Addis Ababa University

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School of Mechanical & Industrial Engineering

Industrial Occupational Safety and Health Model Development in Manufacturing Industries:-a case of Akaki Basic Metal Industry

A Thesis Submitted to the School of Graduate Studies of Addis Ababa Institute of Technology, Addis Ababa University in partial fulfillment for the Degree of Master of Science in Mechanical Engineering (Industrial Engineering Stream)

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II

Declaration

I hereby declare that the work which is being presented in this thesis entitled "Industrial Occupational Safety and Health Model Development In Manufacturing Industries:-a case of Akaki Basic Metal Industry" is original work of my own, has not been presented for a degree of any other university and all the resource of materials used for this thesis have been duly acknowledged.

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This is to certify that the above declaration made by the candidate is correct to the best of my Knowledge.

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Abstracts

Manufacturing is a significant sector of the economy in many nations and is frequently regarded as an engine of economic expansion, particularly in developing nations. Despite its importance, the metal sector is seen as unsafe due to frequent and high accident rates as well as worker health issues. Therefore, the primary goal of this research is to create a safety model with the goal of development in occupational safety and health in order to reduce workplace injuries, diseases, and deaths in the Akaki Basic Metal Industry. Employees of Akaki Basic Metal Industry from all departments were deemed to be the study population's respondents. Using an open-ended questionnaire, 220 randomly chosen corporate employees provided the primary data .The hypothesized model was developed and tested on a sample 215 respondents who worked for production businesses. The Statistical Package for the Social Sciences (SPSS) version 23.0 was used to enter and analyze the acquired data, and the Analysis Moment of Structure (AMOS) version 21 software was used to build the model. Descriptive statistics were utilized to analyze the data in order to evaluate the OSHP-related factors at Akaki Basic Metal Industry. Through the use of structural equation modeling (SEM) and confirmatory factor analysis (CFA), research models were examined and confirmed. The case company develop a safety model with the aim of to reduce workplace hazard .To achieve all of the goals, a design using mixed methodologies was developed. A good-fit structural model (PCLOSE=0.001, Goodness of Fit Index=0.971, Root Mean Square Error of Approximation=0.121, Comparative Fit Index=0.986 and TLI =0.906) indicated that Safety culture, safety police and safety climate constructs direct influence on firm productivity. The new Occupational Safety and Health Model Result can be used to provide better understanding of the links between firm productivity indicators and contributing components, and make stronger recommendations for effective intervention in construction projects. Employees are more likely to abide by safety rules if administrative professionals are seen as being concerned about OHS. A worker safety and health program has also been created and put into place. However, without the cooperation of both employees and employers a thorough occupational safety and health program were unachievable

Key words: OSH Management system, Employee productivity, Structural equation modeling

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Abbreviations

ILO: International Labor Organization

MOLSA: Ministry of Labor and Social Affairs.

OSH: Occupational Safety and Health

OHS: Occupational Health and Safety

OHSMP: Occupational Safety and Health management practice

OSHMS: Occupational Safety and Health

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CHAPTER ONE

1. Introduction and Background of the study

1.1. Introduction

The strategies, policies, plans of action, and procedures that an organization may use to guarantee the safety of its employees are known as Occupational Safety and Health Practices (OSHP). The chance of an accident may be reduced by safety and health procedures used in production. If workers, the industry, and society as a whole are aware of what is going on, accidents can be averted. An organization's OSHP may motivate staff to increase workplace safety performance. Additionally, putting in place a strong OSHP at work will reduce accidents while also benefiting the business in other ways (Lim Hui Yee1 & Hussein Mohammed Esmail Abu AL-Rejal2, 2016).The goal of the multidisciplinary field of occupational safety and health (OSH) is to protect people's safety, health, and well-being while they work or are employed. Health is the state of being mentally and physically sound, as well as being protected from danger in the form of illness or injury, for everyone who works there, including workers, contractors, and visitors (Khan et al., 2014).The issue of workplace safety is expanding globally due to commercial competition. Today's manufacturing sector has experienced greater societal economic development as a result of globalization and industrialization (Jilcha, 2017).Every employee has a basic right to a safe and healthy workplace. It is crucial to implement safe and healthy practices for both the community and the workforce. According to Taufek et al. (2016), workplace safety and health procedures may help to lower the likelihood of an accident happening. According to a study by (Jilcha & Kitaw, 2017), top management commitment, all members of the organization, the government, and collaboration with universities, research and development institutions, are required to improve and develop workplace safety and health.

In the industrial world, workplace accidents, diseases, and infections continue to be a big problem (Lim Hui Yee1 and Hussein Mohammed Esmail Abu AL-Rejal2, 2016).The International Lab our Organization (ILO) estimates that 125 million workers suffer illnesses and injuries at work each year. A total of 10 million workers suffer major injuries at work, and 220,000 people die as a result. With approximately 75% of the world's workforce employed in Third World nations, the Third World is the region most severely impacted (Mamtani & Mahajan, 2020). The prevalence rates of work-related injuries over a two-week period and annually were 335 and 120 per 1000 exposed workers, respectively. Small- and medium-scale industrial workers, respectively, were the subjects of 114 (35.5%) and 208 (32.4%) of all work-related injuries (Tadesse & Kumie, 2007).According to Kumie et al. (2016), there were 333 injuries per 1000 workers per year at two metal factories. Furthermore, it is clear from the Ministry of Lab our and Social Affairs' (MOLSA, 2016) data that out

of 14,914 organizations in Ethiopia, 25,812 employees experienced death, temporary disability, or permanent impairment (Berhan, 2020).

However, according to the ILO, occupational accidents and diseases (OAD) cost the world's Gross Domestic Product (GDP) 4% (1.2 trillion dollars).These numbers are periodically updated by the ILO, and the updates show a rise in accidents and illness. The number of deaths and disabilities attributable to industrial and occupational injuries is rising throughout Africa, especially Ethiopia (Licence, 2020). According to a survey published in 2006 by Ethiopia's Ministry of Labor and Social Affairs, manufacturing is the industry with the riskiest workplaces. The primary causes of this include the features of the sector, a lack of safety leadership, and a failure to implement Article 92 of labor Proclamation No. 377/06. As a result, the primary objective of the study was to evaluate occupational health and safety management practices in the study region (Endale Regasa, 2018) .

1.2. Problem Statement

The Ethiopian Basic Metal Works Industry (EBMI) is among the biggest and most important producers of a wide range of products for other significant industries like sugar, electric utilities, and construction. Occupational injuries occur in the production of spare parts in the Akaki Basic Metal Industry factory result of unguarded machinery, improper ventilation, splitting materials, metal sparks, molten metal, excessive heat, use of non-defective equipment, and a lack of awareness on the parts of both employers and employees. Occupational injuries can include physical impairment, property damage, fatalities, and job termination, all of which will result in significant financial losses. Five years clinical accident report data shown that the number of occupation injury is very seriousness. The accident report data also shown that small injury rate up to large injury rate occurs in the case company .Because of medical certificate employee also absents in the working days. The company clinical data shown that in 2009 E.C. 125, 2010 E.C 80, 2011 E.C. 39, 2012 E.C. 41 and 2013 E.C. 20 numbers of accident / injury was recorded. Based on this in a year of 2009E.C the number of working hours was 2336 and in one hour 0.0535 accident/ injury were occurred in the case company. In 2010E.C also the number of working hours was 1752 and in one hour 0.0457 accident/ injury were occurred the working area of case company. In 2011E.C also the number of working hours was 1226.4 and in one hour 0.03 accident/ injury were occurred in the case company. In a year of 2012E.C the number of working hours was 1214.136 and in one hour 0.034accident/ injury were occurred in the case company. And the last one in a year of 2013E.C the number of working hours was 970.9 and in one hour 0.021 accident/ injury were occurred in Akaki Basic Metal Industry. From 2009 E.C. to 2013 E.C., there has been a decrease in occupational injuries among workers. The reason for this work injury reduction is as follows:

- In 2009 E.C., the number of employees at Akaki Basic Metal Industry was 879. In the case of the company, due to a new work organization, around 43% of the workforce has been reduced. As a result, the total number of employees in 2010 E.C. was about 500.
- In 2009 to 2013 the number of production in the case company was 437826, 232546, 159200, 51065 and 59346 recorded continuously. It shows as the production of the case company has decreased. The reason for the decrease in production is the lack of imported raw materials (such as furnace cables, control electronic cards, etc.), old machines, a lack of water used for the furnace cooling system, and at the time, due to the current coronavirus, the production of the Akaki Basic Metal Industry has decreased from time to time. Due to the reasons mentioned above, the employees were not able to work full time, and due to these reasons, the occupational injuries had been reduced.

❖ In general, despite the above-mentioned reasons, workers are still suffering from work-related accidents and injuries. Even if the number of employees is reduced, the number of occupational accidents will increase when the Akaki Basic Metal Industry is operating at full capacity and producing products. This study investigates and solves the problem of occupational accidents and injuries in the case company.

1.2. Research questions

1) What are the various kinds of hazards, injuries and accidents happening in Metal Industry?
2) What are the factors that affect Occupational Safety and Health Practices at Akaki basic metal industry?
3) What Industrial Occupational Safety and Health Model is Appropriate for Akaki Basic Metal Industry?
4) To what extent do factors that affect firm productivity at the work place?

1.4. Objectives of the Study

1.4.1. General Objective

The primary goal of this research is to create a safety model with the goal of development in occupational safety and health in order to reduce workplace injuries, diseases, and deaths in the case firm.

1.4.2. Specific objectives

1) To identify various kinds of hazards, injuries and accidents happening in Metal Industry?
2) To identify factors that affect Occupational Safety and Health Practices at Akaki basic metal industry?
3) To identify Occupational Safety and Health Model is Appropriate for Akaki Basic Metal Industry?
4) To identify the extent of factors that affect firm productivity at the work place?

1.4. Significance of the study

These studies primarily benefit the employees and employers of case companies. This thesis research aids industries in identifying hazards and accidents that occur in the workplace that are related to OSH. The study findings can be used by the case company to solve a problem.

1.5. Scope of the study

The scope of this study is observing, studying and evaluating factors that affect OSHP that are governed by Akaki basic metal industry. Also in the manufacturing industry occupation hazard, injury and accident will be discus to evaluate the existing metal industry and employees' health and productivity are also some of the research conceder area.

1.6. Limitation of the study

The research was focused to only one metal industrial called Akaki Basic Metal Industry. Due to this limitation the output of the company does not generalized other metal industry. The other limitation of the study was some employers were unwilling in providing immediate responses finally budget and other required facilities are the limitation of the study.

1.7. Organization of the Study

There were five chapters in the study. The study's background, problem statement, aims, research questions, significance, scope, and limitations were all presented in the first chapter, which also serves as the introduction to the study. Related literature was evaluated and discussed in Chapter 2. The research approach employed in the study is described in chapter three. Discussions and Data Analysis are presented in Chapter 4. The summary, conclusion, and advice based on the study's findings are covered in the final chapter, Chapter 5. This thesis report also includes appendices, references, and other formal documents like acknowledgements and abstracts.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Introduction

A review of the literature is presented in this chapter. Both theoretical and empirical literature is covered. The chapter discusses various types of hazards, accidents, and injuries as well as related literature, theoretical review, conceptual framework, review of related literature, and research gaps with regard to the factors that affect occupational safety and health practices, work behavioral characteristics that influence occupational injuries, occupational injury that affects employees' performance, and implementation of occupational safety and health practices

2.2. Theoretical Review

2.2.1. Background and Global history of Occupational Safety and Health

Bernardino Rammazzini (1633–1714) is regarded as the founding father of occupational health. During his lifetime, Rammazzini is credited with founding the discipline of occupational medicine. In the year 1700, he released the well-known book titled "The Disease of the Workers. “Poor working circumstances, such as cramped quarters, poor sanitation, and physical and mental risks, were prevalent during the industrial revolution (1760–1840). Britain passed the Health and Safety at Work Act in 1802 in response to these worries. Act on Moral Apprentices. Britain first established the measuring of occupational mortality in the middle of the 19th century. The first factory medical inspector, who dealt with notifications and reports from certifying surgeons, was appointed by Britain in 1898. The International Lab our Organization (ILO) was established in 1919 to address unfair and difficult working conditions. "Measures to be taken for protection of the worker against sickness, disease, and injury arising out of employment" are included in the ILO constitution. The mandate and interest of the World Health Organization (WHO) in occupational safety and health (OSH) are derived from its constitution, which states that "improving working conditions is considered to be an important factor in health protection and promotion"(MOH, 2015) Ratified.

