose of this study was to investigate the relationship between environmental management practices, intellectual capital, and the sustainability performance of manufacturing firms in Uganda. The study adopted a cross-sectional research design combined with a descriptive and correlational research approach. The study population was 606 manufacturing firms, from which a sample of 234 firms was selected. Complete and usable questionnaires were solicited from 161 respondents, indicating a 70% response rate. The data were analysed using factor analysis, correlation, and regression. The study findings show that environmental management practices and intellectual capital are significant predictors of sustainability performance, predicting 58.5% of the variance in sustainability performance. Sustainability performance can improve if manufacturing firms prioritize investment in the development and enhancement of their intellectual capital, most especially human capital, and adopt sustainable and eco-friendly practices through the integration of environmental considerations into product and service development processes. This study contributes to the literature by providing empirical evidence of the link between environmental management practices, intellectual capital, and the sustainability performance of manufacturing firms in a developing country context. Owing to the study's focus on manufacturing firms in Uganda, results may not be able to represent the perceptions of accountants of all companies in Uganda or other countries and further research is recommended to explore the perceptions of accountants in different industry sectors or countries to obtain a more comprehensive understanding of the relationship between environmental management practices, intellectual capital, and sustainability performance.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Both developed and developing countries have conducted substantial research on sustainability performance (e.g., Artiach et al., 2010; Abdul-Rashid et al., 2017; Basri and Siam, 2019). This is a result of businesses being expected, without a doubt, to continue to add value to their many stakeholders, including shareholders, clients, and society at large (Basri and Siam, 2019). While consumers and society at large want reasonably priced, high-quality goods and services as well as a healthy environment, shareholders anticipate a consistent dividend payment each year. In order to be able to meet the varying needs of their stakeholders, businesses must ensure good sustainability performance (Karpoff, 2020).

Sustainability performance has been defined as the performance of a firm in all aspects and for all corporate sustainability drivers (Burawat, 2019; Schaltegger and Wagner, 2006). This definition means that an organization's performance needs to capture financial performance, operational performance, environmental performance, and social performance. This is in agreement with Younis & Sundarakani (2020). This therefore means that improvements in sustainability performance, according to Abdul-Rashid et al. (2017), help to mitigate damages caused by industrial activities which in turn improves the quality of life of all creatures in the universe and protection of future generations from the impact of resource scarcity.

Globally, sustainability performance among manufacturing firms is of great concern as most of the manufacturing companies focus on financial performance at the expense of environmental and social performance. For example, one of the United Kingdom's biggest dairy farms was fined £1.52 Million for polluting the Cornwall River at the crown court on 23rd June 2022. (Kaminski, 2022). In the USA, DuPont, makers of Teflon were fined $10.25m plus $6.2 by the environmental agency for failure to disclose substantial risks about PFOA which caused human harm, including pregnancy-induced

hypertension, kidney and testicular cancers, and ulcerative colitis and an additional settlement for personal injury claims of $670.7 million for more than 3,500 people (Gaber et al., 2023).

In Uganda, the situation is not any different, for instance, the National State of the Environment Report Uganda published by NEMA (2021) noted that manufacturing firms exploit the environment as a sink for pollutants and waste. Particulate matter (PM2.5 and PM10) emissions were discovered to be the primary cause of air pollution at several sites throughout air quality monitoring. These pollutants come from burning rubbish and industrial boilers, furnaces, and incinerators.

Yu and Ramanathan (2016) state that environmental management practices entail promoting environmental conservation efforts by employees, integrating environmental considerations into new product development, maximizing reuse and recycling of materials, and undertaking collaborative research projects which are key for improved sustainability performance. Improvements in environmental management practices help to mitigate damages caused by industrial activities which in turn improve overall sustainability performance and this has a ripple effect on the quality of life of all creatures in the universe and protection of future generations from the impact of resource scarcity (Abdul-Rashid et al, 2017). This therefore means that manufacturing firms need to be deeply concerned about the future to operate better now.

Several explanations for corporate sustainability performance exist in the literature. For example, corporate governance (Hussain et al., 2018), sustainability manufacturing processes (Abdul-Rashid, Sakundarini, Ghazilla, and Thurasamy, 2017), green management (Raharjo, 2019), proactive sustainability strategy (Wijethilake, 2017), reverse logistics (Banihashemi, Fei, and Chen 2019), green supply chain management (Geng, Mansouri, and Aktas 2017; Younis, Sundarakani, and Vel 2016; Laosirihongthong, Adebanjo and Tan, 2013), firm characteristics (Lourenco and Branco, 2013), sustainability performance management (Gadenne, et al.,2012) and voluntary disclosures (Razaee and Tuo, 2017). The majority of the studies link intellectual capital to performance in terms of financial and non-financial performance without focusing on social and environmental performance. For example, Hussinki et al. (2017) found intellectual capital and the performance of firms in Finland to

be significantly associated. Locally, Bananuka et al (2022) found intellectual capital to be significantly associated with sustainability performance disclosures using evidence from manufacturing firms in Uganda. Also, Nkundabanyanga (2016) found intellectual capital to be significantly associated with the financial performance of service firms in Uganda. Further, Kaawaase et al (2020) found that intellectual capital is significantly associated with the financial and operational performance of Small and Medium Audit Practices in Uganda.

An examination on rebooting the Manufacturing Sector Post the Covid-19 Pandemic in Uganda by Financial Sector Deepening (2022) noted that the size and individual production capacity of the manufacturing firms explained their vulnerability to economic shocks. Small firms with low production capacity are more likely to find it difficult to modify and adapt in the face of economic disturbances. This is in line with literature from Obwona et al (2014), whose research revealed that eight out of ten manufacturers employ fewer than 35 people, and nearly five out of ten employ fewer than ten people which reflects a limitation in finances that can be used to develop intellectual capital to help the manufacturing firms achieve profitability and sustainability through the use of skilled intellectual capital. This is because the majority of manufacturers are modest small companies that rely mainly on personal resources and informal credit from family and friends which can't financially sustain manufacturing firms. Such firms are more concerned about financial survival than social and environmental performance.

Except for Bananuka et al (2021) whose study documented a significant relationship between environmental management practices and environmental performance, and Bananuka et al (2022) whose other study documented a significant relationship between Intellectual capital and sustainability reporting practices, not many studies exist in the literature documenting the combined effect of Environmental Management Practices, Intellectual Capital and sustainability performance using evidence from Uganda. But more to this is the evident concern that there are no studies that suggest a model or approach that manufacturing firms can use to ensure sustainable performance; a solution that will help firms to strategically employ intellectual and environmental practices in a way

that not only ensures sustainable performance financially and operationally but also environmentally and socially. For any manufacturing firm to stand the test of time it must be mindful of both its internal and external environments. It must not only focus on its financial and operational performance but its social and environmental performance too which begs an All-Stakeholder Sensitive Approach or model in the employment of Intellectual Capital and implementation of environmental practices (in compliance with the Ugandan laws/NEMA) for sustainability performance.

Existing studies on sustainability performance focus on other countries other than Uganda and it is unclear whether such study results can be generalized to Uganda. This is because there are differences in laws and there are no universally accepted laws to manage environmental management practices, intellectual capital, and sustainability performance. The study will add the intellectual capital aspect of the manufacturing firms' sustainability to the study by Bananuka, Bakalikwira, Nuwagaba, and Tumwebaze, (2021) about Institutional pressures, environmental management practices, firm characteristics, and environmental performance. Therefore, the need to close existing gaps in the literature and to suggest a model for improvement of sustainability performance in Uganda's manufacturing firms motivated this study.

1.2 Statement of the Problem

The improvement in the sustainability performance of manufacturing firms is critical to the achievement of sustainable development goals. In Uganda, the National Environmental Management Authority (NEMA) has carried out environmental management practices with different stakeholders with diverse intellectual capital to ensure the sustainability of manufacturing firms. Evidence however has indicated that a number of firms under the Uganda Manufacturing Association (UMA) are not performing well in all aspects of sustainability performance (Economical, Social, Operational and Environmental). Despite NEMA's efforts to ensure environmental and social compliance, manufacturing firms continue to exploit the environment for sink pollutants and waste in Uganda. The 13th National State of Environment Report (NSOER) 2018-2019 published by NEMA in 2021 reported inadequate waste management practices, emission of harmful gases into the air, construction, expansion, and

operation of facilities without approvals, noise pollution, inappropriate handling of waste, and limited use of personal protective equipment as the major areas of non-compliance by manufacturing firms. Economically, Uganda Clays Limited (UCL) reported half-year net profit dropping by more than half to Shs2.7b in Financial Year 2022 due to increased investment in sustainability costs (UCL, 2022). These statistics reveal that substantial investment is required for firms to ensure sustainability performance. Socially, Conform Uganda was fined UGX 3b for infringing on Megha industries' mattress cover design. (Monitor updated, (2021). Given that most manufacturing firms focus on profit maximisation at any cost amidst the increased need for environmental management practices and the requirement for the ever-evolving intellectual capital, this study argues that poor sustainability performance could be attributable to a lack of sufficient amount of Intellectual Capital and inadequate Environmental management practices which pose a threat to the quality of life on earth.

1.3 Purpose of the Study

This study sought to investigate the relationship between environmental management practices, intellectual capital, and the sustainability performance of manufacturing firms in Uganda.

1.4 Study Objectives

i. To examine the relationship between environmental management practices and the sustainability performance of manufacturing firms in Uganda.
ii. To examine the relationship between intellectual capital and the sustainability performance of manufacturing firms in Uganda.
iii. To examine the predictive power of environmental management practices, intellectual capital on the sustainability performance of manufacturing firms in Uganda.

1.5 Research Questions

i. What is the relationship between environmental management practices and the sustainability performance of manufacturing firms in Uganda?
ii. What is the relationship between intellectual capital and sustainability performance on manufacturing firms in Uganda?

iii. What is the predictive power of environmental management practices and intellectual capital on the sustainability performance of manufacturing firms in Uganda?

