Predicting and Analyzing the Impact of Occupational Safety& Health on Labor Productivity: A Case of Ethiopia Plastic Industry

By:

Feleke Workie

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Advisor:

Dr. Kassu Jilcha (Associate Professor)

Co-Advisor:

Ayele Legesse (Doctoral Student)

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School of Graduate Studies

School of Mechanical and Industrial Engineering

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By

Feleke Workie Defersha

Approved by Board of Examiners:

Dr. Kassu Jilcha	----------	----------
Advisor Name	Signature	Date
Dr. Gezahegn Tesfaye	----------	----------
Internal Examiner	Signature	Date
Dr. Solomon Mengistu	----------	----------
External Examiner	Signature	Date
Dr. Gezahegn Tesfaye	----------	----------
Member of school AC	Signature	Date
Dr. Abdulkadir Aman	----------	----------
Interium Head SMIE	Signature	Date
Dr. Shegaw Ahmed	----------	----------
Interium Executive Dean for Academic Affair	Signature	Date

Declaration

Feleke Workie Defersha hereby declare that this thesis entitled "**Predicting and Analyzing the Impact of Occupational Safety& Health on Labor Productivity: A Case of Ethiopia Plastic Industry**" is my original work and has not been presented for a degree in any other university or institution. All sources of material used for this thesis have been duly acknowledged and reference. This work is submitted in partial fulfilment of the requirements for the master of science degree in mechanical and industrial engineering at Addis Ababa university. Addis Ababa institute of technology, school of mechanical and industrial engineering. This thesis is the result of my own investigation and analysis. Any view expressed in this study are mine and do not necessarily represent the view of institution.

Name: Feleke Workie

Signature: ----------

Date: ----------

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Executive summary

Back ground: the Ethiopian plastic industry occupational health and safety risks are negatively impact labours motivations and output. While the information of Ethiopian plastic industry occupational health and safety, such as a review of situational analysis and needs assessment and the impact of energy use on labour productivity in the industry, specially address how to predict or look into the relationship between worker productivity and OHS in Ethiopia plastic industry out of 396 employees of 70 target labours are take all.

Objective: In order to create mitigation plans for preventive and corrective measures, the objective is to forecast and analyze the impact of OHS on labour productivity in EPI.

Methods: the following techniques to be used to predict and assess how OHS would affect worker productivity in Ethiopia plastic industry. review of relevant literature: analyse the corpus of work on occupational health and safety in multinational industrial enterprises, with a focus on the plastic industry. This to give insight on the possibility, challenges, and state of the industry's OHS protocols. Gatherings of data: gathering pertinent information on worker productivity, OHS metrics, and other Ethiopian plastic industry component. This data to be gathered through unstructured interview, primary and secondary data sources, and surveys, and then analysed the integration of all that are regression analysis and correlation analysis.

Purpose: The aim of this study was to determine how worker productivity in Ethiopia plastic industries was affected by occupational safety and health.

Results and discussion: According to the study's findings, the majority of workers are aware of how workplace safety and health affect labours productivity. Furthermore, the survey discovered that even though workers are aware of the risks to their health and safety at work, they often forget to wear personal protective equipment because they think it's too hot. The study comes to the conclusion that worker productivity is strongly impacted by occupational health and safety. In order to reduce workplace accidents and injuries, this study advises management to protect employees and supply them with personal protective equipment. In order to reduce workplace accidents and increase productivity, the study also suggests that management provide routine training and education on occupational health and safety issue.

Keywords: Occupational health & safety, work place safety, labor productivity, and Ethiopia plastic industry

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List of Acronyms

EPI	Ethiopia Plastic Industry
ILO	International Labour Organization
OHS	Occupational Health and Safety
SPSS	Statistical Package for the Social Sciences
PPE	Personal Protective Equipment
EPI	Ethiopia Plastic Industry
OSHA	Occupational Safety and Health Administration
Df.	differential
Sig.	significant
Std.	standard
Min.	minimum
Max.	maximum
HIRADC	Hazard Identification, Risk Assessment, and Control

Chapter One

1.Introduction

1.1. Introduction

The studies conducted globally provide light on OHS regulations were found to have a statistically fundamental influence on worker operation and related well-being in the construction industry, highlighting the possible influence of OHS on productivity(Segbenya & Yeboah, 2022a). Workplace productivity is significantly impacted by occupational health & safety(Handley, 2021a). The ILO, which has 187 member states, is dedicated to attacking issues pertaining to job opportunities, working conditions, and labor rights(Ameen & Keizer, 2023).
Improving the scope and efficiency of social security for all(United Nations, 2021), Handley and other Studies indicate that a more secure work environment leads to a more efficient staff. OHS actions can improve the atmosphere at work and greatly increase worker productivity(Lari, 2024). The standard and caliber of social life are determined by labor productivity, which also influences pricing and costs ratios, inflation control, pensions, social benefits, and wage levels(Kornieieva et al., 2022).
Iman et al., (2023) research indicates that employee performance and production are significantly influenced by work discipline, motivation, and workplace safety and health. On the other side, OHS-related problems negatively impact workers' capacity for production, which reduces worker output(Katsuro et al., 2010). Approximately two million workers worldwide lose their lives, suffer injuries, or contract occupational diseases as a result of their profession(Rosenberg et al., 2023). Based on Rosenberg information from the Croatian Institute for Health Insurance, over the previous 15 years, 40 workers in the Republic of Croatia have died and 17,844 workers have been wounded at work year on average. Like in many other developing nations, occupational health is still disregarded across the African continent(Muriuki & Njoroge, 2023) because neglecting by Competing political, social, and economic issues.

As Tabor,(2022) idea Today's organizations are dynamic, complex social engineering systems. In addition to productivity, they also prioritize staff well-being, safety, and dependability. Industry 4.0 of all the technologies they use, the ones that have an impact on mechanical and

physical risk indicators are the most significant(Arana-Landín et al., 2023). The facts supporting influences on worker ergonomic improvements should also be emphasized. An important challenge to the economic consensus regarding the nature of labor in the future that is being pushed by the World Bank Group and the Organization for Economic Cooperative Development (the "OECD") is the focus on social justice and sustainability in the 2019 ILO Global Commission Report, which includes the suggestion for a Universal Labor Guarantee (Novitz, 2020). The International Labour on organization's ability to coordinate a consensus among its three constituents of government, employer, and worker representatives has always been a prerequisite for group effort on the part of the organization. The International Labour Office is the ILO's permanent secretariat(Thomas & Turnbull, 2021). According to the International Labour Organization (ILO), occupational health & safety encompasses a variety of disciplines from various sectors and industries working together in a common manner to assist avoid work-related illnesses and injuries as well as to safeguard and improve workers' health(Tapueluelu, 2023). Workers who are exposed to job dangers are more vulnerable to a variety of conditions, including infections, diseases, injuries, and accidents(Of et al., 2022).

The plastics manufacturing plant's ergonomic workstation design lowers postural load, increasing worker productivity and reducing operator absence from musculoskeletal problems(Quiroz-Flores et al., 2023) And also Managing biological and chemical dangers and fostering mental health and well-being among employees are two more crucial faces of occupational health & safety. Every organization's success is largely dependent on its human resources(Ngwenya & Pelser, 2020). As a result, sectors that adopt an entrepreneurial approach understand the significance of psychological capital in optimizing the abilities and potential of their personnel.

To prevent lost productivity and improve worker health and safety, it is vital to establish an occupational safety plan(Morrissey et al., 2021). Workplace health and safety and productivity are significantly influenced by work organization(Hesapro, 2021). Productivity and safety go hand in hand, with increased productivity resulting from enhanced safety measures(Handley, 2021b). Occupational health and safety (OHS) procedures can affect worker productivity in a big way (Segbenya & Yeboah, 2022b). According to research done in the construction industry in Ghana, OHS procedures contributed around 30.4% of the variance in worker performance, and they had a statistically significant impact on worker performance. Worker productivity can be

increased by looking at how occupational safety and health affects labor productivity in Ethiopia's plastics industry.

In conclusion, research and studies carried out all around the world demonstrate the substantial influence that OHS legislation have on worker performance and related well-being. Interventions in OHS can increase productivity; however, OHS-related problems can also be harmful. There is evidence to imply that workplace safety and productivity are complementary, however their relationship is complex.

1.2. Background and Justification

the subject of labor productivity and occupational safety and health is very significant For worker productivity & well-being(Lari, 2024). Ensuring a safe & healthy work conditions for employees is largely dependent on Occupational Safety and Health. Because safe & healthy work condition can result in enhanced efficiency, worker well-being, cost reduction, develop positive working culture, less absenteeism, and lower employee turnover, OHS policy has a substantial influence on worker productivity (Katsuro et al., 2019),(Colorado Occupational Medical Partners, 2021). Different scholars are concluding based on around Predicting and analysing the impact of OHS on worker productivity contexts. according to research Lari,(2024) Employee productivity can be greatly increased and workplace atmosphere can be improved by OHS interventions.

It is crucial to assess and forecast how OHS will affect labor productivity in order to comprehend the social and economic ramifications of OHS measures and to make wise decisions for society as a whole(Lari, 2024). In addition, forecasts regarding workplace safety in the future have been made using predictive analytic s, and the results show a consistent pattern of fewer accidents and injuries combined with more inspections(Predictive Solutions, 2021).

Studies have indicated that investment in Occupational Health Safety (OHS) can yield benefits for businesses as well as employees' health(Thiede & Thiede, 2017). Also, provide a comfortable working environment by installing hazard prevention measures, safety equipment, ventilation, and lighting(Billah et al., 2023). OSHA establishes and implements workplace safety regulations and offers tools and support to companies and workers to help them comply with these requirements(Of et al., 2023). According to Quiroz-Flores et al.,(2023). Plastics companies can use a planned and structured approach to reduce physical strain on workers and enhance their

health and well-being by redesigning jobs in essential production processes in an ergonomic manner(Satria et al., 2022). based on Satria insights that Occupational Health and Safety system implementation in industry aims to create a safe, healthy, and pollution-free workplace by reducing the likelihood of occupational accidents and sickness. Productivity can be impacted by workplace comfort and product organization. (Satria et al., 2022).

the authors of Rosenberg et al., (2023) of The application of the fundamentals of workplace safety comes first who, Workers lessen or do away with risks to work tools (i.e. work processes) and Workplace safety regulations include specifications for equipment. Workers' health and safety are protected by a number of laws and regulations in Croatia, and occupational health & safety is a major part of this legislation(Pedro & Weber, 2023). Based on Pedro & Weber article Enforcing regulations pertaining to occupational safety entails defining the rights, obligations, and responsibilities of all parties involved in putting preventative measures in place to avoid workplace hazards and their detrimental effects. Moreover, OHS procedures are essential for worker productivity and well-being, as issues with OHS have been shown negatively affect workers' productivity at work(Katsuro et al., 2021). Consequently, in order to comprehend the economic and social ramifications of OHS measures and to make wise decisions at the societal level, it is imperative to analyse and forecast the effect of OHS on labor productivity(Thiede & Thiede, 2017).

Noise pollution at work has been connected to a number of detrimental health effects, such as high blood pressure, hearing loss, and the formation of multiple cardiovascular illnesses(Roni & Afridi, 2023).The HIRADC process involves identifying potential hazards and assessing the risks that may come from them in both normal and non-routine activities inside an organization(Mena Ledezma & Posada Correa, 2023). Employers should expect a considerable reduction in workers' compensation payments, medical costs, and lost productivity by implementing comprehensive safety & health initiatives (Occupational Safety and Health Administration, 2021).Workplace accidents frequently arise from a failure to apply occupational safety & health procedures with sufficient attention(Kamisdan et al., 2023). According to FDRE, (2004) The Federal Democratic Republic of Ethiopia's (1995) Constitution has made progress in addressing the concerns of people with disabilities, and the labor law (Labor Proclamation No. 377/2003) is in charge of managing labor administration, industry labor conditions, and occupational health and safety.

As with any industry, occupational health & safety (OHS) that applicable in the plastic industries (Plastic Manufacturing_a Comprehensive Guide, 2023). It is possible to forecast and analyse the effect of OHS on labor productivity in the Ethiopia plastic industry by taking into account a number of variables. The Ethiopia Plastic Industry must abide by occupational health and safety (OHS) laws and guidelines just like any other industrial facility. Workplace hazards, ergonomics, chemical exposure, and physical dangers related to production processes are just a few of the topics covered by OHS, this covers every attempt to give workers a secure and healthful work environment. Based on table 1.1 predicting and analyzing the effect of occupational health and safety on labor productivity in Ethiopia's plastic industry is crucial for preventing mishaps and injuries.

Table 1.1 Number of accidents in Ethio- plastic industry

s/n	Each factory in industry	gender		Type of accident	Total number of accidents
		M	F		
1	poly	1		nail removal	1
2	profile	2		Finger scratching	2
3	crusher	1		a little deafness	1
4	injection	5	20	a little finger injury	25
5	pipe	10		hand bleeding	10
6	Composite		1	finger piercing	1
	total	19	21		40

Generally, the recorded accident due to:

- Injection and pipe factory accident more happen the other factory
- As we have seen men are more exposed than women
- Most finger injuries are caused by knife
- The Care of person that exposed the hazard area (Some people are Carelessness)

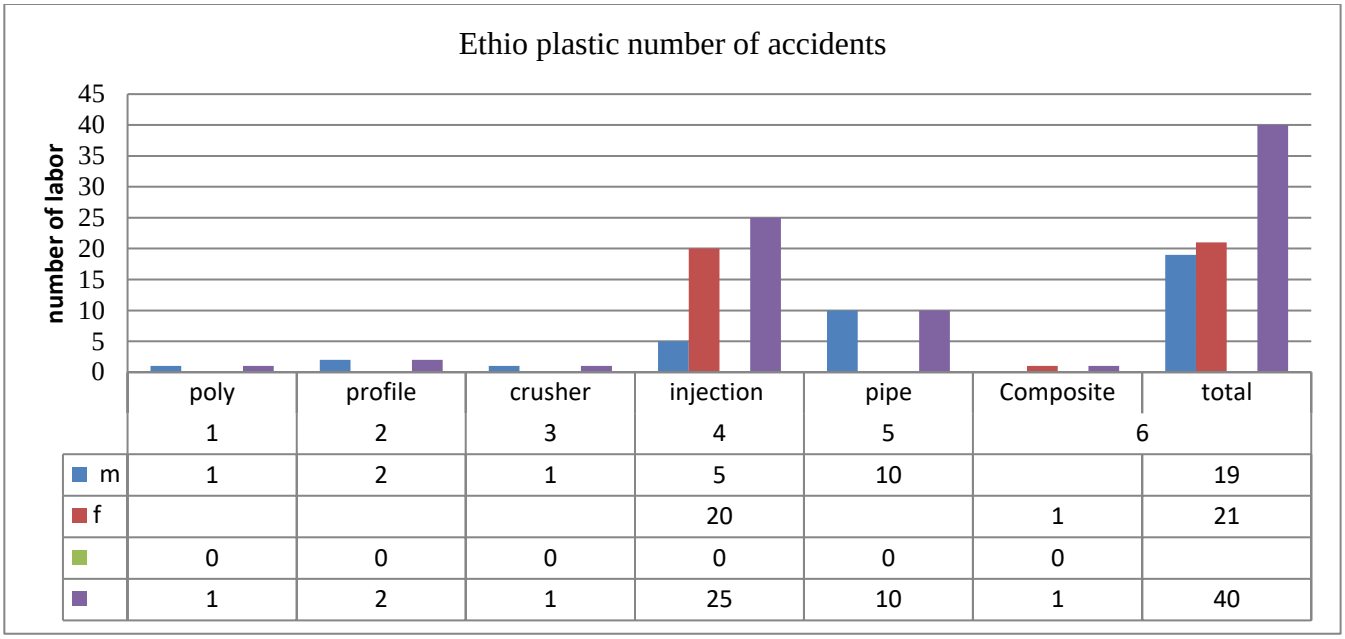

Figure 1.1 Ethiopia plastic industry number of accidents

As shown the bar graph the Ethiopia plastic industry the highest number of accidents recorded in injection factory because Most of the problems occur when cleaning the flash of the product and also the floor is oily which it makes a person slip. The second highest number of accidents also recorded in pipe factory in case of when the product produced without adjust starting.