- **The Occupational Safety and Health Act**

Every nation, including the United States, Canada, and Malaysia, has its own OHS act and policy, according to Dr. Nicholas Kendall (2006). The Occupational Health and Safety Act of 1970 was an attempt to safeguard employees in the United States of America from the risks they encountered at work. The Act created a national federal program to safeguard workers against occupational disease, injury, and death for the first time. An Act of Parliament from 1978 established the Canadian Centre for Occupational Health and Safety (CCOHS), a department of the Canadian government. It is the responsibility of the CCOHS to promote safe and healthy

workplaces. In Malaysia, the Department of Occupational Health and Safety (DOSH) under the Ministry of Lab our is in charge of overseeing the Occupational Health and Safety Act of 1994 and the welfare, health, and safety of employees in both the public and private sectors. The DOSH conducts investigations and analyses into matters pertaining to occupational health and safety. Convention 155 (Occupational Safety and Health) 1981 has been ratified by Nigeria since 1994.A cogent national strategy on workplace safety, occupational health, and the working environment should be developed, implemented, and periodically reviewed with the assistance of tripartite partners. By reducing, as much as is practically practical, the causes of risks inherent in the working environment, this policy aims to prevent accidents and injury to health originating out of, linked to, or happening in the course of work. A National Policy on Occupational Safety and Health was created in 2006 and is currently in effect across the nation (Dr. Clement O. Illoh, 2016).The Occupational Safety and Health Act of 2007 in Kenya. The Ministry of Lab our, Social Security, and Services' Directorate of Occupational Safety and Health Services (DOSHS) is responsible for enforcing safety and health laws. All places of employment, whether temporary or ongoing, are covered under the Act (MOH, 2015). About 20 ILO agreements have been ratified by Ethiopia, including fundamental treaties like the Occupational Safety and Health Convention, 1981 (No. 155) in 1991. According to Abera Kumie, Tadesse Amera, Kiros Berhane, Jonathan Samet, Nuvjote Hundal, and Fitsum G/Michael (2017), these norms serve as the foundation for drafting worker protection laws. As a result, the aforementioned county and others adopt OSH laws in accordance with the ILO agreement..

2.2.2. Occupational safety and health (OSH)

The World Health Organization (WHO) and the International Lab our Organization (ILO) have shared a definition of occupational health since 1950. The Joint ILO/WHO Committee on Occupational Health approved this definition at its First Session in 1950 and updated it at its 12th Session in 1995. According to OSH definitions, this field focuses on worker protection and health promotion as well as the prevention of illnesses and accidents related to the workplace.

It seeks to make work environments and circumstances better. Engineers, doctors, hygienists, and nurses, for example, are just a few of the professionals who contribute to improving the working environment and promoting occupational safety, health, and hygiene (Dr. Nicholas Kendall, 2006).Protecting the safety, health, and welfare of those who are employed or working is the focus of the cross-disciplinary field of occupational safety and health. All individuals at the workplace, including employees, contractors, and visitors, must be in good physical and mental health in order to be protected from danger in the form of illness or injury. Safety refers to the physical status of the workplace and refers to a situation where the risk of harm and damage has been eliminated or substantially reduced. And there are often two sorts of environmental protection.

The first is the workplace's internal environment, which has an impact on the general state of the workplace. The second category of unhealthy settings is the environment outside of the job (Khan et al., 2014). Every employee has a basic right to a safe and healthy workplace. It is crucial to implement safe and healthy practices for both the community and the workforce. Lack of awareness is the main factor in workplace accidents. The majority of the time, incidents gets worse due to a shortage of qualified workers, and people die. If proper steps were implemented, strict laws, rules, and regulations were enacted, and frequent employee awareness program were held, the number of accidents at work might be limited (Taufek et al., 2016).To put it simply, occupational safety and health is the process of identifying and mitigating all potential risks and hazards at work for the sake of the workers' health and safety. By assisting in the preservation and protection of people and other physical assets in the workplace, OSH aims to reduce losses (Kilpinen, 2019).One of the most crucial areas of human concern is occupational health and safety. It aims an adaptation of working environment to workers for the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations (Tadesse & Admassu, 2006).Workplace safety and health refers to ensuring that employees are in good physical condition while at work. Its goal is to improve workers' ability to generate better results. The International Labor Organization uses a variety of tools to improve occupational safety and health, including codes of practice, international labor standards, information dissemination, and technical advice through workshops and publications (Umugwaneza et al., 2019).

2.2.3. Occupational safety and health practices (OSHP)

Occupational Safety and Health Practices (OSHP) are the strategies, policies, measures, and procedures that an organization may implement to safeguard the safety of its employees, according to Hui Yee and Mohammed Esmail Abu AL-Rejal (2016). The OSHP contains many elements that are concerned with safety. They are: management commitment, safety education, employee participation, safety policies, rules, and practices.

Occupational safety and health practices, according to Fatin et al. (2013), also include aspects like safety culture, employee attitude, employer involvement, leadership style, and safety and health training. The importance of safety and health procedures has increased recently, notably in the manufacturing sector (Fatin et al., 2013).The Director of Reflection India indicated that the implementation of OSHP in the production can help to raise employee morale and lower absenteeism, according to a Mamtani & Mahajan (2020) study. By implementing safety program and practices, the company's performance and production are indirectly increased because the rate of accidents is decreased. Additionally, when accident rates drop, operating expenses like health care and insurance costs also go down, meaning the firm won't have to pay as much on worker compensation. The organization performs better as a result. As can be seen in Fig. 1, the overall situation for the Indian manufacturing sector is quite bad due to a number of interacting issues that lead to inadequate OSHP rules and standards.

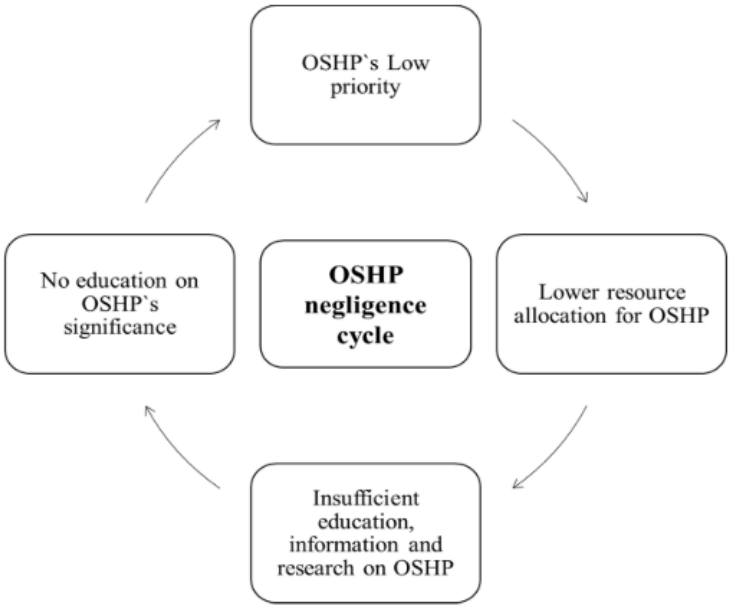

Figure 2.1:Flow-chart showing how OSHP neglect is dependent on a converging cycle.

Workplace accidents are very common in Ethiopia and frequently lead to lengthy absences from the workplace. Services for workplace safety and health were found to be poorly organized. Practices for monitoring and assessing exposure are rare. Despite the fact that the policy and regulatory climate is currently favorable (Kumie et al., 2016) this is still the case. In terms of injury reporting, fundamental occupational health, safety services, safety concerns, occupational health research, and prevention methods, the OSH service is underutilized in this nation. Because of this, there is a dearth of information on occupational injuries, and reports from a few manufacturing sectors may not necessarily represent the entire nation (Jilcha, 2017).

According to Dr. Clement O. Illoh (2016), the benefits of workplace safety and health practices include the following:

- ✓ Productivity is increased

When there is a safety and health system in place.

Legal significance Reduced insurance premiums, long-term healthcare expenditures, and

- ✓ Legal expenses

Less lawsuits, lower ambulance chasers (common law fees), protect employees from employer abuse

- ✓ Health implications

Reduced morbidity, mortality, and fatality

- ✓ Competitiveness of the organization

Improved public image, staff retention, and satisfaction

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2.2.4. Global Situation of Occupational accidents and Hazards

ILO (2019) states that occupational accidents and diseases have a significant impact on people and their families in the short- and long-term, not only in terms of their economic well-being but also in terms of their physical and mental health. Additionally, they can have a significant impact on businesses, lowering productivity, sometimes disrupting manufacturing processes, impairing the competitiveness and reputation of businesses along supply chains, and generally having an adverse effect on the economy and society.

According to estimates, the burden of occupational mortality and morbidity is not equally distributed across the world. About two-thirds (65 per cent) of global work-related mortality is estimated to occur in Asia, followed by Africa (11.8 per cent), Europe (11.7 per cent), America (10.9 per cent) and Oceania (0.6 per cent). This reflects the distribution of the world's working population and hazardous work, as well as differing levels of national economic development. The rates of fatal occupational accidents per 100,000 workers also show stark regional differences (Figure 2), with those in Africa and Asia between 4 and 5 times higher than those in Europe.

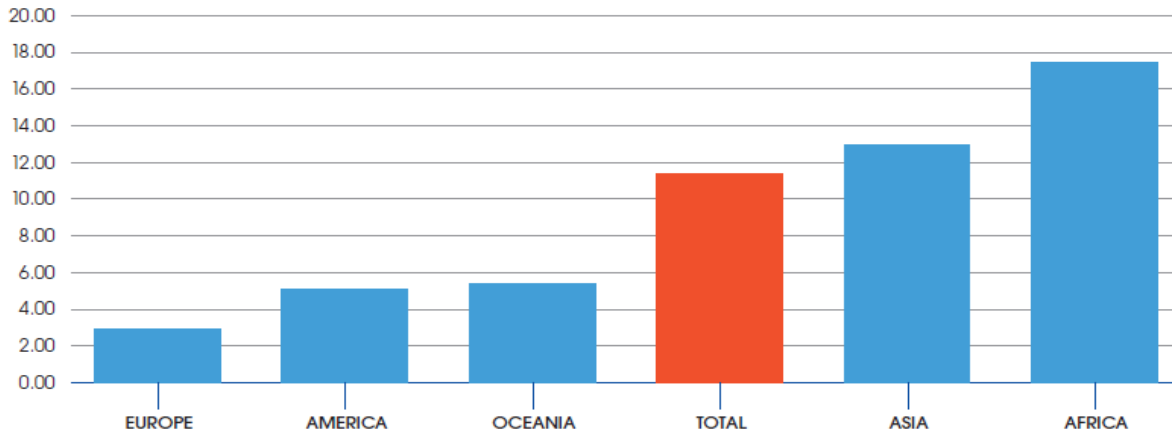

Figure 2.2: Accident fatality per 100,000 persons in the labor force, by region, 2014
Source: - ILO 2019

There are also differences in relative contributions of various causes of work-related mortality by region (Figure 3), though this is also affected by differences in reporting and recording.

Developed countries appear to have a higher proportion of work-related mortality from cancers (over 50 per cent) and a much smaller proportion from occupational accidents and infectious conditions (under 5 per cent). Africa has the highest relative share of work-related communicable diseases (over a third) and occupational accidents (over 20 per cent) and lowest for cancers (less than 15 per cent) (ILO, 2019).