1.6 Scope of the study

1.6.1 Geographical Scope

This study covered manufacturing firms in Uganda that were members of the Uganda Manufacturers Association (UMA, 2020). This was because, according to Bananuka et al. (2022), manufacturing firms are known to pollute the environment. Bananuka et al. (2022) further indicate that manufacturing firms generate carbon dioxide emissions, generate waste, and use natural resources such as minerals and forests in the production process.

1.6.2 Content Scope

The study treated environmental management practices and intellectual capital as independent variables. The outcome variable was sustainability performance. This study used the resource-based view as the critical theoretical foundation.

1.6.3 Time Scope

This study covered one academic year (2021 / 2022).

1.7 Significance of the Study Scope

The findings of this study, therefore, contribute in the following ways:

i. The findings of the study provide insight and information to managers and accountants on ways in which environmental management practices and intellectual capital are essential for the achievement of competitive advantage in terms of sustainability performance.

ii. The findings of the study help the government (including National Environmental Management Authority) in guiding policy formulation.

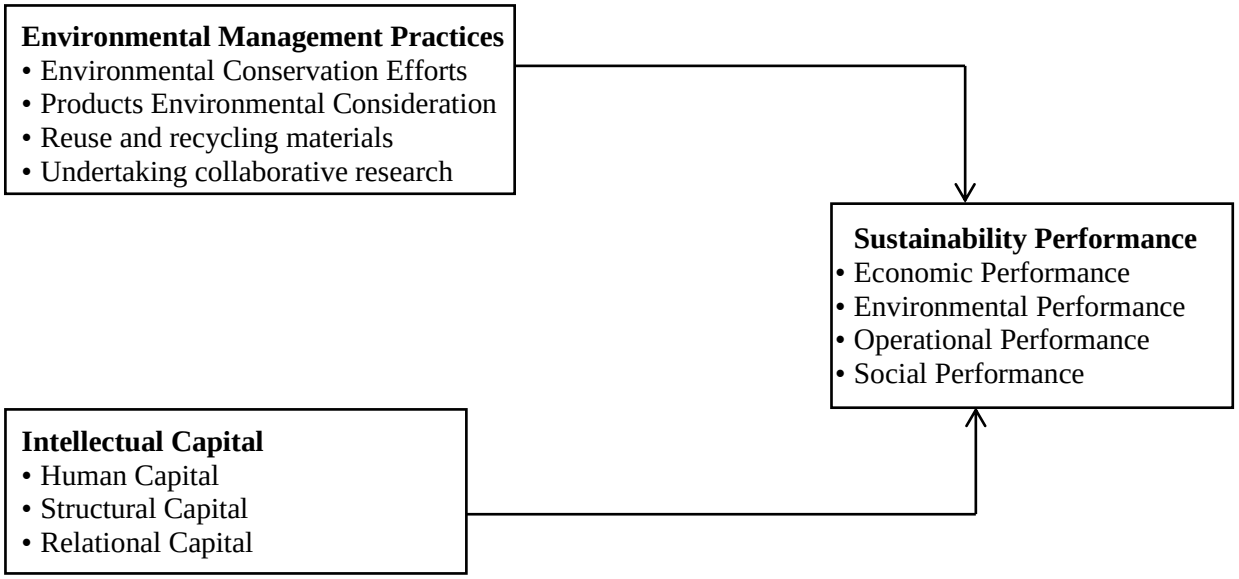
iii. This study add knowledge to the existing literature on sustainability performance by documenting the association between environmental management practices, intellectual capital, and sustainability performance of manufacturing firms using evidence from Uganda.

iv. This study also suggested areas for further research on the topic.

1.8 The Conceptual Framework

This conceptual framework was adopted and modified from the works of Barney et al (1991), Bontis et al., 1998; Famiyeh et al. (2018) and Ru and Ramanathan (2016), Wijethilake (2017) and Younis & Sundarakani (2020). The framework below shows that the independent variables; environment management practices characterized by environmental conservation efforts, products environmental consideration, reuse, and recycling materials and undertaking collaborative research, and Intellectual capital entailing human, structural, and relational capital influence sustainability performance in terms of economic, environmental, operational and social performance. It can be argued that environmental management practices and intellectual capital when efficiently employed improve sustainability performance.

Figure 1. 1 Conceptual Framework



Source: *Barney et al (1991), Bontis et al., 1998; Famiyeh et al. (2018) and Ru and Ramanathan (2016), Wijethilake (2017) and Younis & Sundarakani (2020).*

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter critically presents the review of existing literature related to environmental management practices, intellectual capital and sustainability performance. It also includes the relationship between environment management practices, intellectual capital and sustainability performance.

2.1 Theoretical Foundation

The Resource-Based View (RBV) hypothesis (Barney, 1991), which contends that businesses with internal resources and capabilities such as environmental management techniques and intellectual capital have superior sustainability performance, serves as the theoretical foundation for this study. One of the most popular theoretical approaches used to explain differences in inter-firm performance is RBV theory (Barney and Griffin, 1992). It is predicated on the idea that companies have resources that can be converted into capabilities and strategic assets; but, for businesses to benefit from these, the resources, capabilities, and assets must be priceless, uncommon, unique, and non-substitutable. According to Grant (1991), resources are essential ingredients in the creation and provision of goods and services. They can be tangible or intangible assets.

Firms with resources like intellectual capital in terms of human, relational, and structural capital have an advantage over those that do not. Additionally, these firms are more likely to employ improved environmental management techniques, such as promoting environmental protection, incorporating environmental concerns into product development, maximizing the use of recycled materials, and participating in joint studies on environmental management and performance. If a company effectively uses its intellectual capital and incorporates sound environmental management techniques into its production, marketing, and management processes, it is likely to perform better in terms of sustainability performance.

2.2 Definition of Key Terms

2.1.1 Sustainability performance

According to Adams, Muir, and Hoque (2014), a performance that is considered sustainable includes natural resource conservation and emission levels, other environmental activities and initiatives, aspects of employment, occupational health and safety, community relations, stakeholder involvement, and economic impacts of the organization's activities other than those measured by the financial metrics used in the financial accounts. Another definition of it is a company's success across all facets and for all corporate sustainability drivers (Burawat, 2019; Schaltegger and Wagner, 2006). According to this definition, the performance of an organization must include its financial performance, operational performance, environmental performance, and social performance. This concurs with what Younis and Sundarakani have said (2020).

2.1.2 Environmental Management Practices

Practices that reduce the environmental harm caused by commercial activities are referred to as environmental management practices (Grolleau et al., 2007). According to Yu and Ramanathan (2016) and Montabon et al. (2016), these practices include encouraging employees to engage in environmental conservation efforts, incorporating environmental concerns into the process of developing new products, maximizing material reuse and recycling when developing products and processes, and working together on research projects with universities on environmental management. For this study the researcher defines environmental management practices as practices that entail promoting environmental conservation efforts by employees, integrating environmental considerations into new product development, maximizing reuse and recycling of materials, and undertaking collaborative research projects which are key for improved sustainability performance (Yu and Ramanathan, 2016).

2.1.3 Intellectual Capital

Bontis (1998) defined Intellectual capital as the pursuit of effective use of knowledge as opposed to information. However according to Edvinsson & Malone (1997), intellectual capital is a firm's

possession of the knowledge, experience, organizational technology, customer relationships, and professional skills needed to achieve a competitive edge in the market. Nkundabanyanga (2016) defined intellectual capital as the cumulative expression of the intangible assets possessed by a firm. Additionally, Kianto, Saenz & Aramburu (2017) defined intellectual capital as the sum of all the intangible and knowledge-related resources an organization uses to create value. From the definitions, intellectual capital is the sum of all the intangible assets of an organization that help it achieve a competitive advantage. Intellectual capital (IC) has been playing a vital role in the corporate, institutional, and academic areas in the so-called modern knowledge economy, assisting the shift toward innovative, competitive, and sustainable organizational development. In a larger sense, IC can be described as the collection of employee abilities that, when combined with organizational structure and stakeholder connections, can convey with some degree of accuracy the organizational potential for value generation (Joshi, M. et al, 2013). As a result, IC includes people and their skills (human capital), organizational culture and technology (structural capital), and relationships (relational capital), giving businesses a competitive edge (Kianto, A. et al, 2014; Xu & Wang, 2018)

In this study, intellectual capital will be defined as "the sum of all knowledge that an organization can leverage in the process of conducting environmental management practices to gain competitive advantage." (Lopez- Gamero et al. 2011).

2.2 Environmental management practices and sustainability performance

Numerous studies have examined the relationship between environmental management practices and sustainability performance in manufacturing firms. (Park et al., 2019). Although there are few studies that link environmental management practices to sustainability performance, those that do exist have found a strong correlation between environmental management practices and environmental performance (e.g., Bananuka et al., 2021). Furthermore, Klassen and McLaughlin (1996) draw the conclusion that environmental performance is significantly influenced by environmental management techniques (such as product and operational technologies and environmental

management systems). Additionally, Theyel (2000) discovers that environmental performance is significantly and favorably correlated with environmental management methods (such as total quality management for pollution prevention and personnel pollution prevention training programs) (reduction of chemical waste). Similar to this, a recent study by Yu and Ramanathan (2016) finds that environmental performance is favorably correlated with environmental management methods (such as internal green management and green product/process design).

In a study by Famiyeh et al. (2018), it was found that environmental management practices are positively associated with environmental performance. It was also found that the adoption of Environmental management practices leads to significant enhancements in environmental performance, as measured by the toxicity of the elements present in the toxic release inventory (King et al. 2005). Similarly, Moise et al. (2021) established that the implementation of environmentally friendly practices is very likely to ensure enhanced environmental performance as measured by reduction in air pollutant emissions, effluent waste, solid waste, and the consumption of toxic materials. Tung et al. (2014) found that Australian manufacturing companies that implemented EMPs achieved higher environmental performance than those without EMPs. Moreover, Sroufe (2003) posits that an effective and efficient EMP can aid a company to sustain and enhance the environmental aspects of its operations.