In general, the study of Predicting and analysing the impact of OHS on labor productivity in Ethiopia- plastic industry due to Improving working conditions, keeping a systematic eye on the amount of hazardous and harmful elements in the workplace, and helping to lower the rate of occupational injuries and illness all have an impact on society and the economy. Ethiopia plastic industry may monitor key performance indicators, put in place efficient safety and health programs, and take into account shifting demographics, work organization, and ergonomic concerns in order to increase labor productivity through occupational safety and health. Industry may increase productivity and efficiency by taking a comprehensive approach to workplace safety & health, which would assist them in becoming ready for ongoing changes to the labor force, the workplace, and the nature of work.

1.3. Problem Statement

WHO/ILO estimates that every year, almost 2 million individuals pass away from work-related causes(International Labour Organisation, 2021). Employee performance is greatly impacted by OHS procedures, which account for 30.4% of the variance in performance(Umugwaneza et al., 2019). Particularly for front-line health professionals, job uncertainty, lower pay, and social instability all had an impact on risk factors, risk increases, and interpersonal working relationships(Agus et al., 2020).

Furthermore discussed are the financial effects of poor health and safety, such as increased absenteeism and downtime(Birhan & Endawoke, 2023a). As Birhan & Endawoke articles additionally, the materials offered cover the difficulties and deficiencies in workplace health & safety services in Ethiopia. The number of plastic manufacturing industries will increased from time to time(Plastic & Rubber | Statista, 2023.). Even if there is occupational health & safety policy and Labor proclamation in Ethiopia, its implementation is dependent on the interest of the factory owners. Occupational safety issues are commonly the interest of employees rather than company owners. It is observed that the primary focus of the owners in the manufacturing sector is Primary on maximizing business profits rather than prioritizing the health condition of employees. In addition to that, they don't have enough knowledge about the Worker well-being, workplace safety, and industrial efficiency is just a few of the many considerations that go into estimating and evaluating the impact of occupational health and safety (OHS) on labor productivity(Shikdar & Sawaqed, 2023).

Several study gaps have been found in the literature review on labor productivity and occupational safety and health are Additional study is required to Determine how Occupational Health& Safety affects labor productivity in different industries, Completely understand the relationship between OHS and worker productivity across a range of industries, Safety ergonomics that occasionally overlooked in favor of safety regulation which can reduces worker productivity, and labor perceptions receive less attention to ascertain how these beliefs affect.

The effects of workplace safety & health and their potential impact on worker productivity the study aims to investigate the relationship between worker productivity and workplace health and safety measures within the specific context of Ethiopia's plastic industry. More research is needed

to determine how occupational safety and health affects labor productivity in manufacturing industries, which is why I decided to focus on Ethiopia plastic industry.

As literature review evidence that Workplace safety, employee well-being, and industrial efficiency is required for predicting and analysing the effect of worker productivity and workplace health and safety(Mappangile & Ramdhan, 2022).

As shown a clinical data recorded of Ethiopia plastic industry 40 labors injured by accident in one quarter Such as finger: piercing, injuring, scratching and nail removal, wound body, bleeding and little deafness, based on that clinical data Occupational safety and health problems are putting the victims and their families through unimaginable hardship. In addition to that, When it comes to health care expenses, lost productivity, reduced work capacity, time compensated but not worked, and decreased worker participation, occupational illnesses and injuries cause significant financial losses for industry.

(Ethiopia Plastic Industry 2022). Lower worker productivity due to the fact that has a direct translation occupational health and safety to affects cost savings and profitability. As observed and scanning one year clinical recorded data Ethio- plastic industry An unsatisfactory work environment such as temperature, noise, lighting, dust and Ethiopia's plastic industry performance may be negatively impacted by ergonomic problems that have a negative impact on worker motivation and cause them to put in less effort at work.(Clinical Records 2023).

in Ethiopia plastic industry Workplace safety & health management attention is low, the impacts of its on worker productivity is high. The investigation Predicting and Analyzing the Impact of workplace Health & Safety on Labor Productivity in Ethiopia Plastic Industry that search result is appropriate.

1.4. Research Questions

Upon completion of the investigation, the following research questions to be addressed:

1. What are the key factors that influence worker productivity in relation to workplace safety & health hazard?
2. How can the assessment of workplace health &safety procedures be effectively conducted and what is its relationship to worker productivity in the research area?

3. What are the essential requirements for predicting the influence of workplace safety & health hazard on labor productivity and how can a prediction model be developed?
4. How can a prediction model be formulated to guide the selection of preventative and re mediation actions for occupational safety health hazards?

1.5. Objective of the Study

1.5.1. General Objective

In this study, the general objective is to predict and analyze the impact of Occupational Safety& Health Hazards on worker productivity for decide the preventive and corrective mitigation measures in Ethiopia plastic industry, Addis Ababa, Ethiopia.

1.5.2. Specific Objectives

1. To investigate the factors that impact worker productivity in relation to workplace safety &health hazards.
2. To assess worker productivity in the research domain by analyzing worker performance evaluation methods and workplace safety & health hazards.
3. To forecast the influence of workplace safety health hazards on worker productivity and establish the necessary conditions for developing a prediction model.
4. To develop a prediction model to evaluate the impact of workplace safety & health risks and guide the selection of corrective and preventive measures for effective mitigation.

1.6. Scope and Delimitation

The impact of workplace health & safety hazard on worker productivity in Ethiopia plastic industry will be predicted and analysed with numerous elements and concerns in mind. Therefore, the study to be conduct among Ethio- engineering group of Ethio-plastic industry in Addis Ababa, Ethiopia. Among 396 employees of the Ethiopia plastic industry the targeted 70 labors to be determine by using random sampling size techniques. The research focus on worker productivity

affects by workplace health and safety hazards. The research will cover occupational safety and health issues related to its influence on labour productivity in production areas, clinic, and workshops are selected industry sites.

The limitation of the study will be expected that voluntary of industry to give appropriate data of organization with related to labour productivity and occupational health and safety Due to certain limitations because Ethio- plastic industry management may be not readily providing information to the public, particularly to researchers. However, the data to collected through passing different challenges.

1. 7. Relevance of the Research

The significance of the research that One of OHSA's main responsibilities is to safeguard workers' physical and emotional well-being. Industries that provide a condense work zone can reduce the likelihood of occupational illnesses, accidents, and injuries. In addition to fostering a healthy work atmosphere, this raises job satisfaction and retention rates. Employer morale can rise, worker productivity can increase overall, and employee absenteeism can decrease when OHS is prioritized.

This study is to guarantee that everyone has the chance to lead a healthy, fulfilling life and has access to the necessary healthcare services. Therefore, this study would be great significance to the following groups: management of Ethiopia plastic industry, industry employees, stakeholders, governments and researchers.

- ❖ Industry Management would benefit from the study since it helps them realize how critical health and safety their impacts on their output and make decisions for preventive action.
- ❖ To establish the framework for promoting health and safety consciousness and exposing the weaknesses of the different strategies employed by employers.
- ❖ Workers gain from this study since the results will inform them about the potential risks and harms that come with disregarding workplace health and safety regulations. And also workers follow the organization's standard operating procedure for workplace health and safety.

- ❖ The information from this study would enable the government to evaluate the health and safety procedures used by organizations. The study's recommendations would enable them to develop plans that would raise workplace health and safety requirements.
- ❖ Researchers and other academics working on related projects will be able to use this report as a resource. Lastly, it is hoped that this work would inspire other academics with similar interests to pursue additional research.

1. 8. Expected outcome of the study

A good OHS management system practice in manufacturing industry is important for the increments of productivity and business sustainability. The good workplace safety &health system which is important criteria for manufacturing centers in order to compete in world global market so that this study will use to identify the major workplace safety and health hazard effects on worker productivity and make management decisions for preventive measure which its takes mitigation action in order to control the worker productivity loss in the study areas. Increasing worker productivities of Ethiopia plastic industry also helps to maintain the viability of social security systems by preventing needless expenditures to health care systems and by keeping workers employed rather than relying on pensions or disability payments. In general, this research the expected outcomes are;

- ❖ Establishment of good OHS practices in Ethiopia plastic industry.
- ❖ Keep a secure and effective working environment by understanding and identifying key factors.
- ❖ Show benefit of OHS on worker productivity and to increase the management or industry knowledge related to Safety and health hazards.
- ❖ Enhance industry top management commitment to implement OHS policy and programs in their factory.
- ❖ Raise awareness among staff members, enhance the company's reputation, highlight the safety of plastic products, attract new clients, and expand into untapped areas.
- ❖ Industry can pro-actively address health and safety hazards, put preventative measures in place, and establish a safer workplace that fosters increased productivity.

- ❖ improve overall workplace safety and efficiently minimize risks by utilizing the predictive model to guide their decision-making
- ❖ Decide which preventative and remedial actions to take.
- ❖ Sustain employee's well-being and workers' productivity.

1.9. Paper Organization

The organization of this research paper is divided into five main components. The study's introduction, which includes the issue statement, background information, rationale, goals, research questions, and an overview of the study's importance, reach, and constraints, is covered in the first chapter.

In chapter two, the pertinent literature is reviewed with an emphasis on the main ideas and problems that are important to the study.

The methodology, which includes the population, sample size, sampling strategies, data collection methods, data analysis procedures, and research design, is described in chapter three.

In Chapter Four, the gathered data is examined and analyzed, along with the ramifications of the findings.

Chapter five offers a summary, suggestions, and final reflections on the research, bringing the report to a close.

Chapter Two

2.Literature Review

2.1. Introduction

Predicting and analysing the impact of OHS on labour productivity which involves considering various aspects, such as worker well-being, workplace safety, and organizational efficiency. The literature survey covers definitions, concepts, factors relevant to the specific objectives, the conceptual framework, and gap analysis.

2.2. Definition Workplace safety &health and labor productivity

Workplace safety & health and labor productivity have a complex relationship that has been the subject of numerous studies. The search results yielded the following important definitions and conclusions are;

Every organization in the world has a fundamental interest in its employees' productivity which The capacity of employees productivity is the ability to finish tasks within regular business hours as outlined in a job description(Mutegi et al., 2023).Workplace safety is defined as the assumption that all or the majority of employees possess the necessary knowledge, abilities, motivation, and interest to contribute to organizational safety and improvements, as well as the necessary experience and expertise to recommend controls and other measures(Karanikas & Zerguine, 2023). Rosenberg et al., (2023)The regulations define protection at work as organized activities that are governed by a set of norms which are three different sorts of regulations exist to ensure workplace safety: basic, special, and recognized rules. The industry labor productivity is the amount of work produced for every unit of labor input(Dua & Garg, 2019). The term "workplace health and safety" (OHS) describes the precautions used to safeguard employees' health and welfare at work (Pedro & Weber, 2023). workplace safety and health refers to a methodical approach implemented in the workplace that includes things like assigning accountability for actions pertaining to OSH, creating work standards and the frameworks necessary to meet them, stressing the regulation of OSH, and making it easier for laws and policies to be enforced(Nainggolan & Beatrix, 2023). Anticipation, recognition, assessment, and control of

workplace hazards that could jeopardize workers' health and safety while considering potential effects on neighboring communities and the environment are the components of the field of OHS risk management.

(Company et al., 2016).

Generally, most authors argue that Employee productivity is defined as an employee's ability to finish tasks during regular business hours as outlined in a job description. Workplace safety is managed by a set of norms. Work output per unit of worker input is known as industry labor productivity. A methodical strategy used in the workplace, such as accountability assignment, is known as occupational health and safety (OHS).

2.3. Concepts of OHS and labor productivity

For the purpose of predicting and analyzing the effect of occupational health and safety on labor productivity, it is imperative to comprehend the relationship that exists between safety, health, and productivity and to implement measures to improve each.

Working to promote and maintain the highest standard of social, mental, and physical health for employees in all professions, occupational health services (OHS) is a subset of public health(WHO, 2021). According to the World Health Organization WHO.Orgnaization (2020), workplace health encompasses more than just the absence of illness or disability and also addresses all facets of social and emotional well-being. Important ideas and conclusions consist of the focusing research area are:

authors Chang et al., (2021). Said that the concept of Productivity and safety go hand in together: A workplace that is safe and has few hazards for employees tends to be more profitable and productive. Productivity rises when safety improves and vice versa. According to Chang Articles Worker happiness and output: When there is a culture of well-being in the workplace, even if it is virtual, team members may focus on the quality of their work rather than the stress and anxiety that come with safety concerns. Effects of safety and health regulations in the workplace (Handley, 2021b). OHS initiatives have been shown to significantly boost worker productivity, enhance the work environment and Workplace safety culture (Handley, 2021). Creating a strong workplace safety culture is essential to striking a balance between productivity and safety.

according to Dufour et al., (2020) to offer a conceptual structure for the OHS duties that cascade hierarchically within an organization.

The improvement of employees' physical and mental health in economic organizations is facilitated by the ISO 45001 occupational health and safety management system and it needed after numerous incidents and injuries involving worker health and safety were reported, particularly those involving occupational hazards like work-related injuries, accidents, and psychological and physical illnesses that frequently resulted in the loss of human element (Malinda et al., 2022).

In summary, Understanding the connection between worker health, workplace safety, and overall productivity is essential to estimating and evaluating how worker productivity is impacted by workplace health and safety in Ethiopia plastics industry.

2.4. Workplace Safety and Health and Labor Productivity

2.4.1. OHS Hazard-Related Factors Affecting Worker Productivity

Considering that occupational safety and health risks have the potential to cause accidents, injuries, and lower employee morale, job satisfaction, and overall productivity, they can have a massive effect on labour productivity. Examining several components that contribute to this relationship is necessary in order to understand the factors that influence labor productivity through occupational safety and health hazards. Among the important conclusions drawn from the search results are;

Factors influencing worker health and well-being beyond standard workplace safety and health concerns include changing employment arrangements, a rise in workplace expectations, and changing demography(Schulte et al., 2019). In some industries, ergonomic problems and poor workplace design can result in issues with worker productivity, health, and safety(Shikdar & Sawaqed, 2023).Workplace dangers(Kumie et al., 2016). Occupational noise and dust are common workplace risks that can lead to illnesses and injuries, reduced productivity, and heat stress.(Morrissey et al., 2021). Because heat stress exposes worker health, safety, and productivity, it is becoming an increasingly significant issue in the workplace. It is crucial to protect worker health and safety while preventing heat-related productivity losses. Productivity

loss due to health issues (HRPL) (Lee et al., 2021). The state of workers' health has a major impact on how productively they can work and remain productive. It is possible to lower by addressing health issues and putting in place screening and education programs for employees. Various risk factors, including injury, explosion, burning, and flashing, can lead to occupational diseases(Tesfaye, 2022.). It is crucial to use risk analyses appropriate for this field (HAZOP, FMEA, Fine-Kinney, L Type Matrix, etc...), particularly in workplaces where chemicals are used as raw materials. Furthermore, a number of variables have been found to be predictive of occupational injuries, including the usage of PPE, professional background, and drug usage(Tadesse & Israel, 2016).