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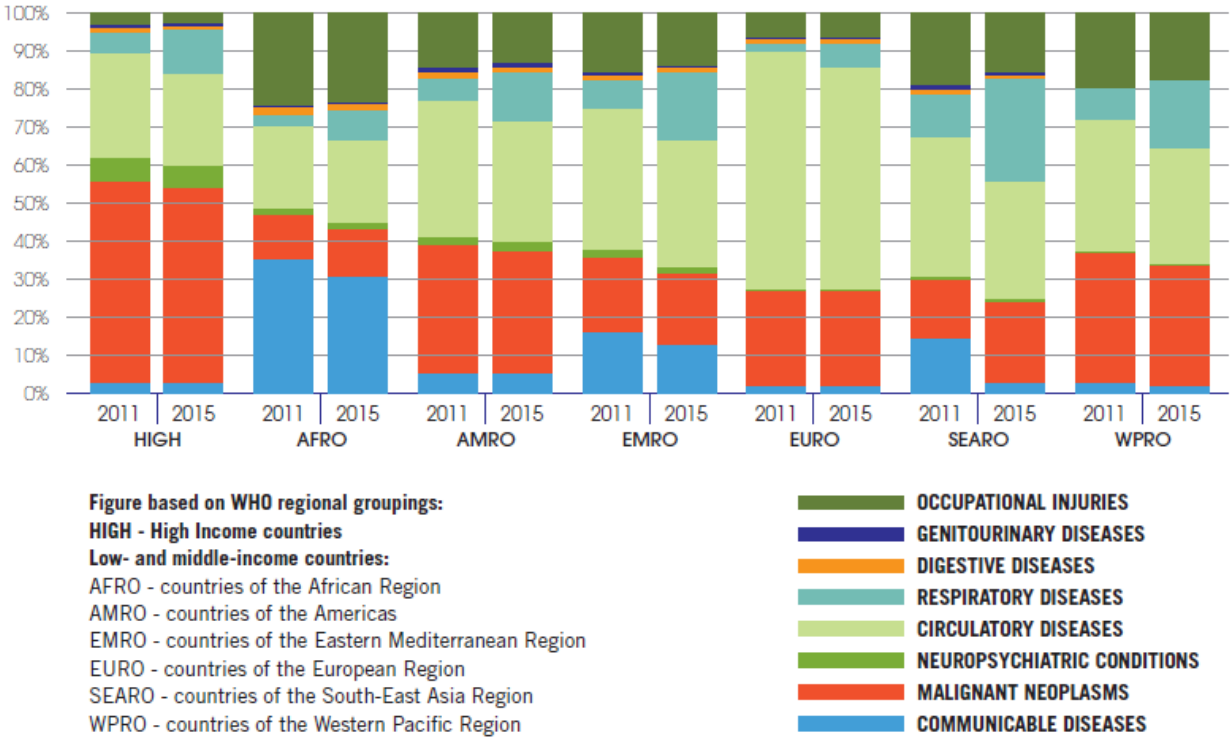

Figure 2.3: Comparison of fatal work-related mortality by WHO regions between 2011 and 2015 Source:-ILO 2019

2.2.4.1.Types of Hazard in the Manufacturing Industry

The type of employment affects how exposed employees are to risks at work (Kumie et al., 2016). The increasing rate of injuries in Ghana can be attributed to the rise in physical, chemical, biological, and psychological stressors associated with occupational activities (Adjotor, 2013). According to Tadesse & Admassu (2006), there are several occupational health and safety risks that can result in work-related illnesses, injuries, disability, or even death. These workplace health and safety risks are divided into six categories:-

- ✓ Physical hazards include things like heat, ionizing and non-ionizing radiation, noise, vibration, and other harmful microclimatic conditions. Depending on the possible hazard, between 10 and 30% of the workforce in industrialized nations and up to 80% in developing and recently industrialized nations are exposed.
- ✓ Mechanical Hazards : Unshielded machinery, unsafe workplace structures, and hazardous unprotected tools are some of the most common mechanical dangers in both industrialized and developing nations. A sizable section of the workforce is impacted in terms of health.
- ✓ Chemical Hazards: These are caused by high concentrations of chemical dust, fumes, mists, liquids, vapors, gases, and dust in the air.
- ✓ Biological hazards: It has been discovered that occupational exposures can result in exposure to a variety of biological agents, including viruses, bacteria, parasites, fungi and organic dusts. Around 15%

of employees in industrialized nations may be susceptible to viral or bacterial infections, allergies, and respiratory illnesses. The most common exposure in many underdeveloped nations is to biological agents**.**

- ✓ Ergonomic Hazards; Examples include excessively poorly designed tools, work environments, or work routines. Accidents or illnesses in the workplace can be caused by improper lifting or reaching, poor vision, or repeated motions in an awkward position. Heavy physical workloads or un ergonomic working situations, such as lifting and moving heavy things or repetitive manual tasks, may be experienced by 10% to 30% of the workforce in developed countries and 50% to 70% of the workforce in underdeveloped countries. In general, ergonomics concerns the interaction of humans with extra environmental factors such as heat, light, sound, airborne pollutants, and all work-related instruments and equipment.
- ✓ Psychosocial hazards: Up to 50% of all workers in industrial countries judge their work to be "mentally heavy". Psychological stress caused by time pressure, hectic work, and risk of unemployment has become more prevalent during the past decade. Other factors that may have adverse psychological effects include jobs with heavy responsibility for human or economic concerns, monotonous work or work that requires constant concentration.

❖ Types of Hazard in the metal industry

According to Miwano et al., (2018) the category of chemical and biological hazards has the highest percentage of exposure at ~94.9%, followed by physical hazards with ~72.1%. Psychosocial hazards and ergonomics had smaller percentages of ~39.3% and ~48.7% respectively. This shows that the respondents are more likely to be exposed to chemical, biological and physical hazards on a typical work day and less likely to be exposed to psychosocial hazards and ergonomics related hazards. According to Habtu et al. (2014), based on the operational description given on the observational checklist in 28 working parts, the injury matrix table of the eight selected industries evaluated six occupational risks. Thus, it was found that 23, 27, and 19 had abnormally high temperatures, noise levels, and dust levels, respectively.

All industries, according to Kifle et al. (2014), feature noisy, unguarded machinery, filthy floors, and barriers that prevent workers from moving around freely. Extreme heat, explosive components, hot metals splashing around, sparking and splitting metals, and fumes, dust, and smoke were all frequent sights in all sectors. Workers were subjected to workplace dangers like intense noise, fumes, and dust as well as dated and risky equipment that might break materials and spark metals. Alcohol consumption at work, being single, feeling extremely stressed out at work, and not using personal protective equipment (PPE) were all associated with a higher injury rate than other factors.

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2.2.4.2.Types of Accidents /Injury happen in workplace

Accidents can happen at any moment, but when they do so at work, there are a lot of factors to take into account. In small and medium-sized industries in Gondar, Ethiopia, Tadesse & Kumie (2007) report that 158 (49.1%) of the injured respondents had sustained more than one injury, and 115 (12%) had sustained work-related injuries for at least two weeks prior to the data collection. In the manufacturing sector or in a job, there are numerous sorts of accidents that can result in fatalities, permanent disabilities, or even non-permanent disabilities, according to Mamtani and Mahajan (2020). The four accident types that occur most frequently in workplaces are as follows:

- ✓ Overexertion injuries are the most frequent; they are brought on by lifting, dragging, pulling, pushing,
- ✓ Electric Shock: Electric shock and even electrocution are serious electrical risks that can have serious consequences in the workplace.
- ✓ Chemicals and Fires: Chemical exposure burns, and severe injuries might result in a fatal working scenario.
- ✓ Slips and falls: Wet or broken floors are a major source of slipping and falling accidents at work.
- ✓ Physical harm sustained at work: According to a study, industrial employees frequently sustain moderate-to-serious bodily injuries, with the hands and fingers taking the brunt of the damage. According to injuries, mishaps involving the upper extremity's fingers were most common. Accidents primarily impacted the thumb, index, and middle fingers of the left and right hands. The foot and leg were the sites of the majority of lower extremity accidents. Exposure to environmental noise is associated with a number of detrimental psychological and physical health impacts. Working in environments where typical noise exposure doses exceed 89 dB is also risky (Khan et al., 2014).

Physical and chemical dangers were found to be the two main hazards in the research area, according to Solomon Tibebe's study on the practices and difficulties of occupational health and safety in Ethiopia: the case of Akaki textile and garment factory. The study found that working in factories has a negative impact on employees' health because the majority of tasks are unsafe, uncertain, and performed in unsanitary conditions (Endale Regasa, 2018).

2.2.5. Occupation injury affect employees' performance

Physical and chemical hazards were the two most significant risks in the study area, according to Solomon Tibebe's study on the practices and challenges of occupational health and safety in Ethiopia, The Case of Akaki Textile and Garment Industry. The majorities of factory tasks, according to the study, are unpredictable, dangerous, and occur in an unclean and unhealthy atmosphere (Endale Regasa, 2018). This has a severe influence on worker health. The health and safety of employees are significantly impacted by each of these risks, which lower productivity (Katsuro et al., 2010).The term "occupational health and safety" (OHS) refers to

the physical and mental conditions that employees face as a result of their workplace environment. The number of employees who experience short- or long-term illnesses or injuries as a result of their employment will decrease if the organization adopts suitable safety and health policies. A solid understanding of OHS can aid employees in concentrating on preventing accidents at work. Safety at work depends on how work is introduced and how risky incidents are. As a result, in order to implement OHS in the workplace, workplace safety should be communicated to the workers from a young age and supplies should be made available. As a result, an individual completes tasks such as work standards, targets or goals, and criteria that have been established and agreed upon. Performance indicators come in several forms, such as (a) quantity, (b) quality, and (c) timing. Gaining personal goals requires putting forth good performance. Performance, or addressing physical and spiritual needs, is therefore a crucial objective in achieving both material and non-material aims. Workplace health and safety affect employee performance. As a result, the organization has implemented human resource management practices, maintaining the physical, mental, and behavioral health as well as the employee attitude to ensure that they continue to be productive and accomplish company objectives (Ekowati & Amin, 2019).

Workplace discipline, environmental factors, and occupational health and safety all have an impact on employee performance. The dominating test shows that discipline has a dominant impact on worker performance. Increasing employee discipline and making sure they have health and safety insurance as well as a nice working environment (including their interactions with coworkers, bosses, and subordinates) can all help increase employee performance. According to Sari and Storyna (2018), employee performance can improve how well the organization runs.

2.2.6. Relationship between OSH and employee productivity

The productivity of the company is closely related to each employee's health and safety, according to Sheth et al. (2016), and this is true across all workplaces. The main productivity advantage of workplace health and safety is decreased absenteeism. Job satisfaction has an impact on employee performance. Employees' mental and physical health can be maintained through occupational health with a good psychosocial state (Ekowati & Amin, 2019). Productivity improvement is a major concern in today's businesses. In the literature of organizational behavior and human resource development, productivity via work performance is a well-explored (Pradhan & Jena, 2016). The employees' perspective is crucial when it comes to safety issues. They added that due to disruptions in production processes, damage to manufacturing equipment, and a bad influence on the company's reputation, industrial accidents not only harm human capital but also cause financial losses. If a safety performance measurement system is developed to comprehend the cost of illness and injury, organizations can employ a cost-benefit ratio as a fundamental tool of economic assessment. Businesses must also analyze non-economic factors like cultural traits and any current management structures when considering workplace safety (Beriha, 2012) .

2.2.7. Occupational Safety and Health Practices implementation

Injury management was a dependent variable in Taufek et al. (2016)'s study, while safety and health practices of safe work environments (including training and supervision, safe work procedures, consultation, reporting safety, and management commitment) were an independent variable. An analysis found that safety protocols had a considerable impact on employee performance, according to Ikechukwu et al. (2020).

Employee performance in manufacturing companies in Rivers State is influenced by the four independent variables (safety training, management commitment, safety awareness, and hazard exposure) that were used as indicators of industrial health and safety. This shows that a lack of a health and safety culture among manufacturers in this industry may be responsible for the poor performance in the manufacturing industry, notably in the state of rivers. As a result, we discover that poor employee performance, which has affected organizational performance, is caused by a lack of or ineffective health and safety program practice..