Evidence presented by Hertin et al. (2008) in their study of five industrial sectors within six European countries concluded that a positive association exists between Environmental management practices and environmental performance. However, the study observed that the impact of EMP on environmental performance was insignificant suggesting that Environmental management practices may not be a strong driver of environmental performance. Thus, although Environmental management practices are a driver of environmental performance, their impact tends to be small where it is voluntarily adopted. Melnyk et al. (2003) observed that the impact of Environmental management practices on environmental performance tends to be insignificant where environmental practices do not follow internationally certified or standardized procedures and processes. Thus, the

degree of adherence of a firm's Environmental management practices to internationally certified or standardized procedures or processes influences the level of environmental performance achieved by the firm. Companies without any form of EMP implementation did not achieve improved environmental performance. In light of the fact that the majority of prior studies have linked environmental management methods to environmental performance, this study contends that it is likely that these approaches can also result in increased sustainability performance.

2.3 Intellectual capital and sustainability performance

Several studies link intellectual capital to firm performance (e.g. Lee & Lin, 2019; Nawaz& Haniffa, 2017; Andreeva & Guranina, 2016; Cleary & Quinn, 2016; Dabic, Laznjak, Smallbone & Svarc, 2019; Cricelli, Greco, Grimaldi & Duenas, 2018; Hussinki, Ritala, Vanhala & Kianto, 2017; Khalique, Bontis, Shaari, Yaacob & Ngah, 2018; Komnenic & Pokrajcic, 2012; Dzenopoljac, Janosevic and Bontis, 2016; Dzenopoljac, Yaacoub, Elkanj & Bontis, 2017; Ginesti, Caldarelli & Zampella, 2018) and ignore aspects of firm performance such as social and environmental performance. According to the analysis of the key factors influencing operating performance from the perspective of intellectual capital, it was found that human capital is critical for operating performance (Lee & Lin, 2019). Lee and Lin (2019) further document that operating performance is better for accountancy firms in China with young employees, a large number of field staff, high invested labor costs, long business age, more management consulting, and a high marketing expense ratio. Furthermore, Nawaz & Haniffa (2017) in their study of the determinants of financial performance of Islamic banks found that overall intellectual capital is significantly associated with financial performance. Nawaz & Haniffa (2017) also document that both human and relational capital efficiency were significant predictors of financial performance, unlike structural capital efficiency.

Dzenopoljac et al. (2016) discovered a strong correlation between intellectual capital and the financial performance of Serbian Information Technology companies. Similarly, using evidence

from the Arab region, Dzenopoljac et al (2017) document that earnings and profitability are significantly affected by structural and physical capital while market performance is mainly influenced by human capital. Ginesti et al (2018) found intellectual capital to be significantly associated with financial performance.

Intellectual capital has a substantial impact on Saudi Arabian and Bahraini companies' accounting-based performance rather than their market-based performance (Hamdan, 2018). Jordao and de Almeida (2017) discovered a strong correlation between intellectual capital and the financial sustainability (long-term success) of Brazilian businesses. Another study found a strong correlation between Finnish enterprises' success and their intellectual capital (Hussinki et al., 2017). Taiwan, Lu (2017) provides evidence that performance is strongly correlated with intellectual capital (human, relational, and structural) (financial and operational performance). Intellectual capital is strongly correlated with sales growth and market value of Indian listed enterprises, according to Smriti & Das' (2018) research. A significant connection between intellectual capital and company performance was earlier discovered by Bontis (1998).

Nkundabanyanga (2016) found intellectual capital to be significantly associated with the financial performance of service firms in Uganda. Also, Kamukama, Ahiauzu & Ntayi (2011) found a significant association between intellectual capital and the financial performance of micro-financial institutions in Uganda. Furthermore, Kaawaase et al (2020) found that intellectual capital is significantly associated with the financial and operational performance of Small and Medium Audit Practices in Uganda. Given that there are conflicting results about the relationships between the components of intellectual capital and performance, this matter needs more research. However, the bulk of research shows a strong correlation between intellectual capital and successful financial and operational outcomes. With the exception of Vale, J. et al (2022) who found that the organization’s sustainable performance was affected by all its intellectual capital components (human, structural, and relational), there is no other data showing a connection between intellectual capital and sustainability performance to the author’s knowledge.

2.4 Environmental management practices, intellectual capital, and sustainability performance.

Numerous studies have examined the relationship between intellectual capital, environmental management practices, and sustainability performance. Chen et al. (2005) conducted an empirical investigation to examine the relationship between intellectual capital and firms' market value and financial performance (Chen et al., 2005). The study used data from Taiwan's listed companies and found that intellectual capital has a positive impact on market value and financial performance and may be an indicator for future financial performance. The authors also found that investors may place different value on the components of value creation efficiency, including physical capital, human capital, and structural capital (Chen et al., 2005). Furthermore, Bontis et al. (2000) conducted a study in Malaysian industries to investigate the relationship between intellectual capital and business performance (Bontis et al., 2000). The study found that human capital is important regardless of industry type and has a greater influence on how a business should be structured in non-service industries compared to service industries. The study also found that customer capital has a significant influence over structural capital, and the development of structural capital has a positive relationship with business performance (Bontis et al., 2000). Additionally, Malik et al. (2020) conducted a study on the pathways towards sustainability in organizations, focusing on the role of green human resource management practices and green intellectual capital (Malik et al., 2020). The study found that green HRM practices and green intellectual capital can affect sustainability, and that they can help in providing environmentally aware and committed employees, leading to competitive advantage and sustainability for organizations (Malik et al., 2020). Nakyeyune et al. (2022) investigated the relationship between knowledge management practices, intellectual capital, and sustainability reporting practices (Nakyeyune et al., 2022). The study found that intellectual capital and knowledge management practices are significantly related to sustainability reporting practices, and that intellectual capital mediates the relationship between knowledge management practices and sustainability reporting practices (Nakyeyune et al., 2022). Similary, Gopalakrishna-Remani et al., (2022) examined the impact of employees' perceptions about top management

engagement on sustainability development efforts and firm performance. The study also found that perceived top management's strong beliefs and active participation in sustainability adoption lead to a higher level of sustainability adoption by organizations, which in turn results in better environmental and financial performance (Gopalakrishna-Remani et al., 2022). Overall, these studies provide evidence for the positive relationship between intellectual capital, environmental management practices, and sustainability performance. Intellectual capital, including human capital, structural capital, and customer capital, plays a crucial role in creating corporate value, building sustainable advantages, and promoting sustainability in organizations. The integration of green HRM practices and green intellectual capital can contribute to sustainability and competitive advantage. Additionally, knowledge management practices and intellectual capital are important factors in influencing sustainability reporting practices and firm performance. However, there is limited research expounding on the combined effect of environmental management practices, intellectual capital, and sustainability performance of manufacturing firms in Uganda. The study, therefore, seeks to examine the existence of a relationship.

2.5 Control Variables

Failure to isolate control variables, according to Bartov, Gul Tsui (2000), could potentially affect the outcomes. Therefore, variables such as firm size, firm age, capital structure, possession of environmental management system, gender diversity, board nationality, and board expertise are controlled for. Previous studies found that firm size is significantly associated with sustainability performance (see Zaid et al., 2020; Younis and Sundarakani, 2020; Naciti, 2019; Lourenco & Branco, 2013; Artiach et al., 2010; Younis et al., 2016). For firm age, there is evidence that significant associations with sustainability performance do not exist (see Younis & Sundarakani, 2020; Zaid et al., 2020; Younis et al., 2016). Capital structure has not been linked to sustainability performance before but rather to the adoption of international financial reporting standards where it has been found non-significant (see Bananuka et al., 2019) and to financial performance where it was found significant (see Al-Kayed et al., 2014). The possession of environmental management

systems is significantly associated with sustainability performance (see Younis & Sundarakani, 2020). Further, Gonzalez et al. (2008) document that Environmental Management System certification improves environmental performance. Boards with members of different backgrounds such as nationality, financial and sustainability expertise, or those boards that are gender balanced are effective in ensuring corporate sustainability. For example, Orij (2010) argues that women are more oriented to social problems than men and this means that females are more inclined to use social reasoning, which enables them to establish relationships aimed at solving the needs of others. Furthermore, Naciti (2019) found that board diversity in terms of gender and nationality is positively and significantly associated with sustainability performance.

CHAPTER THREE

METHODOLOGY

3.1 Research Design

A cross sectional research design was used for this study. The researcher preferred a cross section research design because it allows data on all variables to be collected at once, thus, allowing the researcher to measure prevalence of all variables under investigation on spot (Sedgwick, 2014). This study also used a combination of descriptive and correlational designs that mainly use quantitative research methods. Quantitative research methods are preferred since data can easily be communicated through statistics and numbers. Burns & Grove (1993) define quantitative research methods as a formal, objective and systematic process of describing and testing relationships and examining cause and effect interactions among variables and Creswell (1994) says that quantitative research explains a phenomenon after collecting numerical data using a self-administered questionnaire which is analyzed using a mathematical based method (statistics) in this case the researcher used statistical package for social scientists (SPSS) as a mathematical tool. The descriptive and correlational designs were used to describe data and examine relationships between the study variables.

3.2 Study Population

The study population comprised 606 manufacturing firms of tangible goods and services that are members of the Uganda Manufacturers Association (Uganda Manufacturers Association, 2020). The manufacturing firms are spread countrywide and those in central Uganda constitute 85% of the manufacturing firms that are members of the Uganda Manufacturers Association.

3.3 Sample size Unit of Inquiry and Unit of Analysis

From a population of 606 manufacturing firms, a sample of 234 manufacturing firms was selected. The sample size determination was based on the guidelines provided by Krejcie and Morgan Table of 1970. According to Amin (2005), a response rate of 70% or higher is considered to be a good response rate. The overall response rate was roughly 70% (161 people out of 234).

The unit of inquiry was Chief Finance Officers, Production managers, Operations managers, and Environmental officers since they are directly involved in the environmental management practices and sustainability performance of the company. The unit of analysis was a manufacturing firm.