Increased absenteeism and increased downtime are two ways that poor health and safety can hurt a company's bottom line(Birhan & Endawoke, 2023b). The workplace has changed due to Ethiopia's rapid economic development, and a lack of trustworthy workplace safety & health services has increased the incidence of workplace accidents and missed workdays.(Kumie et al., 2016).

The majority of academics think that predicting and evaluating the impact of workplace safety and health on labor productivity ultimately requires recognizing the interdependence of productivity, safety, and health as well as implementing enhanced productivity strategies. By focusing on employee well-being, implementing OHS interventions, addressing heat stress, and cultivating a strong safety culture, industry can boost productivity and profitability while maintaining a safe and healthy work environment.

2.4.2. Workplace Safety and Health Practices and Labor Productivity in the Research Domain

It is possible to identify industry-specific factors that could impact worker productivity and OHS protocols by considering the nature of the activity, the use of potentially dangerous goods or machinery, and the working conditions in the field.(Schulte et al., 2019). According to (Shikdar & Sawaqed, 2023) predicting and analysing the impact of OHS on labour productivity the Ethiopia plastic industry can be gather information on a variety of elements that affect the link in a study area between labor productivity and workplace health & safety practices. Based on Mappangile & Ramdhan, (2022) Information on the frequency of OHS risks, the efficiency of

safety precautions and training initiatives, and the general productivity levels of workers in the research area may all be found here.

2.4.3. Worker Productivity and OHS Practice Analysis

It requires in-depth assessment techniques to analyze the impact of workplace health and safety hazards on labor productivity. Industry can analyse the relationship between labour productivity and OHS practices in a number of ways, including by conducting regular safety audits, asking workers about their opinions of workplace safety, and measuring worker productivity levels in relation to OHS advantages using performance metrics.

The search results revealed several important conclusions, including**:** according to research findings of Lari, (2024) and Katsuro et al., (2021) Adopting Occupational Health and Safety (OHS) policies can significantly boost workers' productivity. Factors Affecting Productivity that Issues with OHS can have a detrimental effect on employees' ability to be productive, which will lower employee production(Katsuro et al., 2021). Moreover, productivity and workplace safety Workplace organization has a significant impact on the link between productivity and safety(Hesapro, 2013).OHS's Effect on Employee Performance: OHS affects worker performance in the construction business in a statistically meaningful way (Segbenya & Yeboah, 2022a).

To conclude the authors' analysis of these variables, industries can acquire important knowledge about the relationship between worker productivity and OHS procedures. Performance metrics can be used to gauge how well OHS measures are working, while regular safety audits and employee feedback can assist pinpoint areas that need to be improved. By implementing a complete approach to OHS impact analysis, Ethio- plastic industry's may enhancement worker productivity and ensure the safety and well-being of their workers.

2.4.4. Predictive Model for OHS Effect Evaluation

Creating predictive model to examine how workplace safety & health affects worker productivity that can assist industries in identifying possible hazards, evaluating the efficiency of safety

precautions, and allocating resources for OHS advantages in an informed manner. Predictive models for OHS impact analysis are explained in a number of research and websites.

The Work Organization and Productivity Studies have indicated that work organization significantly affects the connection among workplace health and safety and productivity (Hesapro, 2019b). The article highlights the significance of incorporating OHS into productivity concerns by analysing OHS management systems in relation to worker productivity (Genesis et al.,2022). Predictive analytic provides a range of models, such as the forecast, classification, and outliers models, that can be used in the field of health & safety to forecast data and pinpoint issue areas(HSE-network, 2020). In order to maximize injury prevention programs and guarantee employee safety, white papers and research articles address the creation of safety prediction models that can reliably forecast workplace events and assist in identifying factors impacting incident levels(Predictive Solutions, 2021). Predictive modelling has the potential to increase safety in hazardous work environments(Yedla et al., 2020). According to yedla study in the mining industry showed how machine learning techniques and predictive analytic s can be utilized to forecast days away from work and outcomes related to occupational safety.

Creating a model with the goal of increasing safety and productivity while lowering injuries, accidents, and fatalities(Jilcha, 2023). the model also looks at lowering manufacturing costs, improving customer satisfaction, profitability, and staff performance(Hailu et al., 2017).

Predictive modelling can generally be used to find out how worker productivity and OHS benefits are related, identify possible hazards, evaluate the efficacy of safety precautions, and allocate resources tactically. Health and safety professionals can forecast data and identify problem areas by utilizing a variety of models from predictive analytic s, including the forecast, categorization, and outlier's models. It is possible to anticipate workplace safety results and days missed from work using machine learning and predictive analytic s. These resources provide useful insights for Ethio- plastic industry looking to increase worker productivity and OHS impact assessments by show casing the various applications of predictive models and analytic s with relation to the health and safety of the workplace.

2.5. Gap Discussion for the Literature Review

According to the literature research, the following are the gaps in the analysis and forecast of labor productivity and occupational health and safety (OHS):

There has been little research on how OHS affects worker productivity. Although some studies, like those on the food industry in Zimbabwe and the construction sector in Ghana, have looked at the connection between OHS and worker performance, more research is necessary to fully understand how OHS affects labor productivity in a variety of industries(Katsuro et al., 2017).

Longitudinal studies are scarce; the majority of existing research is cross-sectional in nature, which may not fully account for the long-term effects of OHS procedures on worker productivity(Lari, 2024). The relationship between OHS and labor productivity can be better understood by a longitudinal study, such as the one on a UAE Fire and Security firm that was carried out(Purwanto et al., 2020).

It is necessary to conduct research on how worker productivity in other industries, such manufacturing, is affected by occupational health and safety (OHS). Although some studies concentrate on particular industries, such as the food industry in Zimbabwe and the construction sector in Ghana, additional study is needed (Tapueluelu, 2023).Safety ergonomics are sometimes neglected in favor of safety enforcement in studies such as the coal mines study; nevertheless, this can result in higher absenteeism, mistakes, and sick leave, all of which lower labor productivity(Kornieieva et al., 2022).

Minimal attention paid to employee perceptions: While some studies, such as the one on the UAE Fire and Security Company, examine how employees see OHS procedures, more study is required to determine how these perceptions affect worker productivity(Ngwenya & Pelser, 2020). OHS policies and procedures receive little attention: More research is required to determine how OHS policies and practices may be effectively implemented and monitored to increase labor productivity. Some studies, such as the one on the construction sector in Ghana, advocate for the establishment of OHS regulations and practices. Insufficient emphasis on management's role: Although some studies, such as the Ghanaian construction sector study, suggest that management give OHS top priority, further research is required to determine how management may successfully encourage and enforce OHS policies to raise worker productivity.

The literature assessment on labor productivity and OHS has identified a number of study gaps that, in general, call for additional research in the following areas:

1. Additional research is required to determine how OHS affects labor productivity in different industries, such as manufacturing.
2. Safety ergonomics are occasionally overlooked in favor of safety regulation, which can lead to a decrease in worker productivity.
3. Employee perceptions receive less attention, and further research is needed to ascertain how these beliefs affect.
4. Further investigation is necessary to fully comprehend the correlation between occupational health and safety (OHS) and worker productivity in various industries, as there is now insufficient data in this domain.

2.6. Conceptual Framework of OHS and labor productivity

There are independent and dependent variables in the conceptual framework for "Predicting and Analyzing the Impact of Occupational Safety and Health on Labor Productivity: A Case of Ethiopian Plastic Industry." The independent variables can cover a wide range of topics linked to occupational safety and health, such as Ergonomics of workplace safety training, Emergency Management and Health Protocols, OHS and work place Safety Rules and Procedures, and Worker efficiency whereas, the productivity of labor is the dependent variable as shown in figure 2.1.

Independent variables	**Dependent variable**	**Worker Productivity Measurement**
1. Ergonomics of workplace safety 2. OSH training	Worker Productivity	1) Analogizing Worker Productivity Measurement 2) Worth Added 3) Productive Time

3. Emergency Management and Health Protocols 4. OHS and work place Safety Rules and Procedures		4) Point of reference Met

Figure 2.1 Conceptual structure of variables

Chapter Three

3.Material and Research Methodology

3.1. Introduction

Several factors of productivity, safety, and occupational health might be included in an all-encompassing inquiry to approach the study technique for Predicting and Analyzing the Impact of Occupational Health and Safety on Labor Productivity in Ethiopian Plastic Industry. This could involve identifying workplace dangers, determining the frequency of injuries, estimating the financial implications of occupational injuries, and performing a situational analysis and needs assessment of occupational safety and health services in the Ethiopia plastic industry. Then I will be used techniques to predict and assess how OHS would affect worker productivity in Ethiopia plastic industry such as research design, literature review, data collection, ethical consideration, data analysis, predictive model development.

3.2. Design of the Research

The general research design and flow method is outlined in Figure 3 and begins with problem identification, a literature review, and the setting of both general and specific objectives that are in line with the research question.

Secondly, Design the methodology of data collections for the analysis of raw data, and development of the predictive model for predict and analyse the OHS risk levels for the purpose of mitigation measures. Finally, a discussion, conclusion, and recommendations for additional research would be provide to summarize the research findings as shown in figure 3.1.

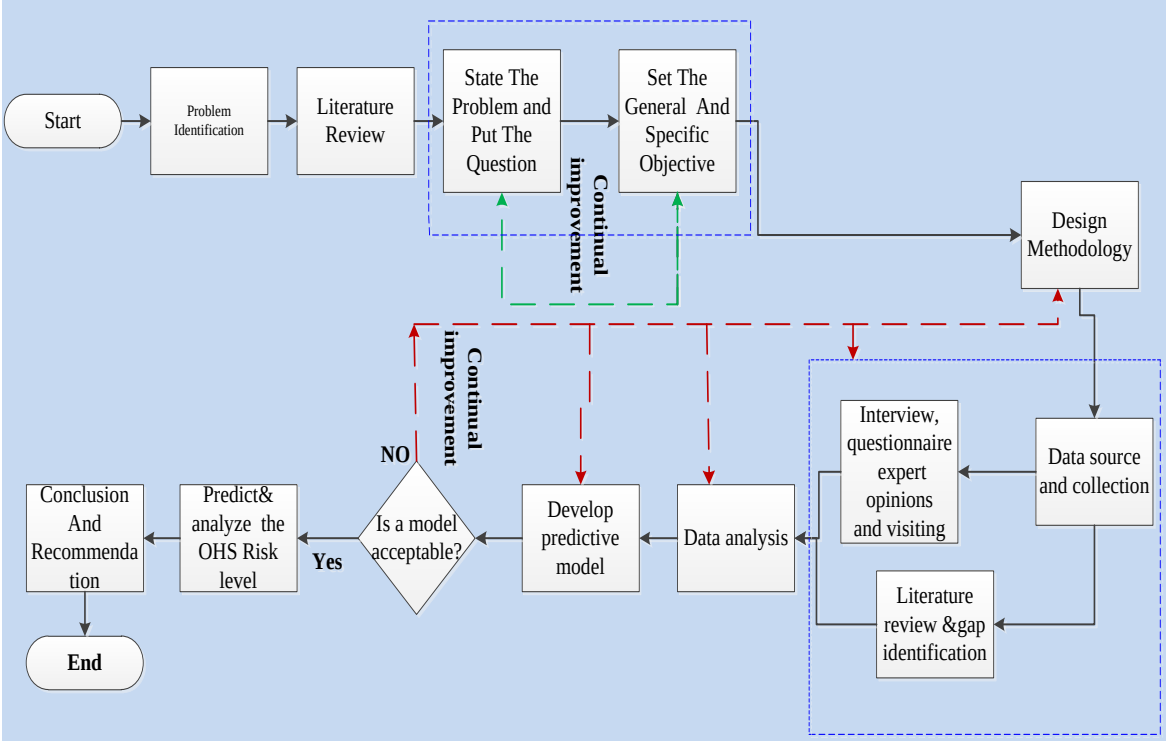

Figure 3.1: methodology framework

3.3. Sample Size Techniques

In industry, each level of employees is taking a sampled by using a census sampling technique, like simple random sampling, to produce a sample that is more accurate and representative.

3.3.1. Population and Determine the Sample Size.

The issues of sampling size determination are critical whenever the survey will be done involves a large population of respondents. In this research case the populations in the Ethiopia plastic industry the total employees are 396, out of this the targeted employees are 70 labors in direct work place participation because when to compare the whole employees, 70 labor is represent. Therefore, the sampling size will be taken 70 labors for respondents of the research by use of census method.

3.4. Sources of Data

Source of data for the research purposes to be collected the Ethio- plastic industry of operation area, clinical records, management staff, supervisors and safety departments.

a. Primary data sources

The Data that gathered through observation, unstructured interview and discussions with targeted to employees of in the industry.

b. Secondary data sources

Data that is available in internal and external documents like studies, reports, books, journals and evaluations.

3.5. Data Collection Tools

Compile relevant data regarding labor productivity, OHS indicators, and additional elements of the Ethiopia plastics. Surveys and interviews can all be used to accomplish this.

1. Within the Ethiopian plastics industry, production supervisors assist in the distribution of questionnaires. I promptly located the respondents in their various workplaces and told the supervisors that I would assist in distributing the surveys.
2. Surveys and interviews with workers, employers, and safety experts in the research area are two methods for gathering data. This can assist in gathering data on OHS practices as they are today, pointing out problem areas, and assessing how well the safety precautions that are in place work. Analyzing occupational accident, injury, and illness data along with lost time is another method. Since they are informed about production processes and safety concerns, safety experts and production heads assist with observations on OHS infrastructures. Additionally, cross-checking questionnaire replies with interview data increases the validity and reliability of the collected information. A descriptive survey research design was used to conduct this study.

3.6. Qualitative and Quantitative Approaches

Quantitative approaches: Collecting numerical data to measure behaviours, relationships, and phenomena is the quantitative method.
Qualitative approaches: Using non-numerical data from sources including observations, interviews, and open-ended survey questions, the qualitative approach seeks to understand labor behavior, experiences, and perceptions.

3.7. Ethical Consideration of Research

The study Predicting and Analyzing the Impact of Occupational Health and Safety on Labor Productivity in Ethiopian Plastic Industry highlights the importance of ethical considerations during data collection. Take the following steps to respect moral principles: obtaining the informed consent of each participant; guaranteeing the privacy and confidentiality of the data gathered; putting in place suitable security measures for data; being open and honest about research procedures and the data collection process; treating each participant with dignity and respect; adhering to pertinent ethical standards; and routinely overseeing and assessing the research process. Finally, discuss the benefits of research efforts in the field, such as assessing worker productivity, projecting the influence of occupational health and safety risks, and investigating the variables influencing worker productivity in relation to occupational health and safety risks in the Ethiopian plastics industry.