2.2.8. Tools of the study

Berhan (2019) suggests route analysis using structural equation modeling, which is an appropriate tool for analyzing multiple causalities, to evaluate the major impact and moderation hypotheses when there are numerous independent factors and dependent variables. The data was analyzed in this way using programmers like Analysis of Moment Structures (AMOS) Ver. 21 and SPSS Ver. 23. According to Gerger (2021), the statistical software packages IBM SPSS Statistics v. 20 and IBM SPSS AMOS 23 were used.

2.3. Empirical Findings OSH

2.3.1. Work behavioral characteristics influence occupational injuries

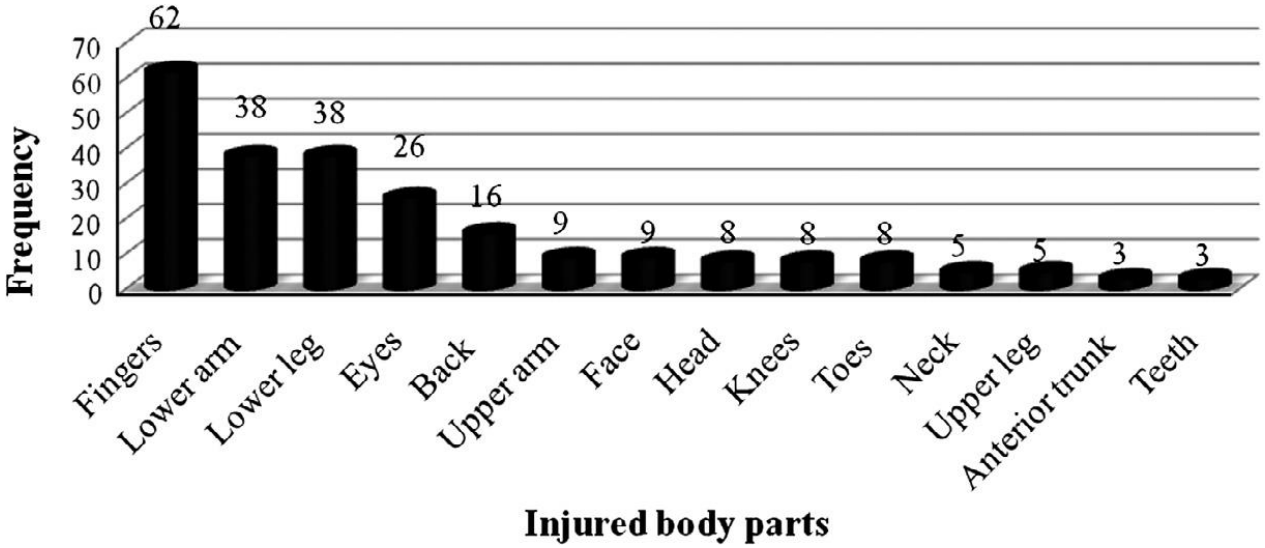
In the modern workplace, there are several labor practices that contribute to occupational injuries, including the usage of antiquated equipment, unprotected equipment, splitting of materials, and metal sparks, to mention a few. Employees at various workstations face various types of danger since the outputs produced at each stage of manufacturing differ. According to observation, certain areas of the factory have higher concentrations of each type of hazard than other areas. The majority of factories still use outdated equipment. These pose a risk since they could stop operating suddenly, potentially injuring or killing the person operating the machine. The machines produced a lot of noise and released a lot of dust. Older machinery pose more hazards for occupational health and safety that are more difficult to control than newer equipment. Factory workers' productivity and health suffer as a result of outmoded equipment. The productivity of factory workers suffers as a result (Katsuro et al., 2010). 65 (16.05%), 52 (12.84%), and 48 (11.85%) of the wounded people were related to the machine area or crane operation, welding, and metal processing, respectively (Habtu et al., 2014).

Injuries occurred to workers at two metal facilities at a rate of 333 per 1,000 per year. Flying objects, falls, and machinery were at responsible for 43% of the injuries. Manufacturing injuries were caused by unsafe workplace circumstances including unprotected machinery, splitting materials, metal sparks, molten metal, high heat, and

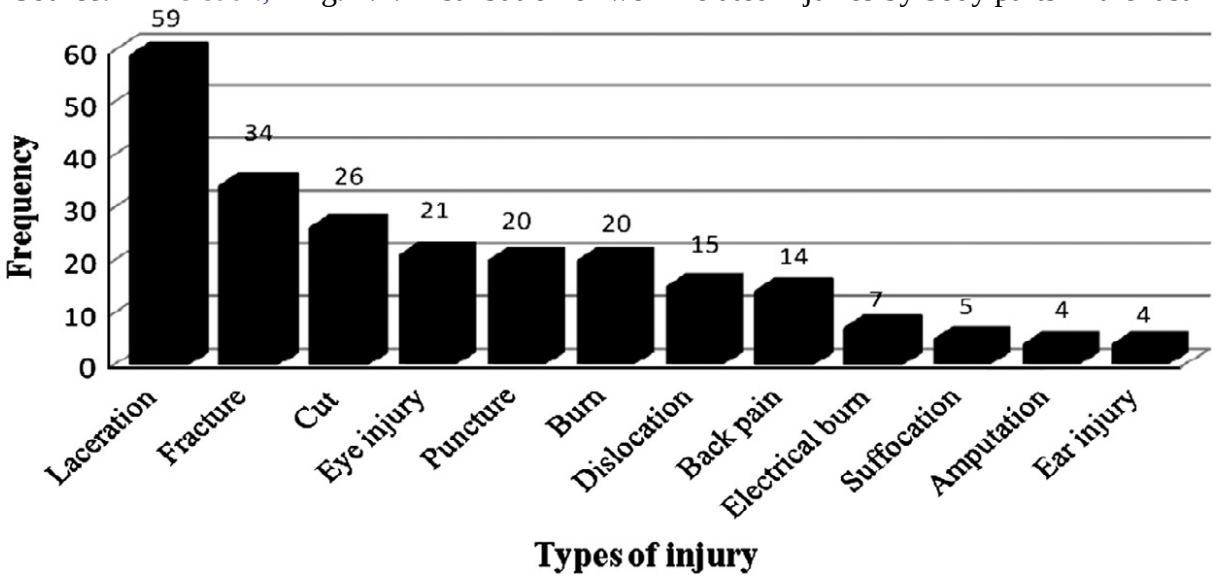
uneven and slick floors (Kumie et al., 2016).In the past 12 months, 14.7% of the 625 participants in the study (Mulugeta et al., 2020) reported having a nonfatal workplace injury. In 52 percent of cases, the injuries required the victim to miss more than three days of work. The most often injured body part was the finger (68.5%), and cuts were the most common type of damage (63%). Most injuries (68.5%) were caused by contact with exposed machinery when cutting, flattening, and smoothing wood. 73 (22.3%) of mechanical workers in small businesses and 181 (27.3%) in medium-sized organizations more than any other industry experienced work-related injuries in 2015, according to Molla et al. Furthermore, Tadesse and Kumie (2007) found that workers in the welding and mechanic industries who were young, untrained, and had sleep issues had significantly increased injury risks.

- **Type of accidents &Injured in metal industry**

According to Shikdar & Sawaqed (2003), metal manufacturing industry had more problems than other types of industry. The prevalence of occupational injuries in the metal manufacturing sector is a serious public health issue. Eyes (31.0%), fingers (27.0%), ankles and feet (28.0%), and compression and crush (24.0%) incidents were mentioned, as well as burr puncture into the eye (22.0%), a component descending (20.0%), and a component falling (16%) (Gulhan et al., 2012).The bodily parts that were most commonly impacted, according to a study by Habtu et al. (2014), were the hands 188 (46.4%), fingers 135 (33.3%), toe 131 (32.3%), and eye 112 (27.7%).According to Gulhan et al. (2012), of the wounded workers who were allocated to various working areas, 65 (16.05%), 52 (12.84%), and 48 (11.85%) were hurt while operating machines or cranes, welding, and the metal processing sections, respectively. Berhan, (2020) mentions that the results demonstrated that the greater prevalence of occupational accidents and injuries, including cuts, punctures, exhaustion, dislocations, sprains, and fractures, are only caused by one or a few factors that are statistically significant contributors to their occurrence. One business uses a nearby private clinic, while four metal industries have their own facilities. According to an analysis of a year's worth of clinical records, the most common minor injuries were burns, eye injuries, bone fractures, cuts, dislocations, punctures, abrasions, and muscle injuries. Among the body parts affected were the back, eye, hand, lower leg, toe, chest, finger, waist, and teeth. A medical board deemed 18 workers in one of the metal sectors permanently disabled after they sustained fractures to their hands, legs, and fingers in a single year and had to have limbs amputated (Benti et al., 2019).According to Kifle et al. (2014), the prevalence of injuries was 33.3% per year, with the most frequent causes of injury among iron and steel industry workers being equipment (12.6%), being hit by falling objects (13.7%), and splitting and flying objects (16.4%).



Source: Kifle et al., Fig. 2.4: Distribution of work-related injuries by body parts in the last 12 months



Source: Kifle et al., Figure. 2.5: Types of work-related injuries in the last 12 months

2.3.2. Occupation injury affect employees' performance

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2.3.3. Factors that affect Occupational Safety and Health Practices

Workplace safety and health procedures are influenced by a variety of circumstances. The inadequate implementation of safety standards and procedures is largely due to a lack of management commitment, safety performance, safety climate, hazard management, and safety and health training.

- **Occupations safety and health management**

Businesses utilize occupation safety management systems, which are built-in tools, to manage risks that could harm the health and safety of their employees while also ensuring that they can easily comply with all relevant regulatory requirements (Fernández-Muiz et al., 2009).The following are elements of managing occupational safety and health:

1. **Occupational health and safety planning (PL)**

Preventing accidents and injuries starts with planning for workplace health and safety. Safety planning is a proactive method that involves several actions to reduce workplace risks (Moosa, 2018).

2. **Occupational health and safety policy and International standards (PO)**

A statement of principles and general norms that serve as a roadmap for action is what is meant by the definition of occupational health and safety policy. The purpose of the statement should be to emphasize the significance of taking health and safety precautions and the part that each employee plays in preserving a safe and healthy workplace (Mnyika, 2012),(Moosa, 2018). OSHA 2007 and other standard procedures must be followed in all workplaces in accordance with governmental laws and regulations (S.K.Kimeto et al., 2016)

Only 24 countries had ratified the International Lab our Organization's Employment Injury Benefits Convention (No. 121), which lists occupational diseases for which compensation should be paid, and only 31 countries had ratified the International Lab our Organization's Occupational Health and Safety Convention (No. 161).. Adhering to these standards should be the first step in putting an OSH system in place. Agricultural and home-based employments are two hazardous professions that are usually not considered "industries" by OSH rules. Only 5%–10% of employees in underdeveloped nations and 20%–50% of employees in wealthy nations have access to appropriate occupational health and safety protection (Jilcha, 2017). To ensure that a national OSH policy is comprehensive, steps should be taken to ensure that the government, employers, and workers' organizations all participate in its formulation, implementation, and evaluation (ILO, 2008).

Ethiopia was one of the first nations to enact workplace safety and health laws in the 1920s. In 1964, the Ethiopian Labor Standard Proclamation became a legal document. This was altered in 2006 to conform to the constitution's provisions on worker protection in Ethiopia. It is fairly clear and unambiguous what the goals of the labor proclamation are, which include adhering to the requirements of international workplace safety and health agreements such the International Occupational Safety and Health Convention No. 155/1981. The development of an OSH policy is a critical step in ensuring a safe and healthy workplace in Ethiopia. The Ministry of Lab our and Social Affairs provided significant assistance in the development and approval of the OSH policy. The Ethiopian Constitution (49), which governs OSH, is the cornerstone. It has a variety of elements that guarantee that people and employees are protected from environmental and workplace risks. OSH regulations were created in Ethiopian workplaces by the Ethiopian Labor Proclamation. The declaration outlines each party's responsibilities in this scenario the employer, the employee, and the government inspectors (Kumie et al., 2016).According to respondents, (Alkilani et al., 2013) state that "management commitment and involvement" is the main barrier to developing outstanding H&S practices. "Management commitment" in the context of safety and health refers to a worker's loyalty to their employer. In addition to top management's critical role in reducing workplace accidents and injuries, it is also the duty of employees to follow the rules. Management commitment is defined as an organization's continual display of a supportive and positive attitude towards its employees' perceptions of workplace safety (Taufek et al., 2016). Hui Yee and Mohammed Esmail Abu AL-Rejal (2016) state this .All management levels must be committed to and supportive of the safety and health program.