3.4 Sampling procedure

This study used simple random sampling without replacement since only those manufacturing firms in the central region were selected for this study. Given that the list of the members of the Uganda Manufacturers Association was obtained, it was easy to reach out to those sampled firms. A rotary method was used to draw the sample. This involved writing the name of each business on a piece of paper, then folding and putting it in a tin. Thereafter, one folded paper is picked at a time without replacing until a determined sample while respondents were selected.

3.5 Data Sources

Primary data relating to the study variables was directly obtained from respondents for this study.

3.6 Data Collection Procedure and Instrument

A questionnaire was used as a data collection instrument. The questionnaire was designed on a six (6) likert scale measuring the extent of Agree and disagreement with a given statement. The questionnaire consisted of three sections. The first section of the questionnaire contained items on the demographic characteristics of the respondents like level of education and gender among others. This was followed by items on Intellectual Capital, Environmental management practices, and Sustainability performance.

Questionnaires were distributed by the researcher to the Chief Finance Officer, Production manager, Operations manager, and Environmental officer in each firm. Data was collected in a period of three months, and this gave the researcher time to analyze and interpret data.

3.7 Measurement of variables

This study's dependent variable is sustainability performance. Scholars such as Younis & Sundarakani (2020) operationalize sustainability performance in terms of economic performance,

operational performance, social performance, and environmental performance. Younis & Sundarakani's (2020) measurement of sustainability performance is clearer as compared to the GRI guidelines which focus only on environmental, social, and economic performance indicators. In this study, sustainability performance was operationalized in terms of economic, operational, social, and environmental performance. The independent variables include environmental management practices and intellectual capital. Studies such as Bananuka et al (2021) and Montabon et al. (2007), measured environmental management practices in terms of the promotion of environmental conservation efforts by employees, integration of environmental considerations into the new product development process, maximization of reuse and recycling of materials when developing products/processes, and undertaking collaborative research projects with universities on environmental management. This study utilized such measures of environmental management practices. The operationalization of intellectual capital followed earlier scholars and was operationalized in terms of human, structural, and relational capital (see Bontis, 1998; Nkundabanyanga, 2016; Kaawaase et al., 2020).

Table 3. 1Measurement and operationalization of variables

Global variable	**Dimension**	**Issues to examine**	**Measurement**	**Sample questionnaire items**
Environmental Management Practices	Environmental Conservation Efforts	Employee practices that entail promoting environmental conservation efforts (Yu and Ramanathan, 2016).	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	Our firm has consistently sensitized employees on the need to minimize on water consumption.
	Products Environmental Consideration	Practices that entail integrating environmental considerations into new product development (Yu and Ramanathan, 2016).	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	We have developed environmental control mechanisms.
	Re-use and recycling of materials	Practices that entail maximizing reuse and recycling of materials (Yu and Ramanathan, 2016).	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	Our firm considers opportunities for reuse/recycling/recovery of material when designing products/processes.

	Undertaking Collaborative Research	Practices that entail undertaking collaborative research projects (Yu and Ramanathan, 2016).	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	Our firm collaborates with universities and other institutions of higher learning in conducting research related to environmental management
Intellectual Capital	Human Capital	The value that the employees of a business provide through the application of their skills, know-how, and expertise (Nkundabanyanga, 2016; Kaawaase et al., 2020)	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	We have self-driven employees.
	Structural Capital	The supportive infrastructure, processes, and databases of an organization that enable human capital to function Nkundabanyanga, 2016; Kaawaase et al., 2020	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	Our systems make it easy to access relevant information.
	Relational Capital	The value inherent in a company's relationships with its customers, vendors, and other important constituencies. (Nkundabanyanga, 2016; Kaawaase et al., 2020	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	Our clients appreciate the use of sustainability reports.
Sustainability Performance	Economic Performance	The results or outcomes of economic activity, such as growth, investment, profitability, return on capital (Burawat, 2019; Schaltegger and Wagner, 2006).	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	Our retained earnings figure has continued to increase overtime.
	Environmental Performance	Economic activity impacts or consequences on the environment, society, and future generations (Burawat, 2019; Schaltegger and Wagner, 2006).	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	Our firm has consistently registered reductions in the fines paid and remediation costs regarding environmental damage.
	Operational Performance	The effectiveness and efficiency of a company's day-to-day operations to achieve its goals and objectives (Burawat, 2019; Schaltegger and Wagner, 2006).	Respondents' mean score of items included in the questionnaire on a 6 -point Likert scale	Quality development processes of our company is better than that of key competitors.
	Social Performance	The impacts or consequences of economic activity on society, people, and	Respondents' mean score of items included in the questionnaire	We have improved our corporate image over the years.

		future generations (Burawat, 2019; Schaltegger and Wagner, 2006).	on a 6 -point Likert scale	

3.8 Data Analysis

Data was analyzed using SPSS software. Before data analysis, the questionnaires were checked for completeness, coded and later entered in SPSS. Frequency runs were made to identify missing values and data out of range. This was followed by factor analysis and descriptive analysis. After descriptive analysis, correlation and regression tests were done and presented in tables.

3.9 Validity of research instrument

Validity refers to the accuracy of an instrument in measuring whatever it is intended to measure (Field, 2009; Creswell, 2009). Validity is therefore the degree or extent of accuracy of results obtained from analysis of data which represent the actual situation under study. It is also the appropriateness of data collection instruments used to measure whatever it is supposed to measure. The validity of the questionnaire was evaluated by use of the content validity index (CVI), using the following formula: Content validity index (CVI) = Number of questions deemed valid

The total number of questions in the questionnaire

Table 3. 2 Content Validity index

Content validity index	
Variable	**CVI**
Intellectual capital	0.94
Environmental Management practices	0.95
Sustainability performance	0.93
Average CVI	**0.94**

Source: Primary data

The instrument is valid in this research if the content validity is above 0.7. From the table above, the content validity index for the variables was 0.94 which implies that the instrument passed the content validity test.

3.10 Reliability of research instruments

Field, (2009) defines reliability as the measure of the consistency of the results from an instrument after repeated trials. Reliability has also been defined as the extent to which a degree of random error is present in the measurements taking place, since reliable measurements contain only a very small amount of error (Cooper & Schindler, 2003). The data collected was analysed for reliability using SPSS Version 20 software to calculate Cronbach's alpha, which serves as an index of the true score of the underlying construct. This analysis is referred to as test-retest reliability, measuring the probability of similarity or overlap in stability (Silverman, 2016). Cronbach's Alpha is a measure of internal consistency that is how closely related a set of items are as a group (Cronbach, 1951). An alpha of 0.5 or more was considered valid (Field, 2009; Sekaran, 2003). However as per Nunnally (1978), a scale is deemed to be reliable if its Cronbach is greater than 0.6 ($\alpha = > 0.6$).

Table 3. 3 Reliability statistics

Variable	Number of items	Cronbach Alpha Value
Intellectual capital	36	0.824
Environmental management practices	41	0.946
Sustainability performance	76	0.953
	166	

Source: Primary data

The findings from the investigation revealed that the research tool exhibited dependability, which was evaluated through the Cronbach Alpha Value. Every item measurement obtained a minimum score of 0.824, surpassing the satisfactory threshold of 0.70 (Amin, 2005). This affirmed that the research tools-maintained reliability and were therefore considered reliable and appropriate for gathering data in this study.

3.11 Exploratory factor analysis

This is a technique for identifying groups or clusters of variables (Field, 2009). For purposes of this research, factor analysis was used to reduce the data to better explain the study constructs. The constructs used in the variables of the conceptual framework were tested using factor analysis to

establish whether they were good measurements. The extraction method used was the principal component analysis and the rotation method was Varimax with Kaiser Normalization. Items under Environmental Management Practices, Intellectual Capital and Sustainability performance with a correlation less than 0.5 were excluded from the rotation tables. To establish the adequacy and suitability of the data for EFA, Kaiser-Meyer-Olkin (KMO) and Bartlett's test were assessed. The rule of thumb is that the KMO value should be above 0.7 and Bartlett's test should be significant ($p < .05$) (Field 2009). The results in table 3 below indicate that there was sampling adequacy and suitability for the researcher to carry out EFA (KMO > .7) and Bartlett's test (p .000).

Table 3. 4KMO and Bartlett test of sphericity

Variables	CVI	KMO	Barlett test's test of sphericity approx. X2	Df	Sig.	No. of items	Variance extracted
Intellectual capital	0.94	.667	224.1	56	.000	36	74.6
Environmental Management practices	0.95	.792	1962.2	60	.000	41	74.2
Sustainability performance	0.93	.799	3283.3	231	.000	76	67.7

The content validity index for the variables above recommended KMO value of above 0.5 and a significance level for the Bartlett's test below 0.05 implies that the instrument passed the content validity test. Bartlett's test of sphericity in all scales reached a statistical significance of .000 for each scale and the KMO values for the study variables are all above 0.6 which is acceptable implying that the data was suitable for factor analysis. Items with factor loadings above 5 were considered for the study. The number of items considered under Intellectual capital were 36 with variance extracted of 74.6, 60 items for Environmental practices with variance extracted of 74.2 and 76 items for sustainability performance with a variance extracted of 67.7.

3.11.1 Factor Analysis for Environmental Management Practices

Results in table below, show that four constructs were appropriate for measuring Environmental

Management Practices, given that they explained 74.2% of the total variance. The construct undertaking collaborative projects explained most, with 27.5% of the variance, Product environmental considerations followed with 24.7%, Maximising reuse and recycling of materials explained 12.2% while environmental conservation efforts explained 9.7% of the variance. Also, from the findings, undertaking collaborative projects construct is the most important (with eigen values of 4.4), followed by Product environmental considerations with eigen values of 3.9. Maximising reuse and recycling of materials and environmental conservation efforts are not that important (with eigen values 1.96 and 1.55 respectively).