3.8. Analyze data and use Tools

3.8.1. Analyze Data

After gathering, the data would be arranged and used as an input for the analysis. Excel and statistical evaluation are used in the analysis. SPSS or ANOVA were used to analyses the data on industry statistics and the frequency of positive or negative responses.

To find any meaningful relationships between labour productivity and OHS measures, analyse the gathered data using quantitative methods. For this by integrating the regression analysis, and correlation analysis to be all applied.

3.8.2. Multiple linear regression approaches

When developing a prediction model to guide the selection of preventative and corrective activities for occupational safety and health risks, consideration must be given to the hazard-specific safety and health standards and regulations under the Occupational Safety and Health Act.

By examining trends in a given collection of input data, it entails building models that have been trained on past data to forecast future occurrences or results. Regression models is an algorithm can be used to train these models. Predictive analytic s forecasts activity, behaviour, and trends based on past and present data, and one of its key components is predictive modelling(Rami Ali, 2020).

3.9. Reliability and Validity

To produce research findings of the highest quality, The legitimacy and dependability of data collection techniques are authoritatively guaranteed. Enhancing the dependability of obtained data requires the use of established techniques, training, pilot testing, and other forms of validity assessment. Validity and reliability are key ideas in guaranteeing the accuracy and dependability of data in study and analysis.

3.10. Summary of methodology

Table 3.1 the Specific Objectives of the Research done by using Tools and approaches outlined

s/no	The Specific Objectives of the Research	tools	approaches	Expected outcomes
1	For investigate the factors that impact worker productivity in relation to occupational safety and health hazards.	➢ Questionnaire ➢ Interviews ➢ Surveys ➢ industry reports ➢ Literature review	➢ Qualitative ➢ quantitative	➢ determine key factors influencing worker productivity
2	For assess worker productivity in the research domain by analysing worker productivity evaluation methods and occupational health and safety practice.	➢ Questionnaire ➢ Interviews ➢ focus group discussion ➢ Industry reports ➢ Literature review	➢ Qualitative ➢ Quantitative ➢ regression &correlation analysis	➢ Identify worker productivity levels per labor ➢ Measured variables
3	For forecast the influence of workplace health & safety hazard on worker productivity and establish the necessary conditions for developing a prediction model.	➢ Literature review ➢ Secondary data source ➢ Data screening, organized	➢ SPSS ➢ Qualitative ➢ Quantitative	➢ Analysed data and developed a prediction model. ➢ Pre assumption test model
4	For develop a prediction model to evaluate the impact of workplace safety & health risks and guide the selection of corrective and preventive measures for effective mitigation.	➢ Literature review Analyzed data by multi linear regression analysis	➢ algorithms of Regression models. ➢ ANOVA ➢ Qualitative ➢ Quantitative	➢ Develop fitness of model ➢ Evaluate the impact of OHS ➢ Formulate model ➢ Decide on risk level analysis

Chapter Four

4. Analyze, Interpret and Discussion

4.1. Introduction

With a case study of Ethiopia plastic industry in Addis Ababa, the main objective of this study was to ascertain how occupational safety and health impacts workers' productivity. This research examined worker productivity in relation to occupational health and safety threats, worker productivity evaluation methods, and occupational health and safety procedures. Furthermore, how the study hypotheses were influenced by the effects of workplace health and safety risks and the requirement to set the conditions for the creation of a prediction model were also looked at, as was the effect of these risks on worker productivity. Using original data that were gathered from the industry, the study performed both descriptive and inferential analysis. Inferential statistics were analyzed using multiple regression analysis and Pearson correlation, whereas specific descriptive statistics like percentages, means, and standard deviation were utilized. Along with a summary of the investigation and conclusions, this chapter also provides the presentation and explanation. Using charts, tables, and figures, the study's conclusions were presented. Figures, tables, and charts were utilized in this chapter to convey the research findings.

4.2. Demographic Characteristics

The purpose of the study was to determine the characteristics of the study participants, including their greatest degree of education, position within the company, and length of employment in the Ethiopian plastics industry. As a result, the section displays the findings from these attributes, which are displayed in the ensuing subsections.

4.3. Ratio of Responses

The study involved supervisors, production managers, workers in production, electricians, mechanics, and OSH managers from the Ethiopia Plastic Industry in order to acquire the necessary primary data.

The aforementioned were given a total of 70 questionnaires; as shown in Figure 4.1, 67 of the questionnaires were filled out and returned. According to Orodho (2019), a response rate exceeding 50% helps collect enough data to be broadly applicable to the target group. This indicates a general response rate of 95%. Additionally, according to Kothari (2014), a descriptive study should have a response rate of at least 50%. Consequently, enough information was acquired to forecast and analyze the effect of worker productivity in EPI and occupational safety and health.

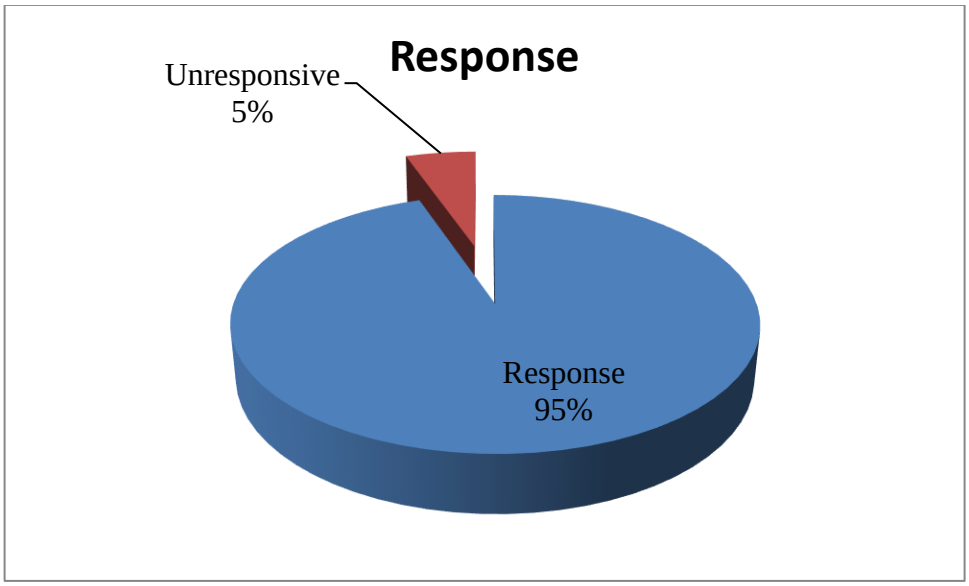

Figure 4.1 Ratio of Responses

4.3.1. Highest Educational Level

The purpose of the study was to determine the highest level of education attained by respondents in the Ethiopian plastic industry, which included managers of production, supervisors, workers in production, electricians, mechanics, and occupational safety and health (OSH). According to the study's findings, which are displayed in figure 4.2, the majority of participants 26.86% were undergraduate students, while the remaining 7.46% were postgraduate students. As illustrated in Figure 4.2, 44.78% of survey respondents held academic credentials at the diploma level, and 18% held certificates, based on the Response, 95% Non-response, and 5% findings.

The results of the study indicate that each responder had completed secondary school or higher education, making them eligible for the study based on their understanding and interpretation of the questionnaire's questions. As a result, they provided accurate and reliable information for the study. The study's conclusions regarding the respondents' highest degree of education lend credence to Baruch and Holtom's (2018) assertion that response rates and information dependability are enhanced by higher education levels.

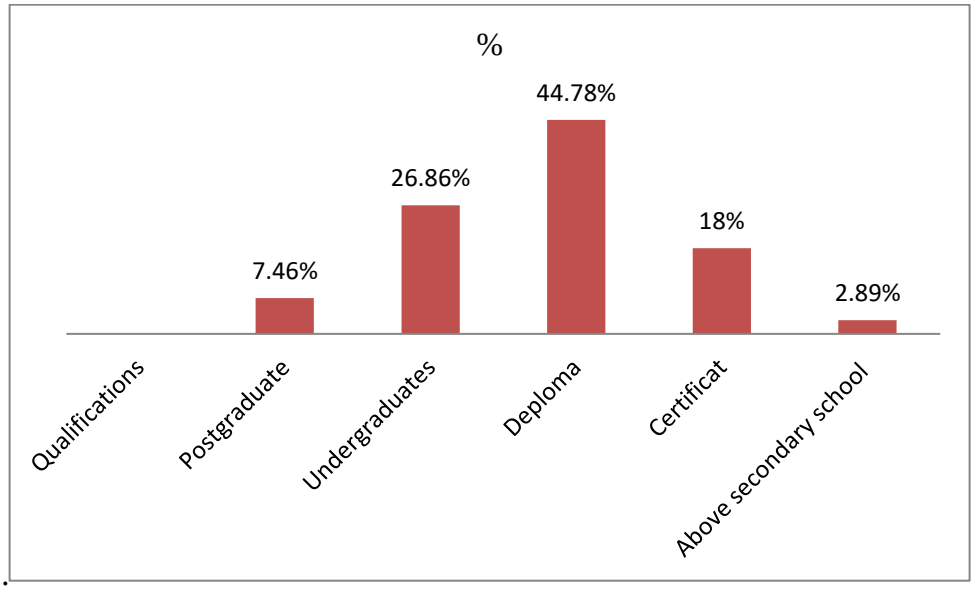

Figure 4.2 Highest Educational Level

4.3.2. Position within the Industry

To ensure that the data was representative of the target audience, the study also attempted to assess the functions performed by the production, operations, and procurement managers that were included in the sample. Figure 4.3 illustrates the study's findings, which showed that 49% of the respondents worked in production, with the remaining 18% of the population under investigation being made up of other individuals. The results presented in this section indicate that all of the company's departments that were involved in the (production, operations, OHS, and maintenance) were fairly well-represented in the study. The outcomes also take into account the opinions of many employees in the business that took part in the OHS.

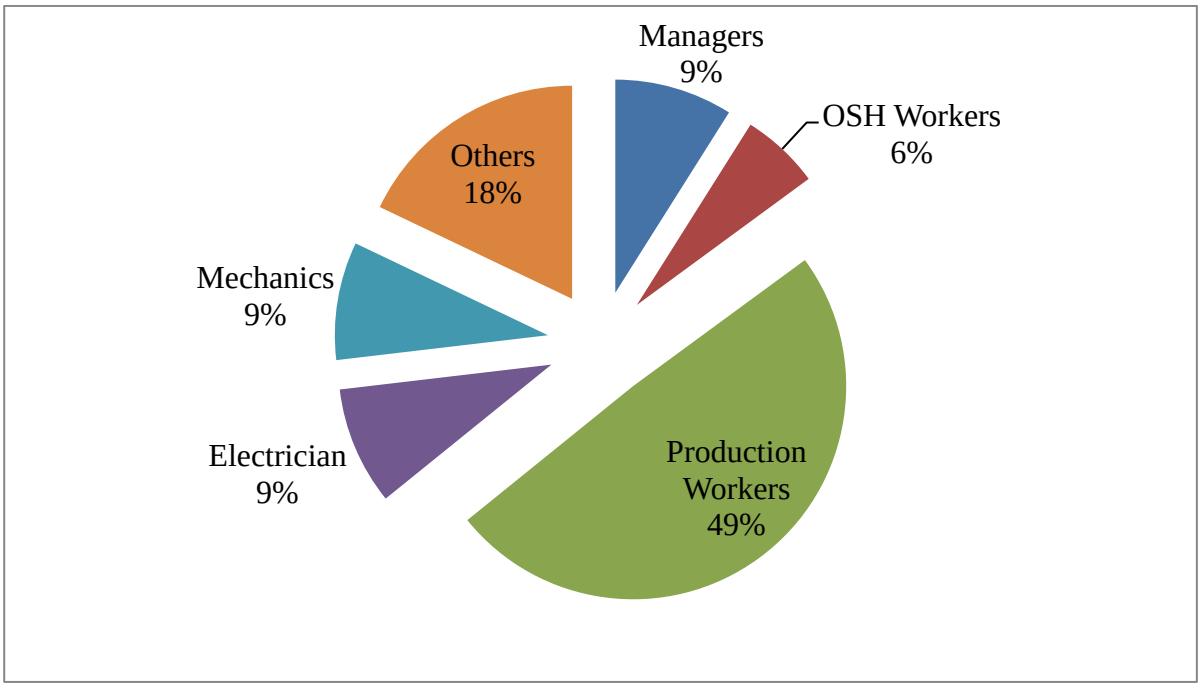

Figure 4.3 Position within the industry

4.3.3. Experience at Work

As depicted in Figure 4.4, which presents the study's findings, 51% of the respondents had more than ten years of work experience, making them the respondents with the highest level of work experience. Of the total responders, 42% had held their positions for five to ten years. A significant proportion of the participants, or 7%, had held their current positions for less than five years, according to the study's findings. Given that over 93% of the participants had worked for more than five years, the results indicate that a sizable majority of them had kept their current employment for a suitable amount of time. The results additionally imply that the participants possessed adequate exposure to the organization to be conversant with its lean manufacturing methodologies.

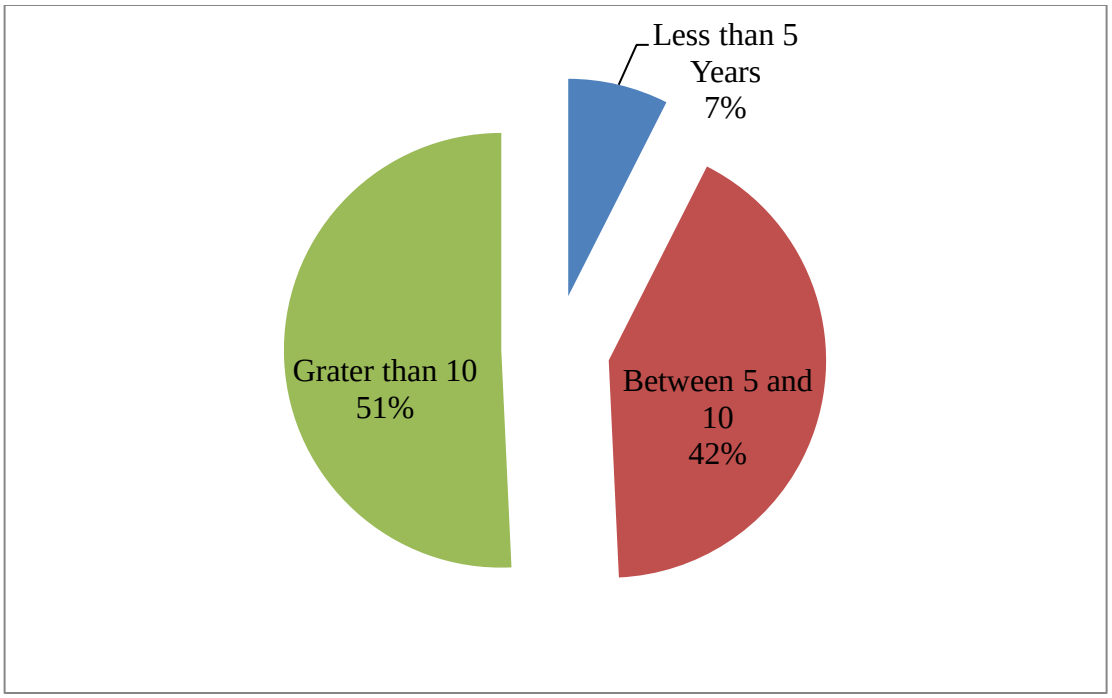

Figure 4.4 Experience at Work

4.4. Analyses and descriptive findings

The responses based on the different indicators of the study variables were recorded on a Likert scale of 1–5 (5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Dis Agree and 1 = Strongly Dis Agree) using descriptive statistics of mean and standard deviation. As a result, the average responses for each variable are shown in this section, while the standard deviation shows how much the replies varied.