3. **Occupational health and safety promotion** (PR)

Occupational health and safety promotion is a strategy used by people, communities, governments, and others, including businesses and non-governmental organizations, to establish and maintain the core components of safety at the local, national, and international levels (Moosa, 2018).

4. **Occupational health and safety communication and awareness** (CA)

The "company's formal and informal verbal, written, or unwritten policies, plans, standards, and procedures" that are utilized to raise safety awareness at the organization are characterized as occupational health and safety communication and awareness (Moosa, 2018).

5. **Occupational health and safety training** (TR)

Laws, standards of conduct, and other matters important to the organization's health must be included in safety training. Personal protective equipment, emergency planning, and accident reporting are all covered in safety training (Mnyika, 2012). Employees are subject to the employer's responsibilities during safety training. Occupational accidents and injuries will rise as a result of safety training's failure to be effective (Taufek et al., 2016). One element of the solution for establishing safe work practices is a preventative safety measure that enables employees to deal with unforeseen threats and acts as a motivator for staff to change their behavior (Fatin et al., 2013). Hui Yee and Mohammed Esmail Abu AL-Rejal (2016) contend that the company should provide training to all staff levels. Through training, employees can improve their routines, knowledge, and abilities. After the training, a program for setting goals and providing performance feedback should be developed. The likelihood of an accident can be predicted with the aid of training in accident prevention. All of these topics should be covered in training program: safety promotion, accident prevention, safety practices and compliance, personal protective equipment, accident and emergency response, equipment and machinery, chemicals, workplace dangers, and worker involvement. All levels of employees should receive training from the organization. Employees can enhance their habits, knowledge, and skills through training. A goal-setting and performance feedback program should be created after the training. Training in accident avoidance can help forecast the likelihood of an accident .Khan et al. (2014), mention how inadequate management awareness of occupational health and safety led to improper OHS service implementation. There weren't enough capable people to handle the health and safety duties, and those hired for the position weren't OHS specialists. They were ignorant of the significance of workplace health and safety from a worker's perspective.

6. **Occupational health and safety control, monitoring and review** (CR):

"A systematic action conducted to detect changes affecting a safety system with the specific objective of identifying that acceptable or tolerable safety can be met" is how occupational health and safety control, monitoring, and review are defined (Moosa, 2018). Control and oversight of internal operations will make it possible for ongoing improvement. This control is carried out through comparisons with other businesses, analysis of working circumstances, and internal company events (Fernandez Muñiz et al., 2009)

❖ **Other Factors that affect Occupational Safety and Health Practices are**:

1. **Occupational health and safety leadership (LD**)

Leadership in occupational health and safety it entails the management's attempts to accomplish the organization's short- and long-term goals (Fatin et al., 2013).

2. **Safety climate (SC)**

The societal attitudes, common practices, and environment surrounding workplace safety are referred to as the "safety climate." To express a concept that captures workers' subjective impressions of the importance of safety throughout the organization, we will use the term "safety climate" (Brown et al., 2000).

Safety atmosphere is an indicator of the temporal status of safety culture that takes into account how each individual views the business. As a result, it relates to the perceived level of safety at a certain location at a particular time and is situation-based. As a result, it tends to be unstable and subject to change based on the features of the current environment or existing circumstances. The safety climate is viewed as a transitory state of an organization that is subject to change, depending on the peculiarities of the particular operational or economic circumstances (Beriha, 2012).

3. **Hazard management (HZ)**

Hazard management is the process of defining, identifying, evaluating, and addressing workplace safety hazards (Moosa, 2018). An exposed gasoline tank or chain, a spinning machine, exposed electrical connections, a leaky dust extractor, etc. are a few instances of dangers that can be identified and dealt with as potential sources of danger. Plans for hazard inhibition and management take current organizational safety standards into account. Physical, biological, chemical, and ergonomic hazards fall into the following four categories: noise, radiation, high temperatures, or poor lighting; infectious waste, viruses, or bacteria; dust, fumes, or gases; and repetitive motion; improperly designed equipment; improper work procedures; or improperly designed furniture.

The management of identified risks is governed by safety regulations outlined in the hazard prevention and control policy. Attempting a risk-free or less hazardous option is part of this. By taking action to prevent and control the dangers, employers can manage those that have been identified as being present in the workplace (Morgan Morgan et al., 2021).

4. **Safety culture (SCU)**

Organizational psychology, organizational behavior, and management literature emerged in the 1950s and 1960s as a result of social and behavioral psychology, which is also where the concept of safety culture first appeared.2012 (Beriha).The goal of a safety culture, according to Adjotor (2013), is to lessen the exposure of employees, managers, clients, and the general public to conditions that are judged hazardous or damaging in a firm. This is accomplished through a variety of attitudes, norms, roles, and social and technological practices. the culmination of a person's or a group's beliefs, attitudes, perceptions, skills, and behavioral patterns that can affect how dedicated a company is to its health and safety management system, as well as its competence and style. According to Kim et al. (2016), psychological, behavioral, and environmental factors all contribute to safety culture. The meaning, experiences, and interpretation of lab our and safety that have been gained collectively are symbolically and interpretively reflected in part. Included are shared ideals and beliefs that

work together with a company's structure and management to generate behavioral norms (Fatin et al., 2013). Any employee, regardless of rank or position, who acknowledges and actively participates in error avoidance is part of an organization with a strong safety culture. In reality, safety culture is a set of guidelines that help a group of individuals change their behavior. These guidelines assume that all members of the group respect safety and will willingly uphold the group's safety norms. Typically, a strong safety culture increases management and employee trust (Beriha, 2012) .

5. **Safety performance (SP**)

"The actions or behaviors that individuals exhibit in almost all jobs to promote the health and safety of workers, clients, the public, and the environment" are how safety performance is described (Moosa, 2018).

6. **Employee Productivity (EP)**

Employee productivity is the sum of all elements that affect productivity in a business over a specific time period. In terms of quality, quantity, time, and efficiency, it is a technique to evaluate how well employees, machines, the manufacturing system, etc. convert inputs into usable outputs. Employee output is seen as a crucial element in the growth and competitiveness of enterprises. Productivity gains are essential for evaluating the production factor as a whole. (Morgan Morgan et al., 2021). Employee productivity is the total of all elements that affected a company's productivity over a specific time period. In terms of quantity, quality, time, and efficiency, it is a technique to evaluate how well people, equipment, the production system, etc. convert inputs into useable outputs. Employee output is seen as a crucial element in the growth and competitiveness of enterprises. A company's overall production capacity can be evaluated by looking at productivity gains (Morgan et al., 2021).According to Kumie et al. (2016), to maintain the workers' health, a complete overhaul of the current OSH scenario is necessary. This shows that reducing exposure to OSH dangers can enhance the working environment. Research results that support the execution of regulations intended to enhance working conditions are therefore promoted. With a wide range of stakeholders, including national institutions, involved in the creation and use of OSH evidence, it is strongly urged that suitable measures be implemented to enhance the working environment. Since a firm, not the government or any other institution, is in charge of implementing OSH, this study differed with the prior writers. Even if a nation has the best OSH laws, risk reduction is challenging without practical execution. The company, especially manufacturing management, as well as employees, must be committed to implementing the policies and evaluating their efforts to keep the workplace safe in order to eliminate occupational hazards.

2.4. Research Hypotheses

As seen in Figure 2.6, a series of hypotheses (H1 to H21) relating the components of the research model were put out. The twelve components that connect the twenty one fundamentally theorized relationships make up the Firm Productivity Model. These theories link all of the constructs directly. These hypotheses explain the

relationships between exogenous factors OHS Planning (PL), OHS Policy (PO), OHS Promotion (PR), OHS Training (TR), Internal Communication and Awareness (CA), Control, Monitoring and Review (CR), and OHS Leadership (LD) and endogenous factors Safety Performance (SP) and Firm Productivity (FP).These theories include:

H1: Safety performance is directly impacted by safety leadership

H2: Safety performance is directly impacted by the safety climate.

H3: Security Safety performance is directly impacted by hazard management.

H4: Safety performance is directly impacted by safety planning.

H5: Safety performance is directly impacted by safety policy

H6: Safety performance is directly impacted by safety promotion.

H7: Safety performance is directly impacted by safety training

H8: Safety performance is directly impacted by safety communication and awareness

H9: Safety performance is directly impacted by safety control, monitoring, and review.

H10: Safety performance is directly impacted by safety culture

H11: Safety leadership affects firm productivity in a non-direct manner.

H12: The safety climate has a tangential effect on firm productivity

H13: Security Risk management affects business productivity in an indirect way.

H14: Safety Planning affects firm productivity in a non-direct manner.

H15: Firm productivity is indirectly impacted by safety policies

H16: Firm productivity is indirectly impacted by safety promotion

H17: Firm productivity is indirectly impacted by safety training

H18: Safety awareness and communication have a negligible direct effect on firm productivity

H19: Firm productivity is indirectly impacted by safety control, monitoring, and review

H20: Safety culture influences firm productivity in a non-direct manner.

H21: Direct link between firm productivity and safety performance

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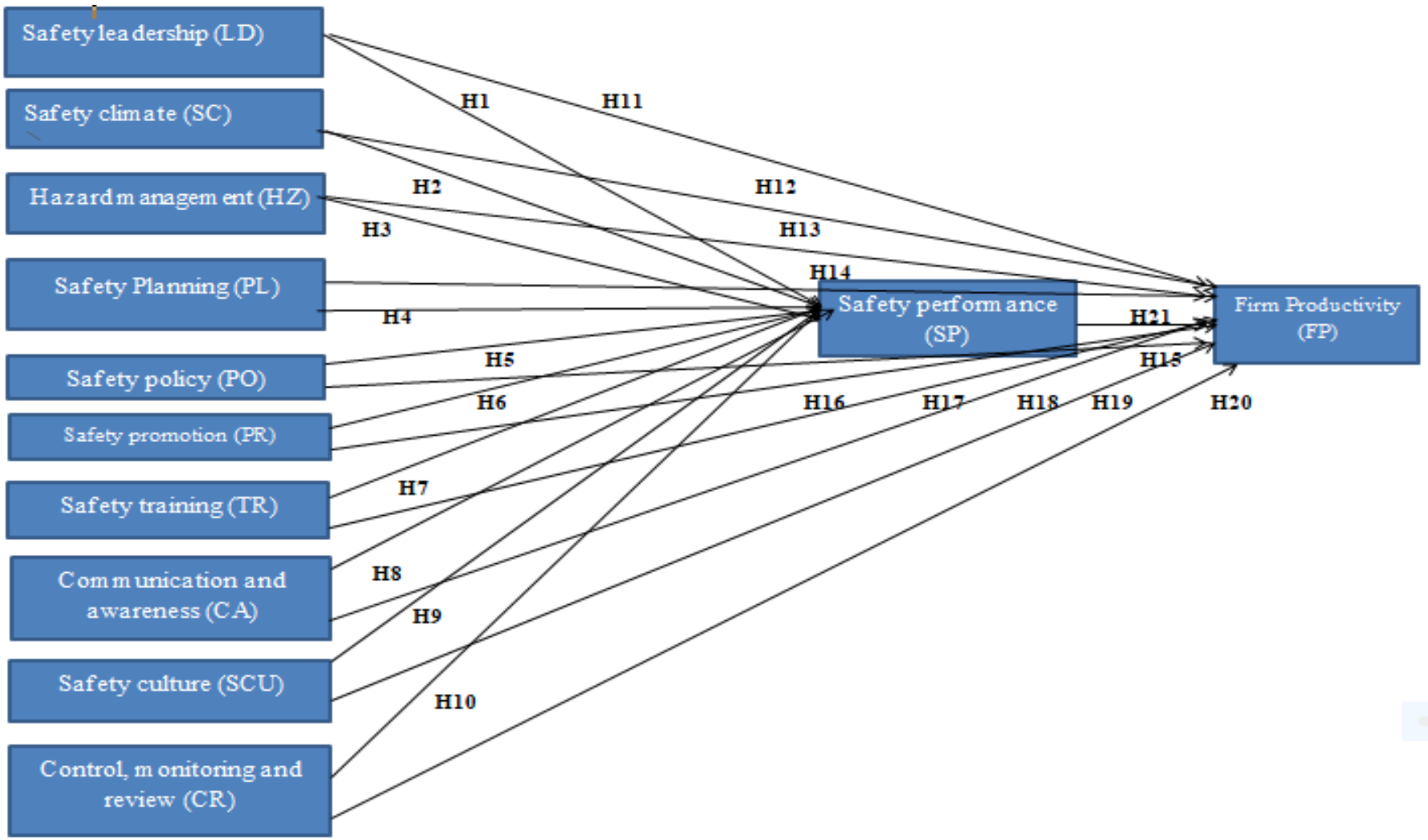