Table 3. 5Factor analysis for environmental practices

Environmental practices	Undertaking collaborative projects	Product environmental considerations	Maximizing reuse and recycling of materials	Environmental conservation efforts
Our firm collaborates with universities and other institutions of higher learning in conducting research related to environmental management	.888			
Our firm has had or is considering a knowledge transfer partnership with a university or college to improve our environmental performance	.882			
Our firm collaborates with international bodies dealing with research on environmental management	.880			
We always elaborate the environmental report	.860			
We always provide our environmental report to those interested in it	.829			
We have developed environmental control mechanisms		.860		
All strategic, long term, corporate decisions in our firm are made after due consideration to environmental criteria		.849		
We started diagnosing environmental issues		.825		
Our firm considers environmental matters while developing new products		.784		
Our organization has a cross-functional cooperation for environmental improvements		.415		
Our firm considers opportunities for reuse/recycling/recovery of material when designing products/processes			.880	
In this firm we recycle our biproducts residues			.853	

In this firm, we aim at ensuring that no bi product or any material goes to the dustbin			.803	
Our firm has consistently sensitized employees on the need to minimize on water consumption				.896
Our firm has consistently appealed to employees to work towards energy saving				.891
Our firm supports students undertaking research on environmental management				.902
Eigen values	**4.4**	**3.9**	**1.96**	**1.55**
Variance (%)	**27.5**	**24.7**	**12.2**	**9.7**
Cumulative (%)	**27.5**	**52.2**	**64.5**	**74.2**

3.11.2 Factor Analysis for Intellectual Capital

Results in table below, show that three constructs were appropriate for measuring Environmental Management Practices, given that they explained 74.6% of the total variance. The construct Human Capital explained the most, with 28.4% of the variance, Relational Capital followed with 26%, while Structural capital explained 20.3% of the variance. Also, from the findings, the Human Capital construct is the most important (with eigen values of 3.41), followed by Relational Capital with eigen values of 3.11. Structural Capital is not as important as the other two constructs with eigen values of 2.3.

Table 3. 6Factor analysis for Intellectual Capital

Intellectual capital	**Components**		
	Human capital	**Relational capital**	**Structural/ Organizational capital**
Our networks with our customers have made this firm what it is	.842		
We have self-driven employees	.807		
Our employees have good relationship with the customers	.755		
Level of commitment of our staff to work is high	.744		
Our employees complement each other in this firm	.516		
Our clients appreciate the use of sustainability reports		.925	
Our clients are knowledgeable in interpreting sustainability reports		.899	
There are available materials that guide us on the preparation of sustainability reports		.835	
Employees in this firm always search for knowledge		.506	
Our systems make it easy to access relevant information			.879

Our information systems are stable			.824
Our employees are experts in their jobs and functions			.806
Eigen values	3.41	3.11	2.3
Variance (%)	28.4	26	20.3
Cumulative (%)	28.4	54.3	74.6

3.11.3 Factor Analysis for Sustainability Performance

Results in the table below, show that the four constructs were appropriate for measuring sustainability performance, given that they explained 67.7% of the total variance. The construct Economic Performance explained the most, with 26% of the variance, Environmental performance followed with 19.3%, Operational performance explained 12.7% while social performance explained 9.7% of the variance. Also, from the findings, the Economic Performance Construct is the most important (with eigen values of 3.6), followed by Environmental performance with eigen values of 2.7. Operational performance and social performance are not as important as the other two constructs with eigen values of 1.78 and 1.36. respectively.

Table 3. 7Factor analysis for Intellectual Capital

	Component			
	Economic performance	**Environmental performance**	**Operational performance**	**Social performance**
We have registered reductions in water usage		.708		
Our firm has consistently registered reductions in levels of emissions		.757		
Our firm has consistently registered reductions in the fines paid and remediation costs regarding environmental damage		.922		
Our firm has consistently registered reductions in the costs of regulatory		.924		
Our equity stock has increased overtime	.947			
Our revenue growth rate is better than that of our key competitors	.872			
We have a higher revenue growth rate as compared to our peers in the same industry	.827			
Our retained earnings figure has continued to increase overtime	.943			
Quality development processes of our company is better than that of key competitors			.840	

Customer satisfaction of our company is better than that of key competitors	.810			
We control the market			.360	
Our clients customers refer other clients to our firm			.813	
Our social commitments have increased over the years				.775
We have improved our corporate image over the years				.910
Eigen values	3.6	2.7	1.78	1.36
Variance (%)	26	19.3	12.7	9.7
Cumulative (%)	26	45.3	58	67.7

3.12 Ethical considerations

An introductory letter was obtained from the faculty of graduate studies and research of Makerere University Business School. The researcher used the letter to obtain permission from management to carry out research in their organizations. The respondents were informed of the nature of the study to be carried out, the purpose of the study and reasons for the study. They were also assured of anonymity as the questionnaire wouldn't require them to write their names on it and this increased the respondents' level of confidentiality. This helped to minimize the suspicion that members could have had towards the whole exercise of data collection and to ensure that the researcher's motives for undertaking the study are not confused with any opportunistic tendencies. The researcher informed the respondents that any information collected about their personal lives would be held in strict trust.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF THE FINDINGS

4.1 Introduction

The presentation, analysis, and interpretation of study results are covered in this chapter. The presentation was made with the following goals in mind: to examine the relationship between environmental management practices and the sustainability performance of manufacturing firms in Uganda; to examine the effect of employee's intellectual capital and the sustainability performance of manufacturing firms in Uganda; to examine the combined effect of environmental management practices, intellectual capital and sustainability performance. Both qualitative and quantitative data were produced by the study. The results of the data analysis, which included factor analysis, correlation, and regression, are shown in tables. The demographics of the respondents are shown first, then the firm characteristics, and lastly results of the data analysis.

4.2 Firm Characteristics

Several demographic and firm characteristics were considered which were important in the interpretation of responses given.

4.2.1 Respondents Characteristics

Out of the 161 respondents, 75%(n=121) were male while 25%(n=40) were female. This implies that this sector is majorly dominated by male personnel, and this is consistent with Barnes (2018) who noted that the manufacturing sector in Uganda is overwhelmingly dominated by male personnel in both management and technical roles. The results also show that 72% (n=116) of the respondents were aged 35 years and below, followed by those aged between 36 – 45 years 19% (n=30), 8%(n=13) were between 46-55 years old and 1% (n=2) were 55 years and above. This implies that the age group most actively engaged in the manufacturing sector is 35 years and below. This data is consistent with the report (UBOS, 2019) which noted that youth employment in Uganda's manufacturing sector has increased with people between the ages of 18 and 30 making up the majority of those employed in the sector. The research yielded an intriguing discovery on the level

of education of the respondents. Out of the 161 respondents, 55% (n=89) had attained low or no formal education, followed by 19% (n=30) that had attained a bachelor's degree, 16% (n=26) had attained a diploma and 10% (n=16) had attained a master's degree. The findings align with the United Nations Development Program's (2019) emphasis on promoting inclusive growth and highlighting the potential of the manufacturing sector to generate employment opportunities for individuals with varying levels of education. The duration of service for the respondents had the majority at 66% (n=107) and these had spent less than 5years, followed by those who had spent between 5 to 10 years constituting 29% (n=47) and those above 16 years were 4% (n=7). These findings are in agreement with Kizza and Wakjira (2017), study which found out that the average length of service in manufacturing firms in Uganda is relatively short, with many employees spending less than three years in a given company.

Table 4. 1Respondent Characteristics

Demographic Factors		**Frequency**	**Percentage**
Gender of the respondent	Female	40	25%
	Male	121	75%
	Total	**161**	**100%**
Age of the respondent	Less or equal to 35 years	116	72%
	36-45 years	30	19%
	46-55 years	13	8%
	Above 55 years	2	1%
	Total	**161**	**100%**
Duration of service	16 years and above	7	4%
	5-10 years	47	29%
	Less than 5 years	107	66%
	Total	**161**	**100%**
Level of Education	Bachelor's Degree	30	19%
	Diploma	26	16%
	Master's Degree	16	10%
	Others include No formal education, Certificates at Primary, O level, A level	89	55%
	Total	**161**	**100%**

Source: Primary data

4.2.2 Firm Characteristics

From the table below, the results show that 58% (n=93) of the firms have between 1-10 employees, 13% (n=21) have between 11 – 20 employees, 12% (n=19) have between 21 – 30 employees, 2% (n=3) have between 31-50 employees, 9% (n=15) have between 51-100 employees while 6% (n=10) have 101 employees and above. This shows that the majority of the manufacturing firms have a small number of employees ranging from 1-10 employees. The findings also show that majority of the firms had been in operation for less than 5 years i.e., 60% (n=97) while a smaller percentage had been in operation for 5-10 years 17% (n=28) , 11-15 years 10% (N=16) and above 15 years 12% (n=20). These results point to an influx of entrepreneurs on the manufacturing sector following governments efforts to promote investment, entrepreneurship and growth of the manufacturing sector as further explained in the study by (Alinda, Tumwine, Kaawaase, Navrud, Nalukenge & Sserwanga, 2022).

The results further show that the capital structure of the majority of the firms is a mixture of Equity and Loans, and this made us 66% (n=106). 17% (n=28) of the firms only had Equity Capital, 16% (n=26) financed their operations from other sources such as money from friends. It was rather remarkable that only 1% (n=1) of the firms funded their operations entirely on loans. Additionally, the results show that the majority of the firms i.e., 61% (n=99) are not audited. 29% (n=46) are audited by small and medium audit firms, 6% (n=9) are audited by the Auditor General while 4% (n=7) are audited by the Big 4 audit firms.

The results also show that 65% (n=105) of the manufacturing firms do not have an environmental management system certification and only 35% (n=56) have. A study conducted by Younis and Sundarakani (2019) emphasized the positive impact of EMS certifications on resource efficiency, waste reduction, and pollution prevention in the manufacturing sector. This finding suggests that a substantial number of firms may not have established systematic processes to manage their environmental impacts, potentially hindering their sustainability performance.