In-depth evaluation techniques are required to analyse the impact of workplace health and safety hazards on labor productivity. Many methods are available to industry to analyse the relationship between worker productivity and OHS practices, such as regular safety audits, employee surveys regarding workplace safety, and performance metrics to measure worker productivity levels in relation to OHS benefits.

According to research findings by Lari, (2024) and Katsuro et al., (2021), Occupational Health and Safety (OHS) measures can significantly boost worker productivity. This is only one of the crucial conclusions that the search results brought to light. Factors Affecting Productivity: According to (Katsuro et al., 2021).difficulties with OHS may negatively impact workers'

capacity for productivity. Efficiency and Safety in the Workplace Hesapro, (2018) asserts that workplace organization has a significant impact on the link between productivity and safety. Worker Performance Affected by OHS: Worker performance is statistically significantly impacted by OHS in the construction business (Segbenya & Yeboah, 2022a).

As a result of the authors' examination of these factors, industries can gain valuable insight into the connection between labour productivity and OHS protocols. Performance measures can be used to assess the effectiveness of OHS procedures, and worker input and routine safety audits can help identify areas that require improvement. The employment of a comprehensive strategy to OHS impact analysis can help the Ethiopia plastic industry increase worker productivity while guaranteeing the health and safety of its labours.

The Ethiopia Plastic Industry's occupational safety and health risks were examined in the study along with the factors influencing worker productivity. The elements that affect worker productivity in regard to occupational safety and health hazards were scored by respondents on a 5-point rating system, with 5 representing Strongly Agree, 4 representing Agree, 3 representing Neutral, 2 representing Disagree, and 1 representing Strongly Disagree. Finding the relationship between worker productivity and occupational safety and health in the Ethiopia plastics industry in Addis Ababa was the first objective. In addition to determining the causes of workplace accidents and the steps taken to prevent them, the study also aimed to determine the health and safety procedures followed by industry labours. This part also demonstrates the degree to which the organisation implemented safety protocols. Tables 4.1, 4.2, 4.3, 4.4 and 4.5 below display the average responses.

The information regarding current occupational safety and health practices in Ethiopia plastic industry is presented in this section. The study worked independent variables such as worker efficiency, emergency management, ergonomics for workplace safety, safety training, and occupational safety and health. the following analysis was done on the result from the above table.

4.4.1. Workplace safety ergonomics descriptive statistics

The impact of ergonomic workplace safety measures on worker productivity in Ethiopia plastics industry was also examined in this study. On a scale of 1 to 5, respondents ranked several

assertions about workplace safety ergonomics (5 being strongly agreed, 4 being agreed, 3 being neutral, 2 being disagreed, and 1 being strongly disagreed).

According to Table 4.1, The findings indicate that most respondents highly agreed that the difficulties of working hours were (mean = 4.22), that the difficulties of workload were (mean = 1.66), that the difficulties of the working environment condition were (mean = 1.99), that the majority of respondents highly agreed that the toilets were (mean = 4.33), that the drinking water was (mean = 3.55), that the majority of respondents agreed that the level of chemical exposure was (mean = 4.27), that the majority of respondents did not agree that there was overcrowding on the mean (mean = 2.85), the difficulties of the working temperature were (mean = 2.24), The respondents were largely in agreement about the level of working noise (mean = 1..99), the availability of a protected/insulated electric power source (mean = 4.31), the availability of sufficient lighting (mean = 1.93), and the lack of adequate ventilation (mean = 2.82).

Further study results revealed that most respondents disagreed with the following: most agreed that material is not safely stacked (mean = 1.70), most agreed that segregated hazardous/flammable materials are available (mean = 4.12), most strongly agreed that there is adequate emergency equipment available (mean = 4.42), most disagreed that the proper personal protective equipment (PPE) is being used (mean = 1.90), most moderately agreed that floor markings are visible and that material is kept within them (mean = 3.00),The majority of respondents disagreed that there are adequate fire exits available (mean = 2.39), that all exits are clear of obstructions (mean = 1.58), and that there is not enough space for smoking (mean = 1.43).

The study found that most respondents disagreed that Ethiopia plastic industry uses a variety of ergonomic and workplace safety measures, as indicated by an average score of 2.835. The data addressing workplace safety ergonomics appears to be quite consistent, as indicated by the standard deviation of 1.1.

Table 4.1 Workplace safety ergonomics descriptive statistics

Detailed Statistics			
	N	Mean	Std. Deviation
Industry Practices in Workplace Safety Ergonomics			

Difficulties of working hours	67	4.22	1.20
Difficulties of Workload	67	1.66	1.16
Difficulties of working environment condition	67	1.99	1.38
Availability of toilets	67	4.33	1.21
Availability drinking water	67	3.55	1.05
The level to chemical exposure	67	4.27	1.20
The existence of overcrowding	67	2.85	0.96
Difficulties of working temperature	67	2.24	1.26
The level of working noise	67	1.99	1.38
The level of availability of a protected/insulated electric	67	4.31	0.97
Availability of adequate lighting	67	1.93	1.15
Availability of adequate ventilation	67	2.82	0.87
Material is safely stacked	67	1.70	1.11
Availability of segregated hazardous/flammable	67	4.12	1.04
Availability of adequate emergency equipment	67	4.42	0.92
There is appropriate personal protection equipment (PPE) is in use	67	1.90	1.12
Floor markings are visible and the material is kept within the markings	67	3.00	1.10
All exits are free of any obstruction	67	1.58	0.99
There is enough fire exits available	67	2.39	0.97
There is no enough smoking zone	67	1.43	0.96
Average	**67**	**2.835**	**1.1**

source: 2024 independent survey

4.4.2. The OSH Training Descriptive Statistics

The study also examined how worker productivity in Ethiopia's plastics industry was affected by OSH training. On a scale of 1 to 5, respondents scored several statements about workplace safety &health: 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree. As presented in Table 4.2,The findings demonstrate that the majority of respondents did not agree that the industry has appropriate health and safety policies (mean = 1.60), that the industry has a written health and safety policy that includes procedures and programs for occupational safety and health (OSH), and that working conditions are safe (mean = 1.39), that the majority of respondents did not agree that employees are aware of the industry's health and safety policies

(mean = 1.22), and that the majority of respondents did not agree that the industry's written health and safety policy or programs are available to all employees (mean = 1.99).

The research findings also indicated that most respondents strongly agreed that the implementation of the Health and Safety Act in the workplace will make employees feel safe (mean= 4.55), most respondents highly agreed that employees are aware of any accidents or diseases that have occurred in your company in the past 12 months (mean =4.24), most respondents disagreed that the employees are aware of the laws currently in place regarding health and safety and that protective clothing is provided to all employees (mean= 1.78),The vast majority of respondents strongly agreed that having a suitable and comfortable workspace along with safety procedures will boost my productivity (mean= 4.69); however, the majority disagreed that health and safety procedures will shield workers from illnesses and injuries (mean 4.55).

The majority of study participants did not agree, on average, with the statement that the Ethiopian plastics industry aware of a variety of OSH training measures (mean of 2.89). The 1.03 standard deviation suggests that respondents' answers on workplace safety ergonomics were not very different from one another.

Table 4.2 The OSH Training Descriptive Statistics

Detailed Statistics			
	N	**Mean**	**Std. Deviation**
The OSH Training Descriptive Statistics			
The industry has adequate health and safety policies	67	1.60	1.17
Does the industry have a written health and safety policy that includes programs and procedures for occupational, health, safety (OSH) and working conditions?	67	1.39	0.92
Employees understand the industry's health and safety policies	67	1.22	0.71
Is the industry's written health and safety policy or programs available to all employees?	67	1.99	1.20
Employees are aware of the existing laws on health and safety protective clothing are provided to all employees	67	1.78	1.18
Are you aware of any accidents/ diseases that had occurred in your company for the past 12 months?	67	4.24	1.24
Implementation of health and safety act in the organization will make employees feel safe	67	4.55	1.02
Adequate and comfortable working environment as well as safety practices will affect my productivity positively	67	4.69	0.80

The practice of health and safety will protect employees from injuries and illness	67	4.55	1.02
Average	67	2.89	1.03

source: 2024 independent survey

4.4.3. Health Protocols and Emergency Management Descriptive Statistics

The impact of health precautions and emergency management on worker productivity in Ethiopia's plastics industry was also examined in this study. On a scale of 1 to 5, respondents ranked several statements about emergency management and health procedures (5 being Strongly Agree, 4 being Agree, 3 being Neutral, 2 being Disagree, and 1 being Strongly Disagree).

As shown in Table 4.3, Based on the results, the majority of respondents did not agree that the floors are kept dry and clean to lower the risk of slips and falls (mean 1.49), most did not agree that our employees think the working environment is safe (mean 1.91),most did not agree that the employees are aware of safety procedures in case of fire (mean 3.54), While most respondents agreed that there are clearly marked fire exits in the event of an emergency (mean 2.36), most disagreed that there is sufficient fireffighting equipment (mean 4.31), most disagreed that employees have received fire fighting training (mean 1.951), and most disagreed that first aid kits and medical services are sufficient (mean 1.60).

The study's additional results demonstrated that most respondents agreed that there are sufficient facilities for separate male and female restrooms (mean 4.42), that labours are not satisfied with the level of cleanliness in the restrooms (mean 2.42), that there is a continuous review of accident prevention measures (mean 1.55),that the industry regularly performs medical check-ups for labours (mean 2.42, With a mean score of 2.75 and a standard deviation of 2.75, the majority of respondents disagreed that the industry conducts AIDS awareness programs. Deviation 1.22; most respondents did not agree that there are directional signs to direct people's movements; most respondents agreed that all labors have access to enough clean drinking water (mean 3.16); most respondents disagreed that there are numerous health hazards (mean 3.76).

Based on the average score of 2.67, it was found that most participants in the survey disagreed with the statement that the Ethiopian plastic sector follows different emergency management and health regulations. According to the 1.18 standard deviation, there was little variation in the respondents' answers about emergency management.

A significant portion of the respondents disagreed with the following: (1) limiting the number of employees; (2) maintaining a safe distance between employees; (3) providing facilities for maintaining cleanliness (such as hand washing stations and hand sanitizers); (4) self-health checks (such as taking one's temperature, body temperature, and symptoms)and (mean = 2.58), The majority of respondents did not agree with the following: (5) that vitamins and/or nutrients should be given to maintain worker immunity (mean = 1.48); (6) that reminder posters about the new standard OHS policy should be posted (mean = 1.27); (7) that workers should be instructed on how to use PPE and masks (mean = 3.51); and (8) that the Universal Journal of Public Health should be read (mean = 1.88).

The majority of study participants did not agree, on average, with the statement that Ethiopia's plastic industry uses diverse health protocols and practices, as evidenced by the mean of 2.28. The 1.14 standard deviation suggests that there was little variation in the respondents' answers about health program practices.

Table 4.3 Health Protocols and Emergency Management Descriptive Statistics

Detailed Statistics			
	N	Mean	Std. Deviation
Emergency Management Descriptive Statistics			
The floors are kept clean and dry to reduce chances of falls and slips	67	1.49	1.01
Working environment is considered safe by our employees	67	1.91	1.16
Employees are aware of safety measures in case of fire	67	3.54	1.16
In case of emergency there are clearly marked fire exits	67	2.36	1.18
There is adequate fire- fighting equipment in place	67	4.31	1.13
Employees have been trained fire- fighting skills	67	1.95	1.11
There are adequate first aid kits and medical services	67	1.60	1.10
There are enough toilet facilities separate for males and females	67	4.42	1.05
Employees are satisfied with the standard of cleanliness in the wash rooms	67	2.42	1.45
There is a continuous review of accident prevention measures	67	1.55	1.02
Industry conducts medical check- up for employees regularly	67	2.42	1.45
The industry has an AIDS awareness programmer	67	2.75	1.22
There are directional signs to guide movement of people	67	2.42	1.45
There is enough clean drinking water for all employees	67	3.16	1.05

Health hazards are very many	67	3.76	1.22
Average	67	2.67	1.18
Health Protocols			
Limitation on the number of workers	67	1.51	1.05
Keeping distance between workers	67	4.14	1.23
Availability of facilities to maintain cleanliness (hand washing stations, hand sanitizers, etc.)	67	1.88	1.02
Self-health check (rapid test, body temperature, symptoms)	67	2.58	1.41
Providing vitamins and/or nutrients to maintain worker immunity	67	1.48	0.97
There are reminder posters of the new normal OHS policy	67	1.27	0.75
Educating workers on the use of PPE and masks	67	3.51	1.32
Universal Journal of Public Health	67	1.88	1.02
Average	67	**2.28**	**1.140**

source: 2024 independent survey

4.4.4. OHS Descriptive Statistics and Occupational Safety Rules &Procedures

The study also examined how worker productivity in Ethiopia plastic industry was affected by regulations, policies, and standards related to occupational safety and health. On a scale of 1 to 5, respondents assigned ratings to numerous statements about emergency management and health procedures (5 being Strongly Agree, 4 being Agree, 3 being Neutral, 2 being Disagree, and 1 being Strongly Disagree). As seen in Table 4.4, The findings indicate that the majority of respondents moderately agreed that the company gives training and information to enable each employee to act safely when completing the work (mean 3.03), the majority of respondents disagreed that the company provides intense supervision for each employee (mean 1.61),the majority of respondents disagreed that OHS signs and posters in the workplace serve as a helpful reminder for employees to work safely (mean 1.93), A significant proportion of the respondents strongly agreed that the company offers work methods or directives that make work easier and safer (mean 4.14), most agreed that the company provides personal protective equipment (PPE) in accordance with work safety standards (mean 3.19), most disagreed that workers always wear PPE to prevent accidents while working (mean 2.03), most disagreed that the company fosters good communication with all workers (mean 2.191), and most disagreed that workers comprehend safety procedures and evacuations at work (mean 2.70).

The majority of study participants, on average, did not believe that the Ethiopian plastics industry uses different health protocols, as shown by a mean score of 2.60. The 1.16 standard deviation suggests that respondents' answers on occupational safety and health procedures were not very different from one another.

The study's findings also revealed that most participants agreed that OHS regulations and procedures are easily implemented and have an impact on workers (mean = 4.07), that workers can be impacted by penalties for violating OHS procedures (mean = 4.22), that workers can be impacted by the availability of work safety signs (mean = 3.94), that most participants disagreed that OHS regulations and procedures are regularly revised (mean = 1.83),The survey revealed that a majority of respondents (mean = 4.04) believed that workers can be influenced by easily understood OHS laws and procedures, whereas a majority (mean = 2.32) disagreed that workers should be socialized to the new standard OHS policy.