Figure 2.6: Conceptual Firm Productivity model

Table 2:- literature gap

Title	Author and year	Method	Gap
Magnitude and Factors of Occupational Injury among Workers in Large Scale Metal Manufacturing Industries in Ethiopia	(Habtu et al., 2014)	To combine the knowledge with quantitative conclusions, the data were gathered via a questionnaire and in-depth interviews with key informants.	Even if the data manage and analysis by using SPSS and multivariate logistic regression analysis, there is no chart or illustration to show the effect of factors on occupational injuries
The Effects of Occupational Health and Safety on Employee Performance Through Work Satisfaction	(Ekowati & Amin, 2019)	data were collected by Questionnaire and analyzed by using path analysis.	Health facilities are adequate and can improve employee job satisfaction and higher performance. The gap of this study: work environment was not add or described but only mention it.
Promote Safety Culture and Enhance Safety Performance through Safety Behaviors	(Asamani, 2020)	The design for the study was the cross-sectional survey, using structured questionnaires to collect the data.	The gap of this research was safety performance. Safety Factors such as risk perception, hazards assessment, personal safety values, motivation, beliefs are not mention it

❖ **Literature Summary**

The literature review section revealed that, there are many different types and causes of workplace hazards, worker injuries are a common occurrence around the globe. The literature review also revealed that, depending on the specific types of workplace injuries that exist in the company chosen as the case study, various methods were used to reduce the volume of workplace hazards. Additionally, almost all of the literature shares the view that OSH must be practically implemented for employees to be healthy. Poor OSHP comprehension contributes to occupational injuries at work. The majority of researchers concur that the OSH serves a significant role in helping to prevent and reduce occupational hazards at work additionally; researchers have highlighted the role that outdated equipment, unguarded machines, splitting materials, and metal sparks play in causing occupational injuries. The literature review also shown that factors that affect firm productivity by used different models such as job satisfaction, occupational health, workplace environment, OSH leadership, safety culture, safety climate, and hazard management with safety performance and employee productivity. Therefore, OSHP aims to reduce occupational hazards while also enhancing firm productivity and business efficiency.

2.5. Gap from literature

An earlier study in this area examined causes and strategies for improving employee performance and productivity. The researcher uses the findings to strengthen the study by identifying gaps in the literature. According to Berhan's research findings from 2022; most businesses have good levels of management commitment. The existence of OHS policies, strategies, and processes that are also put into practice is also noted. These procedures currently in use have a sizable impact on lowering personnel and management reasons, physical and ergonomic causes, and physical diseases in the sectors. According to Umugwaneza et al.'s (2019) findings, workers' dedication and performance are impacted by their exposure to workplace dangers. To prevent workplace accidents and injuries, education, safety training, and hazard assessment are essential components. The study comes to the conclusion that employee commitment and performance are greatly impacted by occupational health and safety. The study supports the idea that ineffective or nonexistent health and safety management reduces employee productivity. While 66.2% of respondents were dissatisfied with the health and safety procedures in place at their place of employment, 70.2% of respondents felt that favorable work environment circumstances boost productivity. The financing is depicted as there are various measures of workplace health and safety to increase employee and business productivity. Below presentation case study shown as the methodology and other gaps of the literature reviews aspects:

- ✓ A case study of firms in Spanish conducted by (Fernandez muñiz et al., 2009) on the Relation between occupational safety management and firm performance, sample of 455 Spanish firms. Findings show

that safety management has a positive influence on safety performance, competitiveness performance, and economic-financial performance. Data collect and evaluated from the viewpoint of the firm's safety officer only. Finally, the study was carried out at a specific moment in time, and therefore it is cross-sectional study. Thus, conclusions of a fundamental type may be undecided. But the methodology used does allow us to reject causal models that do not conform to the patterns of association detected conceptual framework and carrying out a particular process of generation and revision of items, the measures developed should be understood as an approximation to latent phenomena, which cannot be measured in full. This journal has methodology gap. (The data collected only in safety department).Under the title of Modeling of occupational safety and health factors in production organizations and the formation of measuring scales of occupational safety climate (Stefanović et al., 2021) mention the future study on the data collect method. The respondents' opinion was through closed-ended questions, which may restrict the respondents to provide more insights into the phenomenon under study. The future study can also include other OSH factors to provide a more comprehensive view of factors influencing the employees' OSH in the workplace as well as the influence of the OSH climate.

- ✓ In addition, Moosa (2018) investigates the Structural Equation Modelling (SEM) Development of a Model for Determining Factors Affecting Safety Performance in the Saudi Arabian Construction Industry.Three factors safety leadership, safety climate, and hazard management were employed in the study to predict safety performance using the Occupational Health and Safety Management System (OHSMS). The author highlights the need for developing future scholars who will expand on new measures. My thesis adds two measurement variables safety culture and business productivity ased on this planned research.
- In order to identify the elements that influence OSH practice, the research study attempts to apply several control measures for firm productivity in OSH from a variety of viewpoints, including OSH management, safety performance, OSH leadership, safety culture, safety climate, hazard management, and firm productivity. Also the stud data collected method was open-ended questions .Based on my searching there was lack of Occupational Safety and Health Model Development in the Industrial of Ethiopian metal manufacturing especially in Akaki Basic Metal Industry, so that this study fulfilled this gap.

CHAPTER THREE

3. RESERCH METHODOLOGY

3.1. Introduction

This section explains how the relevant data and information for the study were acquired, as well as how an analytical tool was chosen to meet the study's goals. Both the research approaches and the study methods are discussed. The research design, data sources, data collection methods, sample procedures, and data analysis methods are all discussed.

3.2. Research Approach

Research methodologies come in two flavors: qualitative and quantitative. Based on (Goundar, 2019).quantitative research is built on the measurement of quantity or amount. Here, a process is expressed or characterized by one or more quantities. Qualitative phenomena that are related to quality are the main subject of qualitative research. It is not numerical, but verbal, descriptive, and logical. To communicate the situation's significance, feeling, and description , although quantitative processes are well fitted to numerical figures, numerical values are collected and presented in these studies in an expressive manner even if qualitative methodologies were mostly used due to the nature of the research. As a result, both qualitative and quantitative methods are used in the research.

3.3. Design Research Design

In this study attempt both survey and descriptive designs were be utilized in order to acquire crucial information from case company usage of open end questionnaires and/or interviews. Descriptive design will be applied to identify the injuries and safety measures. Visits to the workplace and direct observation are additional approaches for recognizing tasks, accidents, the working environment, and other aspects. Tools for statistical quality control complement this strategy. It's a good tool for resolving difficulties with quality. Research technique a systematic approach for gathering data, obtaining finding and to analysis and conclusion the created data a research process is basic guideline. This research technique was set a framework of objectives that complement one another in order to assure objectives followed by the described.

3.4. Data Source of Data

Both qualitative (non-numerical) and quantitative (including numbers) data types are used in this investigation. Both primary and secondary data were used as the main sources of information for this study.

- **Primary Data Collection Sources**: Through the use of firm documents, open- end questionnaires, and observation, primary data will be acquired. (Muhammad & Kabir, 2018).
- The researcher used the following techniques for gathering primary data: -

- ✓ **Site visits and observation**: to observe workplace safety, how employees interact with one another, and how they take precautions to prevent injuries while performing their jobs, so the researcher can choose the first course of action to study the issues of safety and injuries.
- ✓ **Questionnaire**: Several questionnaires will be prepared, coded, and mixed based on a specific issue using conventional formats, and then issued to case firm employees (employers), supervisors, and managers in order to collect quantitative data.
- ✓ **Secondary Data Collection Sources:** According to Muhammad and Kabir (2018), secondary data is knowledge or information that has been obtained from other sources and is readily available and well-documented. Most of the data or material used in this study was gathered from secondary sources, including literature reviews, books, and electronic media like websites, articles, journals, conference papers, and reports that are pertinent to the topic.

3.5. Instruments of Data Collection

The researcher uses an open-ended questionnaire to gather data. Based on the data acquired throughout the literature study, questions are emerging. The majority of the variables affecting occupational safety and health in the metal manufacturing industry have been compiled in the questionnaire from various types of literature.((Moosa, 2018),(Gerger, 2021), (Bao, 2018)(Muui, 2018)). For the workers, questionnaires in Amharic and English were created. The questionnaire was divided into two parts. The questionnaire is broken up into two sections: the first section gives details on the socio demographic characteristics and background of the respondents and the second section goes into further detail on the variables that affect occupational safety and health issues that are assessed in the case firm. In order to provide responders the opportunity to elaborate extensively on their arguments and views surrounding the stated subjects, these questioners also include open-ended questions. Numerous strategies have been employed to collect enough data in the research area; the major sources for primary data were the questioners. A Likert scale was used to generate the survey (1 being very opposed, 2 being opposed, 3 being neutral, 4 being agreeable, and 5 being strongly agreeable). Secondary sources were also used to get the data for these investigations. The study's literature sources included various books, journals, newspapers, thesis papers, and reports on project safety and health that were read at work to augment the study's material. The primary goals of the tools were to gather data on occupational safety and health practices and variables affecting such practices in the Akaki basic metal industry as well as address the research questions.

3.6. Statistical Analysis

The goal of the current study is to provide a greater understanding of how well the safety performance of the Akaki Basic Metal Industry is performing by proposing a wide conceptual model that incorporates the findings

of past research. We study the twenty-one components of the plane model to see how they impact the occupational safety and health practices applied in the Akaki Basic Metal Industry. These components include safety climate (SC), safety performance (SP), OHS leadership (LD), firm productivity (EP), safety culture (SU), control, monitoring, and review (CR), planning for occupational health and safety (PL), training in occupational safety and health (TR), and promotion of occupational safety and health (PR), as well as policy (PO).

3.6.1. Model Analysis

Model evaluation Research models, like the one created for the proposed study, are analyzed and validated through the use of structural equation modeling (SEM) and confirmatory factor analysis (CFA). CFA was initially used to identify and validate the robust model's structural components. The relationships in the model are then examined and improved using SEM. Confirmatory factor analysis (CFA) measures how well a hypothesized model "fits" or demonstrates data. It is used by researchers to investigate the connections between a group of continuous variables that are latent, or unobserved, and a group of variables that are visible. Additionally, it is employed to determine how well a researcher's model fits the data they have gathered. Research models, like the one created for the proposed study, are examined and validated using structural equation modeling (SEM) and confirmatory factor analysis (CFA). The robust model's structural components were initially identified and verified using CFA. The model's relationships are then scrutinized and enhanced using SEM. The degree to which a hypothesized model "fits" or supports evidence is measured through confirmatory factor analysis (CFA). It is used by researchers to examine the connections between a group of continuous variables that are latent, or unobserved, and a group of variables that can be seen (Moosa, 2018).

- **Confirmatory Factor Analysis**

The factor loading and measurement utilized in this study were validated using confirmatory factor analysis (CFA). This strategy is used by the researcher in CFA, a type of structural equation modeling, to test a given theory. The CFA technique raises two issues: factor loadings and fitness indices. In other words, as long as the fitness index does not satisfy the condition, the high factor loading is insufficient to be approved. Parsimonious fit, absolute fit, and incremental fit were the three categories used to evaluate the fitness index. Although the Analysis Moment of Structure (AMOS) software offers a variety of fitness levels, the researcher is entitled to select any fitness level as long as it includes each area (Reviews, 2020).