Moreover, the results also show that 76% (n=123) of the firms are owned by indigenous Ugandans,

6% (n=9) are owned by the government of Uganda while 18% (n=29) are owned by foreign investors. Ownership of firms by indigenous people has been associated with promoting economic development and sustainability particularly in emerging economies Chen et al. (2016). Concerning the nationality of the board members, 84% (n=136) are Ugandans while 16% (n=25) are foreigners which is in line with the ownership structure above. studies such as Adams and Ferreira (2009) and Rahim-Dillard (2021) highlight the necessity of diverse boards and mention that diversity can bring thorough perspectives to decision-making processes and improve financial and non-financial performance, both of which have a significant impact on sustainability performance.

On board composition, the study findings show that male board members constituted the majority at 82% (n=132) while the female board members made us a smaller percentage in comparison at 18% (n=29). The Uganda Bureau of Statistics & United Nations Development Program, (2016) report about Women's Empowerment and Gender Equality in Uganda observed that women remain significantly underrepresented in decision-making positions including leadership roles in the private sector, with limited participation on boards of directors and executive positions in manufacturing firms.

Table 4. 2 Firm Characteristics

		Frequency	Percentage
Number of Employees	1-10	93	58%
	11-20	21	13%
	21-30	19	12%
	31-50	3	2%
	51-100	15	9%
	101 and Above	10	6%
	Total	**161**	**100%**
Number of years in operation	11-15 years	16	10%
	5-10 years	28	17%
	Above 15 years	20	12%
	Less than 5 years	97	60%
	Total	**161**	**100%**
Type of Financing	Equity capital	28	17%
	Equity & Loans	106	66%
	Loans	1	1%

	Others (Money from friends)	26	16%
	Total	**161**	**100%**
Type of External Auditors	Small and medium firms	46	29%
	Auditor General	9	6%
	Big 4	7	4%
	Not audited	99	61%
	Total	**161**	**100%**
Our firm has an environmental management system certification	Yes	56	35%
	No	105	65%
	Total	**161**	**100%**
Ownership of the firm	Foreign investors	29	18%
	Government of Uganda	9	6%
	Indigenous Ugandans	123	76%
	Total	**161**	**100%**
Nationality of Board Members	Ugandans	136	84%
	Foreigners	25	16%
	Total	**161**	**100%**
Board Composition	Male	132	82%
	Female	29	18%
	Total	**161**	**100%**

Source: Primary data

4.3 Descriptive Statistics for the study variables

Table below presents the descriptive statistics for Environmental Management Practices, Intellectual Capital and sustainability performance; that is, minimum, maximum, mean, standard deviation values, skewness and Kurtosis. Mean values were computed from data coded from strongly disagree (1) to strongly agree (6). The means for Environmental Management Practices, Intellectual Capital and sustainability performance are 4.3315, 5.2933 and 4.9876 with a standard deviation of 0.77316, 0.36838 and 0.41056 respectively. According to Field (2009), when deviations are small compared to mean values, it is evident that the data points are close to the mean and hence calculated mean highly represent the observed data. Since the deviations are small compared to the mean, this means the data points closely represent the observed data.

Table 4. 3 Descriptive statistics

	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
					Statistic	Std. Error	Statistic	Std. Error
Human capital	3.23	6.00	5.2874	0.56601	-1.007	0.191	0.881	0.38
Structural/Organizational Capital	3.92	6.00	5.2702	0.46666	-0.448	0.191	-0.186	0.38
Relational Capital	3.94	6.00	5.3223	0.43886	-0.639	0.191	0.59	0.38
Intellectual capital	4.35	5.94	5.2933	0.36838	-0.644	0.191	0.211	0.38
Promotion of Environmental Conservation Efforts	2.92	6.00	4.7611	0.71666	-0.29	0.191	-0.159	0.38
Product Environmental considerations	1.75	6.00	4.2782	1.05645	-0.412	0.191	-0.469	0.38
Maximizing Reuse and Recycling materials	1.50	6.00	4.7888	0.89205	-1.834	0.191	3.547	0.38
Undertaking Collaborative projects	1.88	5.88	3.4977	1.04363	0.479	0.191	-0.826	0.38
Environmental Management practices	2.41	5.78	4.3315	0.77316	-0.247	0.191	-0.093	0.38
Environmental performance	2.76	6.00	5.0272	0.62641	-1.074	0.191	1.858	0.38
Economic performance	3.05	5.86	4.4718	0.5176	0.045	0.191	2.074	0.38
Operational performance	3.27	6.00	5.0166	0.50647	-0.55	0.191	1.164	0.38
Social performance	4.00	6.00	5.4348	0.41975	-0.84	0.191	0.955	0.38
Sustainability performance	3.88	5.86	4.9876	0.41056	-0.537	0.191	0.883	0.38

Source: Primary data

In the Table above, we also reported the skewness and kurtosis statistics to assess normality among single variables. According to Field (2009), the values of skewness and kurtosis should be near 0 in a normal distribution. Skewness is a tilt in distribution and Kurtosis is the peakedness of a distribution. Skewness and Kurtosis statistics for normal data range from −3.29 and 3.29 (Field, 2009). Positive values of skewness show a pile-up of scores on the left of the distribution and negative values indicate a pile-up of scores on the right (Field, 2009). Garson (2012) recommends skewness and kurtosis statistics to be within the +2 to −2 range, though for kurtosis a more lenient +3 to −3 range can also show normality. Following these benchmarks, the normality of the data was tenable.

4.4 Correlation Analysis Results

The correlation analysis results provide insights into the relationship between variables in a dataset.

By calculating the correlation coefficient, we are able to determine the strength and direction of the relationship between two variables. These results help us understand the extent to which changes in one variable are associated with changes in the other variable. Pearson correlation was used because it is a measure of a linear association between two normally distributed random variables (Schober, Boer & Schwarte, 2018). The tables below present the correlation coefficients between these variables, along with the associated significance levels.

4.4.1 Relationship between Environmental Management Practices and Sustainability Performance

The correlation results in the table below show a strong positive relationship between environmental management practices, and sustainability performance ($r=0.724$, $p< 0.01$). This means that organizations that adopt effective environmental practices are more likely to have better sustainability performance.

4.4.2 Relationship between intellectual Capital and Sustainability Performance

The correlation results in the table below show a strong positive relationship intellectual capital, and sustainability performance ($r=0.661$, $p< 0.01$). This means that organizations with higher investment in intellectual capital are more likely to have higher sustainability performance.

Table 4. 4 Correlations between study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Human Capital (1)	1													
Structural Capital (2)	.253**	1												
Relational Capital (3)	.265**	.550**	1											
Intellectual Capital (4)	.724**	.770**	.765**	1										
Promotion of Environmental conservation efforts (5)	0.117	.634**	.520**	.534**	1									
Product environmental consideration (6)	0.081	.745**	.549**	.574**	.817**	1								

Maximizing reuse and recycling materials (7)	.363**	.589**	.526**	.644**	.613**	.675**	1						
Undertaking Collaborative projects (8)	-0.014	.525**	.464**	.399**	.508**	.622**	.335**	1					
Environmental Management Practices (9)	0.154	.749**	.616**	.640**	.859**	.936**	.774**	.764**	1				
Environmental Performance (10)	.188*	.499**	.612**	.550**	.715**	.625**	.670**	.233**	.651**	1			
Economic Performance (11)	.204**	.299**	.470**	.417**	.414**	.413**	.422**	.282**	.454**	.361**	1		
Operational Performance (12)	.369**	.425**	.624**	.616**	.459**	.442**	.575**	.435**	.570**	.416**	.713**	1	
Social Performance (13)	.279**	.451**	.440**	.508**	.544**	.572**	.685**	.279**	.613**	.587**	.382**	.606**	1
Sustainability Performance (14)	**.321****	**.531****	**.686****	**.661****	**.684****	**.651****	**.741****	**.383****	**.724****	**.773****	**.770****	**.847****	**.787****	**1**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Primary Data

4.5 Regression Analysis

In order to investigate the relationships between a dependent variable (Sustainability Performance) and the independent variables (Environmental Management Practices & Intellectual Capital), regression analysis was carried out. According to Field (2009), Regression analysis is defined as a way of predicting an outcome variable from one predictor variable or several predictor variables. The regression analysis was carried out as a complement to the Pearson correlation analysis to establish the degree of influence of the predictor variables onto the dependent variable as displayed in the table below.

Table 4. 5 Regression analysis

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	**Std. Error**	**Beta**			**Toler-ance**	**VIF**
(Constant)	1.839	0.317		5.81	0		
Intellectual capi-tal	0.374	0.074	0.335	5.06	0	0.59	1.69
Environmental Management Practices	0.27	0.035	0.509	7.69	0	0.59	1.69
Model R	.768[a]						
R Square	0.59						
Adjusted R Square	0.585						
Std. Error of the Estimate	0.2645						
Durbin-Watson	1.592						
Model F	113.82						

a. Dependent Variable: Sustainability performance

Source: Primary Data

The regression analysis results in the table above show that Environmental Management Practices, and Intellectual Capital explain 58.5% of the variance in sustainability performance (Adjusted R Square = .585). The adjusted R square provides an idea of how well the model generalizes the study variables and every researcher would like the Adjusted R Squared values to be the same as or close to R Squared (Field, 2009).

CHAPTER FIVE

DISCUSSION OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses and concludes the findings of the study, recommendations, and areas for further research. The study investigated the relationship between environmental management practices, intellectual capital, and the sustainability performance of manufacturing firms in Uganda.

5.2 Discussion of Results

The discussion of the study findings is guided by the research questions obtained from the study objectives below:

i. To examine the relationship between environmental management practices and the sustainability performance of manufacturing firms in Uganda.

ii. To examine the relationship between employees' intellectual capital and the sustainability performance of manufacturing firms in Uganda.

iii. To examine the relationship between environmental management practices, intellectual capital and the sustainability performance of manufacturing firms in Uganda.