The majority of study participants, on average, agreed that the Ethiopia plastics industry uses a variety of Occupational Safety rules and procedures (mean of 3.40). The 1.30 standard deviation suggests that there was little variation in the respondents' answers about Occupational Safety Rules and Procedures practices.

Table 4.4 OSH and Occupational safety Rules and Procedures descriptive statistics

Detailed Statistics			
	N	Mean	Std. Deviation
Occupational Safety and Health Descriptive statistics			
The company provides training and information for each worker to act safely in completing the work	67	3.03	0.99
The company conducts intensive supervision for each worker	67	1.61	1.17
OHS posters and OHS signs in the work environment help remind workers to work safely	67	1.93	1.31
The company provides work methods or directs so that it makes work easier and safer	67	4.14	1.23
The company provides work safety equipment or personal protective equipment in accordance with work safety standards	67	3.19	0.93
Workers always wear personal protective equipment to avoid accidents while working	67	2.03	1.39
The company creates good communication with all workers	67	2.19	1.09

Workers understand the safety rules and evacuations at work	67	2.70	1.19
Average	67	2.60	1.16
Occupational Safety Rules and Procedures Descriptive statistics			
OHS procedures are easy to implement with consistency can influence workers	67	4.07	1.26
Penalties for violating OHS procedures can influence workers	67	4.22	1.22
The availability of work safety signs can affect workers	67	3.94	1.27
OHS regulations and procedures are regularly revised which can affect workers	67	1.83	1.33
Easy to understand OHS rules and procedures can influence workers	67	4.04	1.30
Socialization to workers on the new normal OHS policy	67	2.32	1.42
Average	67	**3.40**	**1.30**

source: 2024 independent survey

4.4.5. Worker Efficiency Descriptive Statistics

The effect of worker efficiency on worker productivity in Ethiopia plastic industry was also examined in this study. On a scale of 1 to 5, respondents assigned ratings to numerous statements about worker efficiency development (5 being Strongly Agree, 4 being Agree, 3 being Neutral, 2 being Disagree, and 1 being Strongly Disagree). As demonstrated by Table 4.5, The findings demonstrate that most study participants did not believe that workers could complete and accept responsibility for every task assigned in accordance with company standards and policies (mean = 1.48), most study participants did not believe that implementing the company's program could enhance the morale and caliber of the workforce (mean = 1.82), most study participants did not believe that employees could complete work in accordance with the amount of work assigned (mean = 2.81), The majority of study participants disagreed that employees can complete work within the deadline set by the company (mean = 2.65), that employees can effectively manage their time to finish tasks (mean = 2.37), that independent contractors are capable of resolving conflicts at work (mean = 2.67), that employees have a high level of commitment to their jobs (mean = 4.49), and that employees follow company policies (mean = 4.05).

The majority of study participants, with an average mean score of 2.79, did not agree that the Ethiopia plastics industry used different worker efficiency development techniques. The 1.32 standard deviation suggests that there was little variation in the replies given by the participants considering labor efficiency.

Table 4.5 Worker Efficiency of Descriptive Statistics

Detailed Statistics			
	N	Mean	Std. Deviation
Worker Efficiency Descriptive Statistics			
Workers can complete and take responsibility for each job assigned according to company standards and rules	67	1.48	1.16
The implementation of the program provided by the company can improve the spirit and quality of the company's workers.	67	1.82	1.22
Workers can complete work in accordance with the amount of work assigned	67	2.81	1.23
Workers can complete work in accordance with the time set by the company	67	2.65	1.25
Workers can manage time effectively in terms of completing work	67	2.37	1.37
Independent workers are able to solve problems at work	67	2.67	1.69
Workers have a high commitment to working in this company	67	4.49	1.31
Workers comply with the rules that apply in the provisions set by the company	67	4.05	1.30
Average	**67**	**2.79**	**1.32**

source: 2024 independent survey

4.4.6. Labour productivity of Ethiopia plastic industry

Table 4.6 labour productivity

Labour	Production capacity (ton)/2015/16 year	Design capacity (ton)/year	Labour productivity tons/worker/year	Average Selling price per kg
67	834.15	1,626.88	12.45	320 birrs

source: 2024 independent survey

Based on table 4.6 to determine the worker productivity using 67 employees and s834.15 tons yearly production capacity. Consequently, In the Ethiopian plastics industry, each worker produces about 12.45 tons per year.

Table 4.7 Existing Determinants of Industry

Detailed Statistics			
Descriptive variables	N	Mean	Std. Deviation
Industry Practices in Workplace Safety Ergonomics	67	2.835	1.1
The OSH Training Descriptive Statistics	67	2.89	1.03
Emergency Management and Health Protocols	67	2.28	1.140
OHS Descriptive Statistics and Occupational Safety Rules &Procedures	67	3.40	1.30
Worker Efficiency Descriptive Statistics	67	2.79	1.32
Average	67	2.83	1.18

source: 2024 independent survey

According to table 4.7 When taking four descriptive variables into account, the labor productivity in the Ethiopia plastic industry is predicted to be between 14.998 and 15.562 tons per worker per year in the future. This suggests that the beneficial effects of OHS could lead to a possible improvement in production.

4.5. Correlation Analysis

4.5.1. Analysis of Correlation Between Independent Variables

The relationship between the research variables was determined using a correlation analysis. In order to determine the relationship between the variables included in the study, the Pearson correlation coefficient was utilized. The direction and degree of the association between variables are indicated by correlation analysis, which goes from (-1) to (+1), according to Mugenda & Et.al, (2019). Table 4.8 displays the findings of the correlation analysis. According to study results, worker productivity in Ethiopia plastic industry was positively and significantly impacted by

ergonomic workplace safety measures. With a 0.001 level of significance and a 0.253 Pearson coefficient, this was supported. According to this, worker productivity in Ethiopia plastic industry rises when workplace safety and ergonomics procedures are strengthened. The findings of Tripathi et.al, (2021) are supported by this discovery, which also increases worker productivity and lowers production costs by reducing a range of safety and health hazards.

Based on a level of significance of 0.327 and a Pearson coefficient of 0.078, the correlation results of this study, as presented in Table 4.8, likewise reveal a positive and significant relationship between OSH training and worker productivity. In this case, it is implied that worker productivity in Ethiopia plastic industry increases with more OSH training. The results support the claim made by (Gharbi F, 2021) that lowers safety and health risks, increases production range, decreases throughput times, decreases material handling, decreases set-up times, and decreases production costs. According to Gharbi (2021), an organization's ability to use its available workforce results in continuous production, which is how OSH training affects worker productivity.

A Pearson coefficient of 0.023 and a level of significance of 0.774 corporate the findings of this study, as presented in Table 4.8 which further demonstrate the positive and substantial relationship between worker productivity in the Ethiopian plastic industry and emergency management and health protocol practices. This indicates that an increase in pre-production planning corresponds to a little rise in worker productivity in the Ethiopia plastic industry. This aligns with the claim made byHassan et al, (2019) that allows a business to assess every need of a procedure and conduct remedial actions for emergency management and health protocols. In light of this, emergency management and health protocol practice help to minimize emergencies and hazards (Hassan et al, 2019).

as presented in Table 4.8 The study's correlation results also demonstrate a positive and significant relationship between worker productivity in the Ethiopia plastic industry and occupational safety and health as well as occupational safety rules and procedures, as indicated by a Pearson coefficient of 0.081 and a level of significance of 0.308. The inference from this is that worker productivity in Ethiopia plastic industry rises when Occupational Safety & Health and Occupational Safety Rules and Procedures practices are strengthened. The present analysis aligns with the research findings of Masindet et.al, (2022), which shown a noteworthy correlation between worker productivity and all Occupational Safety & Health and Occupational Safety

Rules and Procedures variables. The study results of Fatuma M, (2018) further corroborate the results, as they demonstrate that a company's ability to effectively achieve its goals and objectives is facilitated by the implementation of Occupational Safety& Health and Occupational Safety Rules and Procedures practices.

A Pearson coefficient of 0.081 and a level of significance of 0.308 corroborate the correlation results of this study, as presented in Table 4.8, which also demonstrate a positive and significant relationship between worker productivity and worker efficiency in the Ethiopia plastic industry. The inference from this is that when worker productivity in Ethiopia plastic industry rises, worker efficiency also rises.

Table 4.8 Analysis of Correlation

Correlations

		Workplace safety ergonomics	OHS training	Emergency Management and Health Protocols	OSH and Occupational safety Rules and Procedures	worker efficiency
Workplace safety ergonomics	Pearson Correlation	1	.057	.074	.382**	.253**
	Sig. (2-tailed)		.477	.350	.000	.001
	N	67	67	67	67	67
OSH training	Pearson Correlation	.057	1	.079	.064	.078
	Sig. (2-tailed)	.477		.320	.422	.327
	N	67	67	67	67	67
Emergency Management and Health Protocols	Pearson Correlation	.074	.079	1	.059	.023
	Sig. (2-tailed)	.350	.320		.461	.774
	N	67	67	67	67	67
OSH and Occupational Safety Rules and Procedures	Pearson Correlation	.382**	.064	.059	1	.081
	Sig. (2-tailed)	.000	.422	.461		.308
	N	67	67	67	67	67

worker efficiency	Pearson Correlation	.253**	.078	.023	.081	1
	Sig. (2-tailed)	.001	.327	.774	.308	
	N	67	67	67	67	67

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

source: 2024 independent survey

4.5.2. The Correlation Analysis's Independent and Dependent Variables

The study predicts how worker efficiency and occupational health and safety hazards would affect worker productivity and lays the groundwork for creating a model that will anticipate the Ethiopia plastic industry. Respondents scored statements on a range of 1 to 5, where 5 represented Strongly Agree, 4 Agree, 3 Neutral, 2 Disagree, and 1 Strongly Disagree, regarding the impact of safety hazards, worker efficiency, and occupational Safety practices on worker productivity and the establishment of prerequisites for creating a prediction model. Table 4.9 displays the average responses.

Table 4.9 dependent & independent Variables

Variables	type Variables	Indicators	Measurement in the questionnaire
Workplace Safety & Health Practice	independent	(OSHA Rules and Procedures, Safety Training, Occupational Safety, Occupational Health, Emergency Management, and Health Protocol Implementation)	Percentage
Worker Efficiency	independent	Workers are able to finish tasks and assume accountability. The program's adoption raises the calibre and morale of the industry's workforce.	Percentage
Worker productivity	dependent	Productive units per labour	unit/worker/hour
Accomplishment of tasks	dependent	Tasks accomplished out of the standard	amount of hour
Worth added	dependent	Total industry revenues over the number of workers in a firm	Amount of money

Establishing the relationship between the research variables was done using a correlation analysis. The correlation between the variables included in the study was determined using the Pearson correlation coefficient in this investigation. The correlation analysis runs from (-1) to (+1) and shows the strength and direction of the relationship between the variables. Additionally, the study sought to evaluate the relationship between the three worker productivity metrics and the index of Occupational Safety and Health practices and worker efficiency. Below in Table 4.10, you can see the findings of the five correlation analyses.

Table 4.10 Analysis of correlation

Correlations

		OSH practice	Worker Efficiency	Worth Added	Productive Time	Point of reference Met
OSH practice	Pearson Correlation	1	.918**	.718**	.883**	.956**
	Sig. (2-tailed)		.000	.005	.000	.000.
	N	67	67	67	67	67
Worker Efficiency	Pearson Correlation	.918**	1	.786**	.902**	.776**
	Sig. (2-tailed)	.000.		.000	.000	.000
	N	67	67	67	67	67
Worth(value) Added	Pearson Correlation	.718**	-.418**	1	.827**	.760**
	Sig. (2-tailed)	.000.	.000		.000	.000
	N	67	67	67	67	67
Productive Time	Pearson Correlation	.883**	-.583**	.418**	1	.973**
	Sig. (2-tailed)	.000.	.000	.000		.000
	N	67	67	67	67	67
Point of reference Met	Pearson Correlation	.956**	.776**	.760**	.973**	1
	Sig. (2-tailed)	.000.	.000	.000	.000	
	N	67	67	67	67	67

**The significance level of the correlation is 0.01 (2-tailed).

a. Not possible to compute since at least one variable is constant.

source: 2024 independent survey

First,The results of the study demonstrated a favourable and substantial relationship between worker efficiency in Ethiopia plastic industry and occupational safety and health practices. A level of significance of 0.000 and a Pearson coefficient of 0.918 corroborated this. This suggests that worker productivity in Ethiopia plastic industry rises in proportion to improvements in occupational safety and health practices. This result is in line with the findings of (Tripathi et.al,

2021) that worker efficiency and occupational safety and health practices reduce workplace hazards and allow workers to remain invested in their work, leading to increased productivity; additionally, there is a corresponding increase in company revenue and value added by workers for every workplace safety investment.

Second, the p-value in Table 4.10 indicates that there is a substantial and positive relationship between occupational safety and health practices and value-added. A level of significance of 0.000 and a Pearson coefficient of 0.883 corroborated this. Additionally, the impact of these practices on value-added was noteworthy. The inference is that heightened workplace safety and health protocols result in a notable rise in the value contributed by workers. These empirical findings support the findings of a study by Wixted et al, (2018)and a report by EU-OSHA, (2021),which suggested that removing workplace hazards increases worker productivity by allowing workers to remain engaged in their work. Additionally, every investment made in occupational safety and health practices is matched by an increase in company revenue and value added by workers. Value-added and occupational safety and health practices are the findings of the current investigation closed the knowledge gaps left by the (EU-OSHA, 2021) and (Wixted et al, 2018) reports.

Third, productive time and occupational safety and health practices have a favourable and significant correlation, as seen by Table 4.10, a level of significance of 0.000 and a Pearson coefficient of 0.918 corroborated this. It would appear from this that program promoting occupational safety and health also boost worker productivity. The study by Rosemberg et.al, (2018) conjectured that a lack of work safety resulted in a decline in work performance measured by lost time, which is supported by these empirical findings. The literature review study by Folkard et, (2023) on the connection between shift work, productivity, and safety is further supported by these empirical findings. According to the study, workplace safety and health practices minimized the frequency and severity of safety accidents by guaranteeing uninterrupted employment.

Fourth, a favourable and statistically significant link was found between occupational safety and health practices and task completion. A level of significance of 0.000 and a Pearson coefficient of 0.956 corroborated this. This demonstrates that an increase in the tasks completed by labors would result from improvements in workplace safety. Because of this, increasing occupational safety and health practices results in a notable rise in the number of workers who complete tasks;

as a result, occupational safety and health practices increase worker productivity. Similar findings were reported by (Umar et.al, 2020); workers in construction companies that lack safety programs are more likely to have safety events, such as heat stress, which impairs their ability to complete jobs by making more mistakes and slacking off.

4.6. Diagnostic tests for Regression Model

Before utilizing an ordinary least square regression model to assess the study hypotheses, the investigation performed diagnostic tests. This was also done to make sure the fundamental presumptions of classical regressions were upheld. Before the corresponding regression models were run, the tests for multicollinearity, homoscedasticity, normality, auto-correlation and linearity were carried out. A description of these tests can be found in the subsection.