3.6.2. Conceptual Model

The model's creation took into account the research difficulties that served as the foundation for the proposed investigation. The Occupational Health and Safety Management System (OHSMS) variables safety culture, safety leadership, safety climate, hazard detection and control, safety performance, and employee productivity are systems to identify factors that are negatively affecting or being negatively affected by occupational safety

and health in the Akaki Basic Metal Industry. These components will make it easier to identify the activities that may be done and/or modified in order to improve worker productivity and industrial safety performance along the dimensions of culture, behaviors, and policy. The dependent constructs (safety performance and employee productivity) and independent constructs (occupation health and safety management) make up this model).

- The conceptual model's independent constructs are:
  - ✓ Planning for occupational health and safety (PL)
  - ✓ Policy for occupational health and safety (PO)
  - ✓ promotion for occupational health and safety (PR)
  - ✓ Communication and awareness for occupational health and safety (CA)
  - ✓ Training in occupational health and safety (TR)
  - ✓ Control, monitoring, and review of occupational health and safety (CR)
  - ✓ Leadership in occupational health and safety (LD)
  - ✓ Hazard management (HZ),
  - ✓ safety culture (SCU),
- The conceptual model's dependent and intermediary constructs are
  - ✓ firm productivity (EP)
  - ✓ safety performance (SP)

3.7. Research Population

According to data the researcher obtained from the human resources division, the Akaki Basic Metal Industry Company currently employs 500 people. Around 220 workers' worth of data are gathered in an open questionnaire. Employees are chosen at random. The chosen employees come from a variety of departments, including those in production, maintenance, safety, and quality. Different research approaches will be used in this study, and primary and secondary sources will make up the majority of the data.

3.8. Sample size

The study's source population is 500 people. We must be conscious of the size of the overall sample and the distribution of the sample among the strata when utilizing stratified sampling. In order to lower the calculated variability, use the formula below to calculate the total sample size and distribute it among the strata **(Birhane Haileye 2016).**

N=500, (e) =0.05,

=N is the total population of case company and

= (e) margin of error was considered 0.05(5%).

= n1 (is the sample size)?

$$n1 = \frac{N}{1 + N(e)2}$$

$$= \frac{500}{1+500*0.05\text{^}2}$$

n1 =220

- Therefor the calculated total sample size is n1=220

The table 3.1 presented that distribution of the research question. Nine different departments were distributed the research question to 220 respondent of the case company .The highest number of the respondents was in the founder work shop and the lowest number of responses was recorded in the company clinic.

Table 3.1: Distribution of questions

No.	Departments	Number of questions
1	Part manufacturing work shop	60
2	Forging and surface treatment	22
3	Fabrication work shop	20
4	Founder work shop	70
5	Quality management	10
6	Human Resource	17
7	Maintenance work shop	10
8	Hand tools	10
9	Clinic	1
	Total	**220**

3.9. Method of Data analysis

The data analysis part answered the key questions that were asked in the problem description. To analyses the data from the questionnaire component, SPSS and AMOS are utilized. The usage of SPSS, or the Statistical Package for Social Sciences, will make data analysis easier. The data gathered from the surveys was first modified, coded, and entered using the Statistical Package for Social Sciences (SPSS). It is clear that the information gathered by questionnaires utilizing the Licker scale which spans from 1 strongly disagree to 5 strongly agree is quantitative in character. Descriptive statistical tools are thus employed in quantitative data analysis. Presenting a table with the collected data, frequency distribution, and percentages calculated.

Additionally, the data that model software has collected. Model is constructed using the Analysis of Moment Structures (AMOS-ver. 21) program. To accomplish the objectives, the data is examined using AMOS, and descriptive statistics are employed to assess the study variables. The quantitative discussion results and data analysis findings have been merged in the data analysis sections. The data outputs were given in accordance with the respondents' responses and the knowledge gained from the literature review in order to finish the study. The final step is the text-formatted interpretation of the output data, conclusions, and suggestions. Throughout the data analysis process, the researcher will use Cronbach's alpha value to support the results. By doing so, errors will be reduced, and the measurement of what is intended to be measured will be ensured.

- **Validity and Reliability**
  - ✓ **Reliability Analysis**

All OSH dimensions have a Cronbach's alpha of 0.957; the results showed that 95.7% of the questionnaire's items were consistent in assessing all of the dimensions.

- ✓ **Validity**

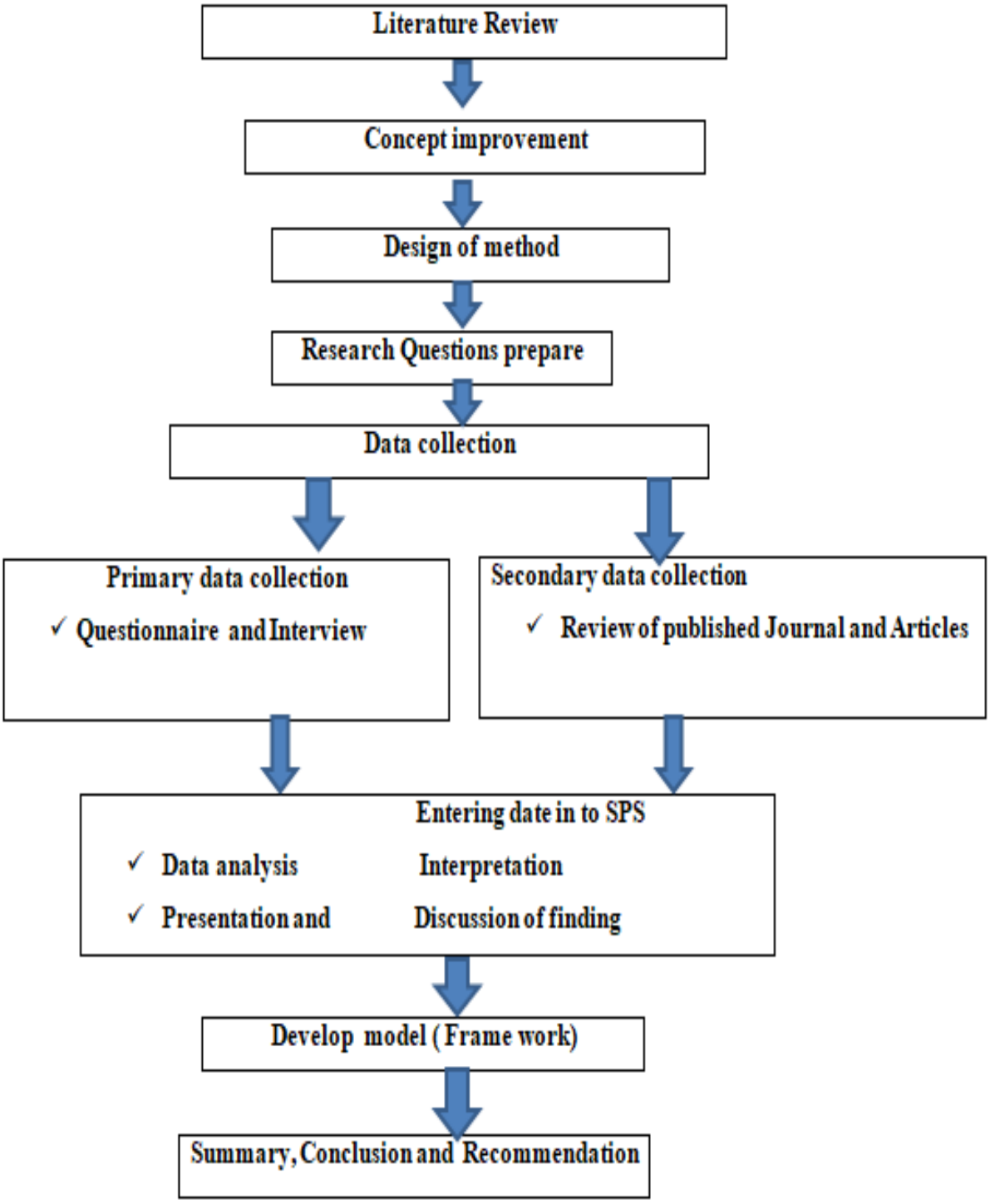
The researcher tried to adopt the instruments from numerous related literatures in order for the instrument to accurately measure what it is intended to measure in reference to the study's topic. Before creating the questions, the researcher relates them to the objectives of the study. A wide range of questions were included in surveys to achieve validity. Consistency in how the questions were administered helped further verify the validity of the content. In order to achieve this, the researcher individually handed out questionnaires to the subjects. Additionally, for clarity and ease of understanding, the questions were written in basic Amharic and English, and the subjects will receive clear instructions

3.10. Ethical Consideration

This study also took ethical issues into account, which are important in scientific research. Respondents have been informed of the study's goal from the outset by the researcher. Each participant was then given a questionnaire. Respondents received assurances that only the researcher would have access to their private data. Respondents have given their informed consent by completing and submitting the questionnaire By completing and submitting the questionnaire, respondents have provided their free and informed consent. The research's conclusions are based on information provided by respondents as well as qualitative data acquired using open-ended questions, and the methodology is realistic and free of bias.

3.11. Research framework

These research articles have a thorough framework that includes all the paths and flows, primary and secondary data collecting, and numerous data analysis methods (see Figure 3.1).



. **Figure 3.1: Research framework**

CHAPTER FOUR

4. DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1. Introduction

This chapter presents analyses, judgments, and findings that speak to the study's goals. It incorporates comments gleaned from survey respondents. The respondents' demographic data, correlation analysis, and factor analysis are all included in this chapter. In order to analyses the information gathered from the target respondents, descriptive statistics were used. Frequency distribution charts displayed each respondent's percentage response.

4.2. Response rate

Table 4.1: Survey Summary

No of participants	Unwilling respondent	Collected questionnaire	Response rate (%)
220	5	215	97.7

Own survey,2022

220 questionnaires were delivered to randomly chosen respondents in order to collect primary data via questionnaires; 215 of those questionnaires were completed and returned to the researcher, providing a response rate of 97.7%, giving the researcher confidence in the study's conclusions.

4.3. Reliability Analysis

The scale's dependability can be determined by computing the coefficient alpha. When Alpha is more than 0.70, it is better. If the findings have a correlation of > r=0.7 it then mean that the instrument was reliable for use in the study. (Assey, 2019) .The actual survey results were analyzed for internal consistency by computing Cronbach's alpha. As can be seen in the following table, which indicates that all OSH dimensions have a Cronbach's alpha of 0.957, the results showed that 95.7% of the questionnaire's items were consistent in assessing all of the dimensions. Based on this finding, I can conclude that all of the items in the questionnaire were consistent in measuring all of the dimensions.