5.2.1 Relationship between Environmental Management Practices and Sustainability Performance

Our results show a significant positive relationship between environmental management practices and sustainability performance. This means that a firm that is able to harness environmental conservation efforts, products with environmental consideration, reuse and recycling materials, and undertaking collaborative research will enhance its sustainability performance. The results are consistent with the findings of a study by Zeng et al. (2018), which examined the relationship between environmental management practices and corporate sustainability performance and found a positive and significant correlation between environmental management practices and sustainability performance. It can therefore be concluded that firms implementing effective environmental management practices are more likely to achieve better sustainability outcomes. The

results from determining the appropriateness of the four constructs in measuring environmental management practices revealed that the constructs explained 74.2% of the total variance, with undertaking collaborative research explaining the biggest variance of 27.5%. This construct also had the highest score with eigen values of 4.4, making it the most important construct, and this was followed closely by product environmental considerations with eigen values of 3.9. This is in line with the findings of a study by Kissi et al. (2019) that investigated the relationship between collaborative relationships and sustainable performance in manufacturing firms and found that collaborations for knowledge acquisition positively influenced sustainability performance outcomes, highlighting the importance of knowledge-sharing partnerships.

5.2.2 Relationship between Intellectual Capital & Sustainability Performance

The results show a strong positive relationship between intellectual capital and sustainability performance. This means that organizations with higher intellectual capital are more likely to have higher sustainability performance. It can thus be argued that investment in human capital, social capital, and structural capital enhances sustainability performance, and firms are more likely to have a competitive edge over their competitors. The results are consistent with the findings of a study by Kalkhoran et al. (2020), which documented that the dimensions of intellectual capital (Human, Structural, and Relational) have a significant impact on business performance. The results are also consistent with Del Giudice, Di Vaio, Hassan and Palladino, (2022), who documented that intellectual capital has a strong connection to knowledge management, which plays a vital role in promoting sustainability performance across various dimensions, including social, economic, and environmental aspects. This relationship ultimately leads to the establishment of production systems that prioritize and uphold the equilibrium of the global ecosystem in both natural and social terms.

A study by Vale et al. (2022), which examined the impact of sustainable intellectual capital on sustainable performance, also found that sustainable intellectual capital positively affects the economic, social, and environmental dimensions of sustainability performance and that human, structural, and relational capital are all important components of sustainable intellectual capital.

Furthermore, another study by Astuti et al. (2023) on understanding the antecedents and consequences of sustainable competitive advantage also found that there is a significant positive relationship between each dimension of intellectual capital (human capital, relational capital, and structural capital) and sustainable competitive advantage using data from 300 manufacturing firms in Pakistan. They noted that sustainable competitive advantage is also significantly and positively related to organizational performance. A study by Al-Musali et al. (2020) that examined the impact of intellectual capital performance on financial performance found that intellectual capital has a positive impact on financial performance but not on productivity. In this study, capital employed efficiency and human capital efficiency were found to be the most influential features of intellectual capital. In agreement with results, Ying, Hassan and Ahmad, (2019), stressed that Human capital plays a critical role in cultivating and promoting corporate sustainability as it contributes to improving an organization's performance across all three dimensions: economic, environmental, and social by supporting sustainable practice's role in knowledge creation within organizations. This is because creation and dissemination of knowledge are key drivers for sustainable development and innovation. Furthermore, employees with diverse skills, expertise, and knowledge are better equipped to identify and implement sustainable practices. Their ability to generate new ideas, adapt to changing circumstances, and apply innovative solutions can lead to improved environmental and social performance.

Predictive power of Environmental Management Practices, Intellectual Capital, on Sustainability Performance

The results of this study show that environmental management practices and intellectual capital are significant predictors of sustainability performance, as they explain 58.5% of the variance in sustainability performance. This means that manufacturing firms with efficient environmental management practices and high levels of sustainability performance are likely to have better sustainability performance. These findings are consistent with a study by García-Meca et al. (2015) that investigated the impact of environmental management practices on firm performance and the

role of intellectual capital and found that environmental management practices have a positive impact on the financial and environmental performance of manufacturing firms and that intellectual capital partially mediates this effect. The authors also found that human capital and structural capital are more important than relational capital in enhancing the benefits of environmental management practices. A study by Maksum & Tamba (2017) which examined the effect of environmental performance and intellectual capital on the financial performance of companies moderated by corporate social responsibility also found that environmental performance and intellectual capital simultaneously have a significant effect on financial performance. This study therefore concludes that the extent to which an organization meets the economic, social, and environmental expectations of its stakeholders while preserving the natural resources and well-being of future generations is influenced by how well the collective knowledge, skills, and abilities of an organization's employees, as well as its organizational structure and relationships with stakeholders, are managed, coupled with the efficiency and effectiveness of its actions and policies to reduce its environmental impact and improve its environmental performance. A study by Jabbour et al. (2014) and another by Wagner, M. (2010) couldn't agree more.

5.3 Conclusion

The purpose of this study was to examine the relationship between environmental management practices, intellectual capital, and the sustainability performance of manufacturing firms in Uganda. Overall, the results indicate that environmental management practices and intellectual capital predict 58.5% of the variance in sustainability performance. The study results show that environmental management practices and intellectual capital are significantly and positively related to sustainable performance. The first study objective of the study was to examine the relationship between Environmental Management Practices and Sustainability Performance. Based on the findings, the study concluded that there was a positive significant association between environmental management practices and sustainability performance, as evidenced by a correlation coefficient of .724. The second objective was to examine the relationship of employees' intellectual capital and

sustainability performance of manufacturing firms in Uganda. Based on the findings the study concluded that there was a significant positive correlation between intellectual capital and sustainability performance ($r = .661$, $p < .01$).

5.4 Recommendations

Manufacturing firms should prioritize investment in human capital development to enhance their intellectual capital. This can be achieved through implementing training programs, initiating skill-building initiatives, and creating knowledge-sharing platforms. By providing employees with opportunities to acquire knowledge, skills, and expertise, firms can strengthen their capacity to effectively address sustainability challenges.

Manufacturing firms should strive to balance sustainability practices with efficient financial management, which may involve optimizing resource allocation, reducing costs through eco-friendly processes, and exploring new business models that align with sustainable principles to enhance the economic performance of the firm. Financial management practices like conducting annual external audits advance sustainability performance through the measurement of economic performance.

Manufacturing firms in Uganda should consider engaging in collaborative projects and research aimed at addressing environmental challenges by partnering with governmental organizations, non-profits, research institutions, and other stakeholders in order to leverage collective expertise and resources to develop innovative environmental solutions. Collaborative projects can also foster knowledge sharing, facilitate the adoption of best practices, and enhance the overall sustainability performance of manufacturing firms.

Manufacturing firms should prioritize adopting sustainable and eco-friendly practices, which may include acquiring environmental management system certification, reducing energy consumption, implementing waste management strategies, promoting recycling and reuse, and integrating environmental considerations into product and service development processes, in order to enhance sustainability performance and achieve a competitive edge over their competitors.

5.5 Limitations to the study

The results will only be limited to the manufacturing firms in Uganda, and so they may not be able to represent the perceptions of accountants of all companies in Uganda or other countries concerning the relationship between environmental management practices, intellectual capital, and sustainability performance. In order to overcome this limitation, the researcher recommended further research to investigate accountants' perceptions in various industry sectors or nations in order to gain a more thorough understanding of the connection between environmental management practices, intellectual capital, and sustainability performance.

The sample size of this study is limited to manufacturing firms, and the study used a cross-sectional design. Thus, the interpretation of generalization and causality between the variables should be treated with caution. Given that it's a cross-sectional study, changes in people's perceptions over time cannot be assessed, and estimates of how quickly study measures might respond to any changes cannot be provided. This is likely because organizations change as well as the circumstances surrounding them. The researcher acknowledged this constraint and emphasized the need for follow-up studies to track the evolution of perceptions and gather more thorough data on the relationship between environmental management practices, intellectual capital, and sustainability performance to get around the limitation of a cross-sectional design.

5.6 Areas for further research

i. Investigating the long-term effects of environmental management practices on sustainability performance.
ii. The role of environmental management practices in enhancing the competitiveness of manufacturing firms in Uganda.
iii. Identification of barriers and challenges faced by manufacturing firms in Uganda in adopting and implementing effective environmental management practices.
iv. The role of external audit in enhancing economic performance of manufacturing firms in Uganda.

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Appendix 1: The Questionnaire

MAKERERE UNIVERSITY

Dear respondent,

I am a student at Makerere University pursuing studies leading to the award of a Master of Science in Accounting and Finance. This program is tenable at Makerere University Business School. Your contribution toward an increased understanding of the issues on improving sustainability performance of manufacturing firms in Uganda is necessary. This is therefore, to kindly request you to complete this questionnaire. The information supplied in it will be treated confidentially and will not be released in any way that will allow it to be associated with any individual.

Yours Sincerely,

Ms. Ainomugisha Ritah
Student

PART A (i): General Information (Please tick as appropriate).

1) Your gender: Male ☐ Female ☐

2) Your age:

Less than 35 years ☐ 36-45 years ☐ 46-55 years ☐ Above 55 years ☐

3) Your highest education level attained.

Diploma ☐ Bachelor's degree ☐ Master's Degree ☐ PhD ☐

Others, specify……

4) Your professional qualification: CPA ☐ ACCA ☐ CIA ☐

Others, specify……

5) Your length of service in this Firm:

Less than 5 years ☐ 5-10 years ☐ 11-15 years ☐ 16 years-above ☐

ii) Firm specific characteristics

6) How many employees are in this firm (an estimate)? .....

7) Number of years this firm has been in operation:

Less than 5 years 5-10 years ☐ 10-15 years ☐ 15-above ☐

8) The firm is financed by:

Equity capital ☐ Equity& Loans ☐ Loans only ☐

Others, specify……

9) State whether the external auditors for this firm are the Big 4, Small and Medium Audit Firms or Auditor General…….

10) This firm has an environmental management system certification;

Yes ☐ No ☐

11) This farm is largely owned by.

Indigenous Ugandans ☐ Foreign Investors ☐ Government of Uganda ☐

Others, specify …….