4.6.1. Normality Test

The study employed the Shapiro-Wilk Test to see if there was a deviation from normalcy because of skewness or kurtosis in order to determine whether the data were normal. Based on Razali and Wah (2011), the data is considered normal when the numbers exceed 0.05. The Shapiro-Milk test statistic spans from (-0.1) to (+1.0). The null hypothesis is therefore not rejected if the statistic is greater than 0.05, which suggests that the data is regularly distributed. Since the dependent variable's significance value (0.063) is greater than 0.05, the results as shown in Table 4.11 demonstrate that the worker productivity of Ethiopia plastic industry was regularly distributed.

Table 4.11 Tests of Normality

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Worker productivity	.288	67	.001	.781	160	.063

a. Test of Normality (Lilliefors Significance Correction)

source: 2024 independent survey

4.6.2. Test of linearity

The study examined the linearity of the relationship between worker efficiency and occupational safety and health practices and worker productivity in EPI prior to executing a regression model. Plotting was done against worker productivity (dependent variable) after the three independent variables OSH, worker efficiency, value contributed, goal time, and productive time were combined to form an independent variable. A plot was then created versus worker productivity, which was the dependent variable. Figure 4.5 illustrates the use of a scatter plot. The study's findings, as depicted in the image, showed that, in accordance with Fairchild's (2020) recommendation, a line fit well with the scatter, assuming an oval shape that indicated all of the variables' relationships were linear.

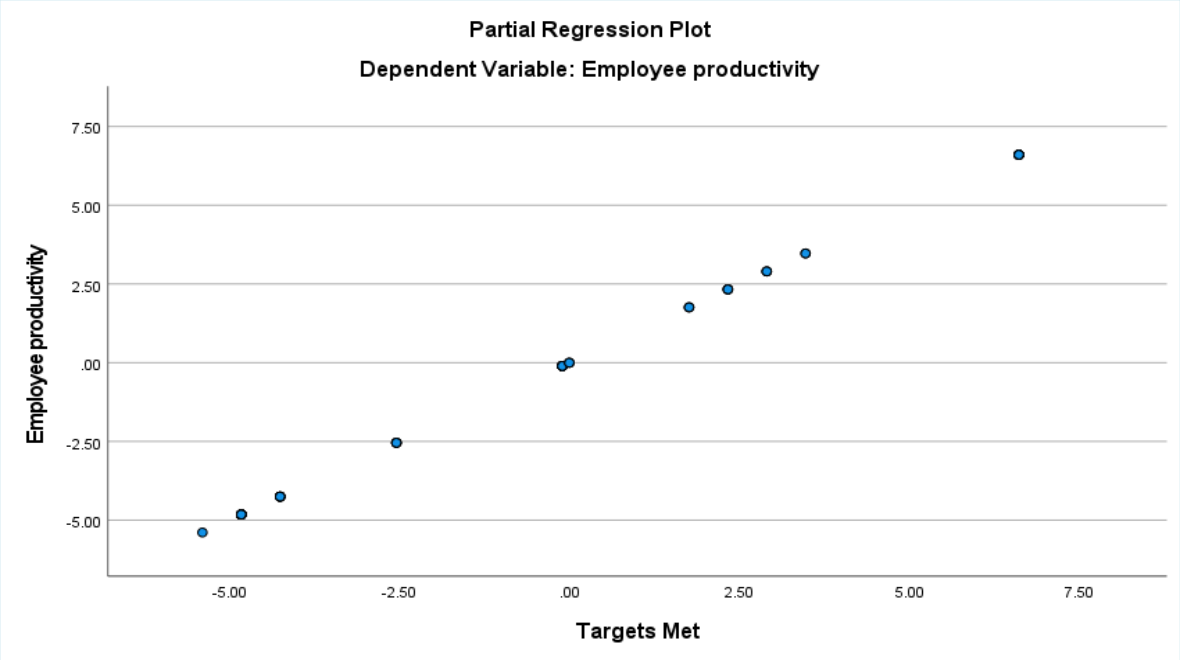

Figure 4.5 Linearity Test

source: 2024 independent survey

4.6.3.Test of Multicollinearity

The study employed a regression analysis to determine the presence of multicollinearity among predictor variables. The tolerance and Variance Inflation Factors (VIF) were extracted. Field

(2020) states that multicollinearity is absent when VIF values are less than 10, and tolerance values greater than 0.1 can support this. According to Field's (2020) guidelines, Table 4.12's results demonstrate that there was no multicollinearity issue because every variable had a VIF value of less than 10. In addition, tolerance values above 0.1 provided additional evidence that the study's variables did not exhibit multicollinearity.

Table 4.12 The Multicollinearity Test of Variance Inflation Factor

source: 2024 independent survey

Coefficients [a]							
	Unstandardised Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	β	Std. Error	beta	T	Sig.	Tolerance	VIF
1 (Constant)	2.215	.522		4.243	.000		
OHS	.406	.098	.297	3.744	.000	.942	1.151
Worker Efficiency	.326	.087	.314	3.744	.000	.839	1.191
Worth Added	2.085E-5	.026	.000	.001	.999	.984	1.016
Productive Time	.059	.087	.053	.679	.498	.981	1.019
Point of reference Met	-.076	.096	-.066	-.793	.429	.840	1.190

A. Worker productivity is the dependent variable.

4.6.4. Test of Homoscedasticity

Reliability of the error term (residual) among the independent variables is one of the fundamental presumptions of the linear regression model. To ascertain if the error term among the independent variables is homogeneous, this study used the Breusch-Pagan test, as advised by Warner (2018). The homoscedasticity assumption must be met, according to the Breusch-Pagan test, if the probability value is more than .05. According to Warner (2018), a significance (Prob > Chi(2)) value of more than 0.05 does not rule out the constant variance null hypothesis. With a

significance (Prob > Chi(2)) value of 0.0423, which is higher than 0.05, as indicated in Table 4.13, the null hypothesis of homoscedasticity was not rejected.

Table 4.13 Test of Homoscedasticity

Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity	
Ho: Variance that is constant Worker Productivity fitted values are the variables.	
Chi2(1)	4.17
Prob > Chi(2)	0.042

source: 2024 independent survey

4.6.5.Test of Auto-correlation

To make sure the error term is uncorrelated, an autocorrelation test was run. The notion that the error component in an ordinary least square regression model shouldn't be correlated is one of its foundations. The Durbin Watson test was used to establish the solution to this issue. Table 4.14's results show that the error term was not auto linked because the DW statistic, at 1.566, falls between 1.5 and 2. (Flick,2019).

Table 4.14 Durbin Watson test

Durbin Watson test	
Durbin Watson-static	1.566

4.7. Multiple Linear Regression Analysis

The extent to which the variables of targets reached, occupational health & safety, value contributed, worker efficiency, and productive time partially, simultaneously, or collectively affect worker productivity was ascertained through the application of multiple linear regression analysis. Table 4.15 contains a detailed explanation of all statistical computations used in multiple linear regression analysis.

worker efficiency was regressed against each measure of worker productivity (productive time, task completion, and value-added) separately in order to test the hypotheses of occupational safety and health practice. Safety ergonomics, emergency management, safety training, and safety transfer were all measured. Additionally, as suggested by (Montgomery et al, 2021) an index of the employee productivity measures was constructed. The impact of workplace safety indicators on overall employee productivity was then calculated by regressing them against the index. Tables 4.15 to 4.17 display the findings.

The findings in Table 4.15 showed that worker efficiency and occupational safety and health practices had a substantial impact on worker productivity in Ethiopia's plastic industry. With p-values less than 0.05, the probability values found for every worker productivity measure were significant. Worker efficiency and occupational safety and health practices could account for changes in worker productivity (productive time, task completion, and value-added), according to the adjusted R-squared values. Exactly Worker efficiency and occupational safety and health practices can account for 79% of variations in the index of all worker productivity measures, 87.5% of variations in productive time, 30% of variations in the degree of accomplishment, and 76.5% of variations in value added by the employee. Other factors or random error account for the remaining variances. Consequently, workers' productivity will grow in terms of more productive time, task completion, and value-added when workplace safety is improved in terms of safety ergonomics, emergency management, safety training, safety transfer, and worker efficiency.

The statistical significance of the models utilized indicates that worker efficiency and occupational safety and health practices were relevant in predicting worker productive time, task completion, and value added, as indicated by the F statistic and P-values presented in Table 4.15. Additionally, this meant that the general study hypothesis which put out the argument that worker production is influenced by worker efficiency and workplace safety and health practices was accepted.

It is concluded that there is a statistically significant relationship between worker efficiency and occupational safety and health practices and worker productivity.

Table 4.15 The Model's Goodness of Fit

Model Summary						
Model	R			Change Statistics		

		R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
I (a)	.893[a]	0.798	0.79	0.39307	0.798	101.421	5	103	0
I(b)	.938[a]	0.88	0.875	0.33411	0.88	188.791	5	103	0
I(c)	.259[a]	0.067	0.3	0.39463	0.067	1.784	5	103	0.013
I(d)	.880[a]	0.774	0.765	0.51929	0.774	87.952	5	103	0
I(e)	.259[a]	0.067	0.3	0.39463	0.067	1.784	5	103	0.013

Note:

- a dependent variable is I(a) Worker Productivity Measures Index, I(b) Productive Time, I(c) Task Completion, I(d) Value Added and I(e) Target met.

Table 4.16 The model's overall significance

ANOVA[a]

		Sum of Squares	df.	Mean Square	F	Sig.
I(a)	Regression	62.681	5	15.67	101.421	.000[b]
	Residual	15.914	103	0.155		
	Total	78.595	67			
I(b)	Regression	84.3	5	21.075	188.791	.000[b]
	Residual	11.498	103	0.112		
	Total	95.798	67			
I(c)	Regression	40.921	5	10.23	1.784	.013[b]
	Residual	567.694	103	5.734		
	Total	608.615	67			
I(d)	Regression	94.871	5	23.718	87.952	.000[b]
	Residual	27.776	103	0.27		
	Total	122.647	67			

- a. dependent variable: I(a) Worker Productivity Measures Index, I(b) Productive Time, I(c) Task Completion, and I(d) Value Added
- b. Predictors: Emergency Management, Safety Training, Occupational Safety & Health, OHS Rules & Procedures, and the Implementation of Health Protocols.

An index of worker productivity metrics, productive time, task completion, and value-added are shown by Table 4.17 together with the coefficient predictions of worker efficiency and occupational safety and health practices.

Table 4.17 Worker productivity measure index

	Index of the worker Productivity measures					Productive time					Accomplishment of tasks					Value added				
	β	Std. Error	Beta	T	Sig.	β	Std. Error	Beta	T	Sig.	β	Std. Error	Beta	T	Sig.	β	Std. Error	Beta	T	Sig.
Constant	14.415	0.088		163.16	0	0.954	0.075		12.69	0	15.905	0.548		29.04	0	16.421	0.117	0.284	140.58	0
X_1	0.579	0.247	0.274	2.345	0.021	0.819	0.21	0.35	3.898	0	0.779	1.516	0.126	0.514	0.038	0.752	0.327	0.354	2.304	0.023
X_2	0.765	0.254	0.397	3.011	0.003	0.437	0.216	0.205	2.02	0.046	0.582	1.559	0.281	1.015	0.043	0.854	0.336	0.147	2.542	0.013
X_3	0.204	0.245	0.106	0.832	0.007	0.621	0.209	0.291	2.975	0.004	0.007	1.502	0.532	2.002	0.044	0.356	0.324	0.133	1.097	0.027
X_4	0.308	0.167	0.158	1.836	0.016	0.292	0.142	0.135	2.05	0	0.38	1.022	0.246	1.35	0.018	0.325	0.221	0.284	1.468	0.004
X_5	0.308	0.167	0.158	1.836	0.016	0.292	0.142	0.135	2.05	0	0.38	1.022	0.246	1.35	0.018	0.325	0.221	0.284	1.468	0.004

Note:

- a. Worker productivity as determined by the index of worker productivity measurements, productive time, accomplishment of task, and value added which is dependent variables.
- OHS, OS Rules & Procedures (X1), Emergency Management (X2), Safety Training (X3), Implementation of Health Protocols(X4), and Worker Efficiency (X5) are independent variables of Occupational Safety & Health.

The effects of worker productivity and emergency management were compared, and the findings showed a strong positive correlation between worker productivity and emergency management. With all other things held constant, the coefficient estimates and P-values obtained indicated that, precisely, when industry improve emergency management. by 100%, it results in an increase of 76.5% in the index of all worker productivity measures, 43.7% in worker productive time, 58.2% in the worker degree of task accomplishment, and 85.4% in worker value added. According to these findings, worker productivity is impacted by emergency management.

Four aspects of the outcome differ from the body of existing literature;

First, the study has presented empirical evidence regarding the impact of workplace emergency management programs on worker productivity. These programs include rescue response and evacuation plans, emergency medical attention and equipment, emergency contacts, safe assembly, exit points, first aid facilities, emergency logs, and documentation.

Second, workplace emergency management has an impact on employee productive time, task completion level, and value-added, according to the empirical findings of the current study. These links are not well explained by the literature currently in publication. The reason behind these findings is that workplace emergency management helps employees feel less anxious about their safety, which allows them to focus more intently on their task. Organizations can respond to safety events more quickly and minimize the number of delays to productivity by implementing more emergency management. In addition, promptly attending to problems saves companies from losing a valuable employee's productivity. Also, it helps businesses bounce back from safety-related accident fast, which reduces lost productivity.

Thirdly, the findings advance the body of theoretical literature already in existence, particularly Heinrich Heinrich's (1931) Domino theory. Emergency management is a crucial component of workplace safety, it continues, adding that companies that have effective emergency management will see improvements in worker productivity, increased time spent on tasks, and increased output.

fourth, the results close the gaps found in the earlier literature analysis; the study by Alariki et.al, (2021) produced results comparable to the current study, although it only employed one emergency management measure and subjective worker performance metrics. Data on labour productivity from the Ethiopian plastics industry was used in this study.

Worker productivity and safety training have a considerable beneficial association, as shown by the results in Table 4.17. In particular, the coefficient estimates obtained for the impact of safety training programs on worker productivity measures demonstrated that, when all other factors remain constant, a 100% increase in safety training leads to improvements in worker productivity measures such as the index of worker productivity measures by 20.4%, worker productive time by 62.1%, worker degree of task accomplishment by 0.7%, and worker value added by 35.6%. According to these findings, worker productivity is impacted by safety training.

The findings provide four distinct contributions to the body of existing literature;

First, the study ascertained how safety training programs affected worker productivity, value-added, and job completion level. Rather of using safety training interventions, existing empirical studies (et.al, 2019) have examined workplace safety training in terms of ex-ante perspective, or employees' subjective awareness. These actions can have produced inaccurate conclusions.

Secondly, this study offers new insights into several worker productivity metrics. Although it only employed one subjective indicator of worker productivity(awareness) the study (Alariki et.al, 2021) discovered a substantial correlation between safety and health training and worker productivity.

Thirdly, the research indicates that the conflicting conclusions of a study conducted by (Shockley, 2019), which suggested that safety training had no effect on productivity since workers tend to forget new information fast and that the time spent in training cut into work hours. The current study makes it clear that worker productivity is impacted by safety training; however, since these programs have a significant positive impact on worker productivity, organizations should add safety regulations, manuals, safety drills, and regular briefs to instructional safety training.