12) This firm's board is dominated by majorly Ugandans Yes ☐ No ☐

13) this firm's board is largely composed of ladies Yes ☐ No ☐

PART B: This part contains the study variables for which instructions are provided.

Intellectual capital. Rate your scores on a 6-point scale ranging from, ***completely disagree….1, Mostly disagree….2, slightly disagree….3, slightly agree….4, Mostly agree….5, completely agree….6.***

A	**Human capital**	**1**	**2**	**3**	**4**	**5**	**6**
1	Our employees are experts in their jobs and functions						
2	Our employees are always a source of new ideas						
3	Our employees have the required competences to prepare sustainability reports						
4	This firm usually employs staff who are highly qualified						
5	When an employee leaves the firm, we do have a succession training						
6	This firm's employees are knowledgeable about their work						
7	Our employees can with stand pressure from work						
8	We have self-driven employees						
9	Our employees provide technical skills to our customers						
10	Most of business ideas are initiated by our employees						
11	Level of commitment of our staff to work is high						
13	Most of our employees are more creative						
14	Employees in this firm are socially competent						
15	Employees in this firm always search for knowledge						
B	**Structural / organizational capital**						
1	There are available materials that guide us on the preparation of sustainability reports						
2	Our internal processes are clear to the users						
3	This firm updates us on the new developments in the areas of corporate reporting						
4	Our online transaction processes are usually fast						
5	Our employees complement each other in this firm						
6	Employees in this firm are result oriented						
7	Our systems make it easy to access relevant information						
8	Our information systems are stable						
9	We work as a team in this firm						
10	We have a well-defined organizational structure						
11	This firm promotes a culture of teamwork						
12	This firm has clear values that guide its employees						
C	**Relational capital**						
1	This firm has many clear openings to its customers						
2	We have good network systems with our customers						
3	Our firm displays her services nearer to our customers						
4	Our networks with our customers have made this firm what it is						
5	We usually get new ideas on compliance through our customers						
6	Our clients appreciate the use of sustainability reports						
7	Our clients are knowledgeable in interpreting sustainability reports						
8	Our employees have good relationship with the customers						
9	Our customers help us to enroll or get new customers						

10	Customers help this firm to improve or update its services						

Environmental management practices*: For this section, indicate your extent of agreement to the statements below.*
Key: completely disagree….1, Mostly disagree….2, slightly disagree….3, slightly agree….4, Mostly agree….5, completely agree….6.

	Promotion of environmental conservation efforts by employees	**1**	**2**	**3**	**4**	**5**	**6**
1	Our firm encourages new ideas for conserving the environment by instituting reward schemes for employees						
2	Our firm has consistently sensitized employees on the need to minimize on water consumption						
3	Our firm has consistently appealed to employees to work towards energy saving						
4	We have put in place an environmental department						
5	We have a definition of an environmental policy;						
6	We have a definition of plans of environmental actions to be undertaken;						
7	We have an Environmental Management System in place and fully functioning;						
8	We started diagnosing environmental issues;						
9	We have developed environmental control mechanisms;						
10	We have embarked on training of employees on environmental protection;						
11	We have labored to elaborate environmental information to our employees						
12	Our senior managers are committed to environmental management						
	Integration of environmental considerations into new product development / service development						
1	Our firm integrates environmental considerations (including the life-cycle assessment and environmental risk analysis) while designing new products or developing new services (e.g. substitution of hazardous substances)						
2	All strategic, long term, corporate decisions in our firm are made after due consideration to environmental criteria						
3	Our firm has established strategic alliances in the past or is interested in such links in order to improve its environmental performance						
4	Our firm has a policy on waste management						
5	Our firm includes in its annual budget, environmental issues						
6	Our firm considers environmental matters while developing new products						
7	We have elaborated environmental indicators in our policies and reports						
8	We disclose environmental indicators in most of our reports						
9	We have always disclosed environmental information through displaying on our noticeboards and various publications of the entity						
10	We always elaborate the environmental report						

11	We always provide our environmental report to those interested in it						
12	We ensure that the elaboration of environmental information of general scope is disclosed through the media, brochures, the internet, etc and disclosure of environmental information of general scope through the media, the organization web page, brochures etc.						
13	Our organization has ISO 14001 Certification						
	Maximizing reuse and recycling of materials						
1	Our firm has won awards from government bodies or other groups for its work in protecting the environment						
2	Our firm considers opportunities for reuse/recycling/recovery of material when designing products/processes						
3	Our firm has a policy on disposal of hazardous materials						
4	Our organization has a cross-functional cooperation for environmental improvements						
5	Our organization is committed to environmental compliance and auditing programs						
6	In this firm, we have initiated processes and procedures for improving reuse of various materials						
7	In this firm, we recycle our bi products / residues						
8	In this firm, we aim at ensuring that no bi product or any material goes to the dustbin						
	Undertaking collaborative research projects						
1	Our firm regularly looks for opportunities (e.g., availability of new energy efficient technologies) to improve its environmental performance						
2	Our firm has had or is considering a knowledge transfer partnership with a university or college to improve our environmental performance						
3	Our firm has improvised new technologies on environmental management						
4	Our firm collaborates with universities and other institutions of higher learning in conducting research related to environmental management						
5	Our firm supports students undertaking research on environmental management						
6	Our firm collaborates with international bodies dealing with research on environmental management						
7	Our firm has an environmental management research project running						
8	Our firm has participated in seminars and workshops regarding environmental management						

Sustainability performance: *For this section, indicate your extent of agreement to the statements below.*

Key: completely disagree….1, Mostly disagree….2, slightly disagree….3, slightly agree….4, Mostly agree….5, completely agree….6.

A	**Environmental performance**						
1	We have registered reductions in energy consumption						
2	We have registered reductions in water usage						
3	We have registered reductions in material costs due to the efficient use of material						
4	We have consistently registered reductions in the levels of waste						
5	We have increased residue recycling over the years						
6	We have registered significant reduction in consumption of hazardous materials						
7	Our firm has consistently registered reductions in levels of emissions						
8	Our firm has consistently registered reductions in the costs of regulatory compliance						
9	Our firm has consistently registered reductions in the costs associated with cleaning up environmental damage						
10	Our firm has consistently registered reductions in the fines paid and remediation costs regarding environmental damage						
11	Our firm has registered significant reduction in emission of air pollutants						
12	Our firm has consistently registered reductions in process/production costs						
13	Our firm has consistently registered increased process/production efficiency						
14	Our firm has consistently registered increased knowledge about effective ways of managing operations						
15	Our firm has consistently registered increased filters and controls on emissions and discharges						
16	We have a mechanism for monitoring internal compliance with environmental policies and regulations						
17	Our firm has consistently registered increased organization-wide learning among employees						
18	There are better relationships with stakeholders such as local communities, regulators, and environmental groups as compared to the previous periods						
19	We provide data on environmental performance to our stakeholders especially to our other departments for internal decision-making.						
20	We design mechanisms that motivate our employees and other stakeholders for continuous improvement in environmental performance.						
21	We provide data to other departments and sections for external reporting						
B	**Economic performance**	**1**	**2**	**3**	**4**	**5**	**6**
1	Return on assets of our company has increased over the previous one year						

2	Our profit before tax has been increasing over the period						
3	We have had an increment in our total assets over the previous one year						
4	Return on assets of our company is above all players in our sector						
5	Return on assets of our company is better than that of key competitors.						
6	Average profitability of our company is better than that of our competitors						
7	Return on equity of our company has increased over the previous one year						
8	Return on equity of company is above all players in our sector						
9	Return on equity of our company is better than that of key competitors						
10	Our equity stock has increased over time						
11	Our retained earnings figure has continued to increase over time						
12	Our revenues have increased over the past one year						
13	We have a higher revenue growth rate as compared to our peers in the same industry						
14	Our revenue growth rate is better than that of our key competitors						
15	Return on investment of our company is better than that of key competitors.						
16	This firm efficiently manages its operating costs						
17	There is an annual increase in return on investment of the firm						
18	Last year, we registered an increase in profit before tax						
19	We incur less expenses on utilities						
20	We invest whatever cash received in our firm						
21	Cost management of our company is better than that of key competitors.						
C	**Operational performance**						
1	Our firm produces quality products or services as compared to our competitors						
2	Quality development processes of our company is better than that of key competitors.						
3	We have new products on market that match customer demands at least every after 2 years						
4	Our customers do not complain on the quality of our products						
5	We have not experienced significant returns of goods to our ware house from our customers (or rejection of our services)						
6	We have the ability to attract high skilled employees						
7	We have the ability to retain high skilled employees						
8	We maintain relations between management and employees						
9	Productivity of our employees is better than that of the employees of key competitors						
10	The overall productivity of our staff is satisfactory						
11	We have the lowest labor turnover in the entire industry						
12	Our employees are remunerated highly as compared to other firms						
13	Satisfaction of customers or clients is our main focus						
14	Customer satisfaction of our company is better than that of key competitors.						

15	Responsiveness of our company is better than that of key competitors.						
16	Customer satisfaction of our company is better than that of key competitors.						
17	Our firm has registered increase in the client base						
18	Our customers / clients are satisfied with our products / services						
19	Our clients / customers refer other clients to our firm						
20	We do not receive any complaints from clients regarding delivery of goods to them						
21	Our firm develops new products or services faster than our competitors						
22	Our firm is always looking for easier means of developing new products than competitors						
23	Our firm looks for innovative ways of designing its products						
24	Our firm is very innovative when it comes to branding its products						
25	Our firm develops environmentally friendly products						
26	We market our products or services in the entire country						
27	We have registered a significant growth in sales over the past previous year						
28	We control the market						
29	We have the largest market share						
30	We have customized some of our products to special groups (niches) which competitors have not done						
31	Our firm has registered a higher market share as compared to the previous periods						
D	**Social performance**						
1	We have improved our corporate image over the years						
2	Our social commitments have increased over the years						
3	We have always aimed at preserving the environment						
4	We have registered an enhanced employ job satisfaction						