Fourth, by identifying the increases in worker productivity attained via the implementation of safety training programs, the study findings contribute to the advancement of the theoretical literature that already exists. This result can be explained by the fact that safety training makes workers more aware of safety, which lowers the likelihood that incidents will disrupt work; it also makes it possible for workers to respond to incidents intelligently and adapt-ably, maintaining work operations; and it makes their specific role in safety and productivity clear. Moreover, it facilitates the exchange of ideas, which increases productive time, task completion, and worker value.

With regard to all worker productivity indicators, the findings in Table 4.17 offer empirical support for the considerable positive link that exists between worker efficiency and occupational safety and health. The coefficient estimates presented in Table 4.17 specifically indicated that when worker efficiency and occupational safety and health are improved by 100%, the index of worker productivity measurements increases by 30.8%, workers' productive time increases by 29.2%, workers' task accomplishment increases by 38%, and workers' value added increases by 32.5%, all other things being held constant. These findings provide credence to the theory that worker productivity is impacted by workplace safety and health.

Therefore, this study concludes that worker efficiency and occupational safety and health (including emergency management, safety training, occupational safety and health and OHS rules/procedures and implementation of health protocols) have a positive and statistically significant effect on each worker productivity measure at a 5% significance level. Consequently,

workplace safety and health and worker efficiency have an impact on worker productivity, regardless of how we define it. According to Tripathi et.al, (2021), the index of all worker productivity variables was used to provide the multiple regression model. As this shows all parameters simultaneously estimated and included in one model, there is no contradiction, it is suggested that the model be presented using the index of all measures.

Table 4.18 displays the Analysis of Variance (ANOVA)

Detailed Statistics						
	N	**Range**	**Min.**	**Max.**	**Mean**	**Std. Deviation**
OHS Practice	67	3.18	1.45	4.64	3.517	0.40417
Worth Added	67	7,259,344	50,515.5	7,309,859	3,090,580	1.0706
Productive Time Period in Days	67	98	5	103	24.3241	0.9462
Accomplishment of Tasks Point of Reference Met	67	76	2	78	10.8333	0.9462

According to the data, table 4.18 for used to determine the estimating models' significance, the average value added per worker input unit was Birr 3,090,579.975 annually, with a deviation of 107%. The productivity of the workforce was less than that of studies conducted in the US (EU-OSHA, 2021) and the UK (Sheehan and Garavan, Citation 2022). It's also less than what the Bureau of Labor Statistics report (Citation2019) for Africa and a Signé research (Citation2020) for Ghanaian manufacturing enterprises report. It was suggested by this result that EPI workers' value added was less than that of the mentioned nations.

In contrast to Signé (Citation2020) and Sheehan and Garavan (Citation2022), who employed a purposive sample, the current study used a bigger sample. As seen in Table 4.18, the somewhat more than moderate adoption of occupational safety and health initiatives may also be to blame for the low worker productivity.

Due to safety accidents, the mean time lost to productivity was 24 days. From the typical 260 days in the EPI, this showed that the average productive period was 236 days. Due to occupational safety accidents, when the 24 lost workdays equal to an average of 192 work hours annually. The Bureau of Labour Statistics report (Citation2019) found that EPI workers produce an average of 1,888 work hours annually, which is less than the internationally accepted standards of 2,080 work hours annually. This worker productivity is higher than the findings of the report. The average annual percentage of labours that did not fulfil expectations was 10.83333hours, with a 94.62% deviation. The data suggests that there was variation in the number of jobs completed by labors across the industry, with the highest number of labors failing to reach targets being 78 and the lowest number being 2.

4.8. OHS Practices on worker Productivity Regression Model

Government rules were included as a moderating variable after an overall ordinary least square regression model was run for the study. The model below was created using conventional least square regression

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \varepsilon \ldots\ldots\ldots\ldots \text{Equation 1}$$

The hypotheses 1 through 4 were tested using the model.

- H01 Worker productivity in Ethiopia plastic industry is not significantly impacted by occupational health and safety practices.
- H02 worker productivity in Ethiopia plastic industry is not significantly impacted by worker performance.
- H03 Productive Time has little bearing on how productive workers are.
- H04 Targets Met has no appreciable impact on labor output.

According to Table 4. 19's model summary results, worker performance, productive time, targets met, and occupational health and safety hazards all had a significant positive impact on predicting and analysing the impact of occupational safety and health practices on worker productivity in order to determine the best course of action for preventive and corrective mitigation in Ethiopia plastic industry. According to Table 4.19's model summary results, worker performance, occupational health and safety, productive time, and targets met account for 71.2% of the

variation in the influence of occupational safety and health practices on worker productivity. The R-square value was 0.712. This indicates that factors outside of the study's model accounted for 28.8% of the variation in the influence of Occupational Safety and Health on worker productivity. The model provides a decent match, as indicated by the value of 0.712 (Kumar, 2021).

Table 4.19 Summary of Model

Model Summary	
Multiple- R	.823
R- Square	.712
Adjusted R- Square	.733
Std. Error of the Estimate	0.18924
Log-likelihood Function Value	-242.170

Table 4.20 Variable Analysis-S

ANOVA[a]

Model		Sum of Squares	df.	Mean Square	f	Sig.
1	Regression	21864.179	5	4372.836	30.161	.000[b]
	Residual	8843.937	61	144.983		
	Total	30708.116	66			

Worker productivity is the dependent variable.

According to Table 4.21 that Constant, Targets Met, Workplace Safety and Health Practices, Value Added, Worker Performance, and Productive Time are the Predictors.

Table 4.21 Coefficients of the Model-S

Coefficients [a]

	Unstandardised Coefficients		standardised Coefficients			Statistics of Collinearity	
Model	β	Std. Error	Beta	T	Sig.	Tolerance	VIF

1	(Constant)	2.215	.522		4.243	.000		
	Workplace Safety and Health	.326	.087	.314	3.744	.000	.839	1.191
	Worker Performance	2.085E-5	.026	.000	.001	.001	.984	1.016
	Value Added	.059	.087	.053	.679	.003	.981	1.019
	Productive Time	0.062	0.071	.011	.711	.004	.971	1.099
	Targets Met	.076	.096	-.066	.793	.002	.840	1.190

Worker productivity is the dependent variable.

source: 2024 independent survey

Variables which are predictors: (constant), targets met, value added, worker performance, occupational safety and health practice, and productive time.

The ANOVA test findings in Table 4.20 were utilized to determine the regression model's significance. The study concludes that the model anticipated Occupational Safety and Health Practices would have a significant connection with worker productivity because the P-value = 0.000 was less than 0.05. The model significantly supports Table 4.21's findings about the effectiveness of Occupational Safety and Health Practices on **worker productivity** in Ethiopia's plastics industry Optimized regression model prior to moderation;

$$Y = 2.215 + 0.326\,X1 + 2.08\,X2 + 0.059\,X3 + 0.076\,X4 \ldots\ldots\ldots\ldots \text{Equation 2}$$

Finally, the study determined the regression model coefficients to illustrate the connection between worker productivity in Ethiopia plastic industry and occupational health and safety. Table 4.21 presents the results, which demonstrate that the production of occupational health and safety has a favourable and substantial effect on worker productivity in the Ethiopia plastic industry (Beta = 0.326, Sig =.000, <.05). Thus, an increase of one unit in occupational health and safety cases is likely to result in a 0.326 unit increase in worker productivity in Ethiopia plastic industry. The research rejected H01 at the 5% level of significance since the P-value was less than 0.05, indicating that worker productivity in Ethiopia plastic industry is significantly impacted by occupational health and safety.

Table 4.21 shows that work performance significantly and favourably affects worker productivity in the Ethiopia plastics industry (Beta =.2.08, Sig =.001, <.05). This suggests that a one unit increase in work performance causes 2.08-unit substantial gain in labor productivity. The research

rejected H02 at the 5% level of significance since the P-value was less than 0.05, indicating that worker productivity in Ethiopia plastic industry is significantly impacted by work performance.

The outcomes additionally demonstrated that worker productivity in the Ethiopia plastic industry is positively and significantly impacted by value added (Beta =.059, Sig =.003, <.05). This suggests that a one-unit improvement in value added causes a noteworthy 0.059-unit gain in worker productivity in the Ethiopia plastic industry. The research rejected H03 at the 5% level of significance since the P-value was less than 0.05, indicating that value added significantly affects worker productivity in the Ethiopia plastic industry.

The findings showed that overall quality control significantly and favourably affects worker productivity in Ethiopia plastics industry (Beta =.076, Sig =.002, <.05). This suggests that an improvement of one unit in overall quality control results in a noteworthy 0.076unit gain in worker productivity in the Ethiopia plastic industry. The study rejected H04 at the 5% level of significance since the P-value was less than 0.05, indicating that worker productivity in the Ethiopia plastic industry is significantly impacted by overall quality control.

4.9. Summary of data analysis and interpretation

All worker productivity measures demonstrate a substantial positive link with occupational safety and health, according to the research. To be more precise, the coefficient estimates showed that when worker productivity measurements are improved by 100%, worker efficiency and occupational safety and health are improved by 57.9%, worker productive time increases by 81.9%, worker task accomplishment increases by 77.9%, and worker value added increases by 75.2%. The hypothesis that worker productivity is impacted by worker efficiency, worker safety and health, and all other worker productivity measures is supported by these results.

Chapter Five

5.Conclusions and Recommendations

5.1. Introduction

The impact of worker productivity in Ethiopia plastic industry was investigated in relation to occupational safety and health and worker efficiency. The precise goals were to improve worker efficiency in terms of worth added, productivity, and point of reference met, as well as occupational safety and health. This chapter covers the study conclusions, suggestions, and areas that require more investigation.

5.2. Conclusion

Based on the study results, the following conclusions were drawn after evaluating the effect of worker efficiency and occupational safety and health on worker productivity in Ethiopia plastic industry. The findings of this study suggest that workers' performance and commitment are impacted by their exposure to workplace dangers. The three most important components of reducing workplace accidents and injuries are education, safety training, and hazard assessment. The research findings indicate that worker productivity at EPI is notably impacted by occupational health and safety. There has been an attempt to create and carry out an occupational health and safety policy. However, if labourers and employees fail to fulfil their individual obligations, there can be no effective occupational health and safety rules. The study demonstrates that low or non-existent workplace safety and health has a negative impact on worker productivity. The investigation comes to the conclusion that the company's main occupational health and safety problems were failure to wear personal protective equipment, high temperatures, noisy surroundings, and exposure to smoke and dust. Nonetheless, the industry needs to implement policies that will enhance workplace safety and health. To enhance occupational health and safety concerns in the organization, some of the strategies include frequent worker safety training, continuous assessment of health and safety practices, and supervision and safety management.

Occupational health and safety policies were non-existent at the company. This company's policy may be successful in lowering workplace risks and enhancing worker safety. As a result, industry must develop and implement at their establishment. For both the impacted employee and the company, accidents are expensive; more accidents result in more absenteeism and higher medical expenses. It is therefore imperative that every effort be made to prevent workplace accidents. workers were not provided with adequate training by the company. According to this study, interventions have a significant impact on the process industry's environmental, safety, and well-being attributes. By recognizing that interventions are a continuous process that require continual monitoring and revision, it is necessary to emphasize their significance. Putting standard operating procedures into place, holding training sessions, and using technology are all ways that businesses can reduce workplace accidents, illnesses, and injuries while also promoting the health and safety of their employees and the surrounding community. This strategy supports a healthy ecology while also helping the process industry's efforts to provide workers with safer working environments.

Reducing occupational diseases and accidents in Ethiopia plastic industry would not only improve and save lives of employees but also reduce the sizeable annual payout by the Ethiopia Social Security Board to victims of work-related accidents. The Ethiopia Labour Law states that Effect of occupational Safety and Health Practices on Employee Commitment and Performance in Plastic Manufacturing Companies in Ethiopia. The company did not implement adequate health and safety practices at work.

5.3. Recommendation

Based on the study's findings, the following recommendations were made:

- The EPI management must consider the worker's literacy level and other factors while providing the required information, instruction, training, and supervision. In order for workers to understand their rights and responsibilities, safety and health education and training must be improved. The management of EPI should plan and conduct frequent trainings, workshops, seminars, and refresher courses on health and safety at work. They should also maintain records of health and safety issues, publish safety documents, and take many other steps to raise worker awareness of safety.

- A few accidents might have been prevented if workers had received enough supervision while performing their jobs. It is the responsibility of management to notify other workers about hazards and risks, as well as those who live or visit the plant, other site occupants, and anybody who plans to visit the facility. A safe and healthy work environment must be ensured through the appropriate sharing of risk information. The risks and hazards that come with working in the workplace must be adequately disclosed to labours. Some of these accidents could be reduced, if not completely prevented, by education.
- The EPI management needs to buy heat-resistant personal protective equipment for heated environments and replace experience worker for new hires. In order to ensure that workers are wearing the personal protective equipment, they have been issued before beginning their jobs, strictly adhere to the safety precautions put in place to prevent accidents, and establish internal rules and regulations governing working conditions, management should also set-up a monitoring team on a regular basis.
- A dedicated safety committee should be established to handle all matters pertaining to health and safety. It should be the duty of the special safety committee to examine accident patterns in order to suggest corrective actions, to examine safety reports and offer suggestions for preventing accidents, and to suggest additions or modifications to safety protocols. In order to significantly improve workplace safety, workers must realize that safety and health procedures are the joint responsibility of management and staff. Systems and facilities used at work should be sufficient, safe, and free from health risks. Management is responsible for providing and maintaining these.
- Workers in industry who are not covered by insurance and are subject to dangerous work environments have expressed dissatisfaction with their lack of contract, compensation for unpaid leaves, and other benefits related to illnesses and injuries sustained on the job. The report suggests that management offer each worker a job contract and health insurance.
- The EPI management have to supply the manufacturing workers with an adequate supply of clean water and pay wounded workers in accordance with the law. In addition, in order to lower stress and prevent accidents, the study suggests that management give labours weekly breaks and yearly leave.

- The necessity of placing a high priority on worker health and safety in the process of EPI and operational environment cannot be overstated. Providing suitable training programs, putting in place thorough safety procedures, and making sure that personal protective equipment is worn are all ways to accomplish this. To detect possible risks and implement the required preventative actions, occupational hazards should be routinely monitored and evaluated.
- For the process industry, it is imperative to emphasize the need of continuous assessment and implementation of new technology.
- To accurately assess the effects of interventions on health, safety, and the operating environment, it is imperative to recognize the significance of conducting impact assessments on a regular basis. By carefully examining these elements, we can obtain insightful knowledge that will direct our decision-making in the future and pinpoint the areas that still need improvement or more focus.
- The EPI managers have a responsibility to guarantee that safety measures are implemented in the workplace consistently, with the aim of fostering worker productivity.
- To handle the safety issues that firms face in their day-to-day operations, qualified safety officers to be hired.
- The EPI safety policies and procedures must be properly implemented and their adherence constantly checked. They should not be taken for granted.
- The EPI rules for workplace safety and health should be clear, simple, and effective rather than merely cosmetically coloured.
- Lastly, monitoring teams should be established by the government and other regulatory bodies to periodically assess whether the plastic manufacturing businesses are adhering to the labor code's safety and health regulations.

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