Table 4.2: Reliability of constructs Statistics

Variables (constructs)	Cronbach's alpha
Safety Planning (PL)	**0.819**
Safety Policy (PO)	**0.746**
Safety Promotion (PR	**0.601**
Communication and awareness (CA	**0.873**
Training (TR)	**0.888**
Control, monitoring and review (CR)	**0.915**
Safety Leadership (LD)	**0.707**
Safety climate (SC)	**0.904**
Hazard management (HZ)	**0.906**
Safety culture (SCU)	**0.907**
Safety performance (SP)	**0.691**
Firm Productivity (EP)	**0.868**

Table 4.3: Case proceeding Summary

		N	%
Cases	Valid	215	100
	Excluded	0	0
	Total	215	100

Over all Reliability Statistics

Cronbach's Alpha	N of Items
0.956	70

Source: Pilot survey study

4.4. Demographic Characteristics of the Respondents

The section provides the data conclusions based on the substantial data that the respondents gave. The demographic information included the respondents' gender, age, the number of years they had worked for the company, and their level of education. An overview of the demographic data is shown in Table 4.4. The respondents were therefore asked to indicate their gender in the questionnaires with the objectives of determining the actual number of respondents in terms of male and female that participates in filling out the questionnaires, ensuring equal representation of both genders, and getting their opinion. This was done because men and women have somewhat different attitudes and views towards events. .Table 4.4 shows that 62

respondents, or 28.8% of the total respondents who completed the survey, were female, while the remaining 153 respondents, or 71.2%, were men. Due to the nature of the work done at the organization, it is frequently true that there are more male employees than female employees. Regarding the ages of the respondents, 151 workers, or 70.2% of the workforce, were in this age range; 34 respondents, or 15.8%, were in the 36–45 age range; and 30 respondents, or 14%, were in the 46–60 age range. The conclusion drawn from the aforementioned data is that the majority of the organization's staff is between the ages of 20 and 35, and that performance management needs to be effectively implemented in order to maximize the company's potential productivity to the benefit of both employees and employers. The information gathered revealed that the company has a young population that requires the expansion of their skills and knowledge; this factor will likely have an effect on the profitability and sustainability of the business. The respondents were also requested to provide details about their educational experience in order to evaluate the academic qualifications of study participants. Table 4.2 also shows those 85 respondents, or 40.5% of the total respondents, had grades below 10, making up 2.3% of the sample. 40 respondents at Level 1-5, or 18.5% of the total, were Table 4.2 also shows that 85 respondents, or 40.5% of the total respondents, had grades below 10, making up 2.3% of the sample. Level 1–5: Of the respondents, 40 had a diploma, which equals 18.5%; 81 had a BA/BSc, which equals 37.7%; and the final 2 had an MAA or MSc, which equals 0.9%. The majorities of respondents according to the data have finished levels 1 through 5 of education and are sufficiently educated to offer their thoughts and replies to the survey. Additionally, it can be inferred that 81 of the company's employees who did not receive a first degree or diploma have some knowledge that is useful on the job as a result of formal education, while the remaining 85 employees need the company's attention in order to make them dynamic and qualified for potential job responsibilities. Work experience, the third demographic variable included in this frequency analysis, was used to determine how long people had regularly worked for the organization. The data collected, which is displayed in the accompanying table, indicates that 123 respondents, or 57.2%, had worked there for between one and seven years; 56 respondents, or 26%; for between eight and fifteen years; and 13 respondents, or 6%, for between sixteen and twenty-three years. The bulk of responders and employees were long-term workers.

Table 4.4: Demographic Characteristic

Demographic factor	Characteristics	Number/frequency	Percent
Sex	male	153	71.20%
	female	62	28.80%
Age	20-35	151	70.20%
	36-45	34	15.80%
	46-60	30	14.00%
Educational level	Less than grade 10	5	2.30%
	Level 1-5	87	40.50%
	Diploma	40	18.60%
	Degree	81	37.70%
	Masters	2	0.90%
Work experience	1-7	123	57.20%
	8-15	56	26.00%
	16-23	13	6.00%

Source: own survey, 2022

4.5. Factors that affect Occupational Safety and Health Practices

4.5.1. Safety Leadership

It is evident from the table 4.5. 55.8% of respondents disagreed with the declaration that top management is actively involved in the safety program (32.1% strongly disagreed and 23.7% disagreed).32.1% of respondents agree with the statement (24.7% agree and 7.4% strongly agree). The opinions of 26 respondents are unaltered. This demonstrates that top management is not actively engaged, and the organization has to close this gap .The respondents were also questioned regarding the assistance of top management for OSH-related issues. The aforementioned table shows that the respondents agree (19.5% agree and 19.5% strongly agree) that senior management supports the safety management or the person in charge of health and safety . 103 respondents did not agree (24.7% strongly disagreed, 23.3% disagreed, and 17.2% were unsure about their position). This demonstrates that the majority of respondents disagreed that senior management supports safety managers. As a result, the information gathered on this topic indicated that there is a gap, and the organization should take the problem seriously.

The following results show that 50.2% of respondents did not believe that the organization invests time and money into enhancing safety performance (26.5% strongly disagreed and 23.7% disagreed). 20% and 13% of respondents, respectively, agree and strongly agree with the statement. The opinions of the 36 responders have not altered. Information on this topic shows that the business should take the issue seriously because the firm does not invest time or money into enhancing safety performance. The respondent's comment regarding the significance of safety is shown in the table above. The statement that the organization views safety as being

equally important to operation and quality in the way work is done was disputed with by 42.8% of respondents (17.7% extremely disagreed, and 25.1% disagreed), as opposed to 24.7% who agreed and 14.9% who strongly agreed. The opinions of 38 respondents remained unchanged. The data gathered on this subject consequently revealed a gap, and the organization should take care of the problem.

The responders were also questioned further regarding the study of injury and sickness data. As shown in the above table, the respondents concur that case firms analyze injury and illness data (such as claims data, first aid logs) to identify causes and create remedies (25.1% agree and 13% strongly agree).101 respondents (25.6% strongly disagreed, 21.4% disagreed, and 14.9% were unsure) disagreed with the statement. This shows how inadequately the case firm assesses injury and illness data (such as claims data, first aid logs) to identify causes and create remedies; the company ought to take the issue seriously.

As noted in the above graphic, the safety program or committee is in charge of identifying and resolving safety-related problems. A total of 75.8% of respondents, or 37.2%, disagree, with 38.6% strongly disagreeing. 12.1% of respondents are unsure, followed by 3.7% who strongly agree and 8.4% who agree. According to the majority of respondents (shown in the table), no safety program or committee has the authority, capability, or resources to identify and address safety issues. The case business needs the company to fill this vacancy because there is a sizable skills gap in the area of safety leadership.

Table 4.5: Safety Leadership

Variable	Categories	Frequency	Percent
The safety program is strongly supported by top management.	vehemently disagree	69	32.1
	Disagree	51	23.7
	Both agree and disagree	26	12.1
	Agree	53	24.7
	Strongly Agree	16	7.4
The senior management team supports the safety manager, also known as the person in charge of health and safety.	vehemently disagree	53	24.7
	Disagree	50	23.3
	Both agree and disagree	37	17.2
	Agree	42	19.5
	Strongly Agree	33	15.3
The business invests time and resources into enhancing safety performance.	vehemently disagree	57	26.5
	Disagree	51	23.7
	Both agree and disagree	36	16.7
	Agree	43	20.0
	Strongly Agree	28	13.0

Safety is just as vital to the company as operations and the caliber of the work performed.	vehemently disagree	38	17.7
	Disagree	54	25.1
	Both agree and disagree	38	17.7
	Agree	53	24.7
	Strongly Agree	32	14.9
To pinpoint reasons and provide remedies, the company examines injury and illness data (such as claims data, first aid logs).	vehemently disagree	55	25.6
	Disagree	46	21.4
	Both agree and disagree	32	14.9
	Agree	54	25.1
	Strongly Agree	28	13
The task of identifying and resolving safety issues falls under the purview of the safety committee or program.	vehemently disagree	83	38.6
	Disagree	80	37.2
	Both agree and disagree	26	12.1
	Agree	18	8.4
	Strongly Agree	8	3.7

Source: - Own survey, 2022.

4.5.2. Safety Performance

The respondents were asked question related to work safely issues. It can be observed from table 4.6 that the respondents agree (26% agree and 9.3% strongly agree) with the fact that Workers and supervisors have the information they need to work safely.99 of the respondents did not agree (23.3% strongly disagree and 22.8% disagree) on the issue while 18.6% are neutral sure on the issue. Therefore, the collected data on this issue showed that there is a gap and the company should work seriously on the issue. As can be observed from the above chart, 56.3% of respondents disagreed with the statement that employees are always involved in decisions that concern their health and safety (25.1% strongly disagreed and 31.2% disagreed).19.5% of respondents agree and 4.7% strongly agree, making a total agreement rate of 26.9%. The opinions of 36 respondents are unaltered. This demonstrates that the majority of respondents were not in agreement on the involvement of employees in decisions impacting their health and safety, and the company must close this gap.

It can be observed from the above table that most the respondents 53.5% of the respondent did not agree (26.5% strongly disagree and 27% disagree) on the fact that those in charge of safety have the authority to make the changes they have identified as necessary, while 19.1% agree and 7.4 % strongly agree on the issue. 43 respondents are neutral on the issue. Therefore, the collected data on this issue showed that there is a gap and the company should work seriously on the issue. Additionally, questions about employee recognition for OSH issues were posed to the respondents. The aforementioned table shows that the respondents agree (22.3% agree, with 7% strongly agreeing) that those who act safely are rewarded. On the issue, 116 of the respondents did not agree (27% strongly disagreed and 27% disagreed), while 16.7% were unsure. This demonstrates that the majority of respondents did not concur that people who behave safely are rewarded. Because of this, the corporation rewards its employees. The response from the respondent regarding tools and equipment is shown in the table below. Everyone has the tools and/or equipment they need to accomplish their work safely, according to 60.9% of respondents (25.1% strongly disagree and 35.8% disagree), while 1.2% and 7.9% strongly agree on the subject. The opinions of 43 respondents are unaltered. Because the information gathered on this issue indicated that employees lack the tools and equipment they need to do their jobs safely, the business should take the problem seriously.

Further inquiries regarding ongoing safety improvement were also made of the replies. The aforementioned data shows that the respondents concur (20.5% agree and 7.9% strongly agree) that everyone at this organization supports continuous safety improvement. (Example: unions.118 individuals did not agree with the statement (25.1% strongly disagreed, 29.8% disagreed, and 16.7% were neutrally certain). This demonstrates that nobody at this company appreciates continual safety improvement; hence the company needs to take the problem seriously. The aforementioned chart also shows that formal safety audits are a routine component of our company and occur at regular periods.37.7% of respondents disagree, and 34% strongly disagree, making up the remaining 71.7%. 10.2% of respondents agree, 4.2% strongly agree, and the remaining 17.2% are unsure about their position. The majority of respondents, as seen in the table, stated that formal safety audits at regular intervals are not a typical aspect of our organization .In light of the fact that the case company has a significant gap in its performance in terms of occupational safety; the company is required to close this gap.

Table 4.6: Safety Performance

Variable	Categories	Frequency	Percent
Both employees and managers have the knowledge they need to perform safely.	vehemently disagree	50	23.3
	Disagree	49	22.8
	Both agree and disagree	40	18.6
	Agree	56	26.0
	Strongly Agree	20	9.3
Decisions that influence an employee's health and safety involve them at all times.	vehemently disagree	54	25.1
	Disagree	67	31.2

	Both agree and disagree	36	16.7
	Agree	42	19.5
	Strongly Agree	16	7.4
The safety authorities have the power to implement the adjustments they have determined are required.	vehemently disagree	57	26.5
	Disagree	58	27.0
	Both agree and disagree	43	20.0
	Agree	41	19.1
	Strongly Agree	16	7.4
Those who behave responsibly are commended.	vehemently disagree	58	27
	Disagree	58	27
	Both agree and disagree	36	16.7
	Agree	48	22.3
	Strongly Agree	15	7
Everyone has the equipment and/or tools required to finish their work safely.	vehemently disagree	54	25.1
	Disagree	77	35.8
	Both agree and disagree	43	20
	Agree	24	11.2
	Strongly Agree	17	7.9
Every employee at this company appreciates the constant advancement of safety.	vehemently disagree	54	25.1
	Disagree	64	29.8
	Both agree and disagree	36	16.7
	Agree	44	20.5
	Strongly Agree	17	7.9
	vehemently disagree	67	31.2
	Disagree	69	32.1
	Both agree and disagree	37	17.2
	Agree	29	13.5
	Strongly Agree	13	6

4.5.3. Safety Climate

A question regarding how new hires learn to work properly was posed to the respondents. The next table 4.7 shows that the respondents agree 24.7% agree and 14% strongly agree that new hires rapidly understand that they must adhere to excellent health and safety practices .On the issue, 45.1% of respondents did not agree (25.1% strongly disagreed, 20% disagreed), and 16.3% were undecided. As a result, the information gathered on this topic revealed a gap, and the organization should take the problem seriously.

From the above chart, it is clear that 44.6% of respondents did not agree (22.3% strongly disagreed and 22.3% disagreed) that employees are informed when they do not adhere to proper health and safety practises.25.6% of respondents (or 37.2%) and 11.6% of respondents strongly agree with the statement. The opinions of 36 respondents are unaltered. This demonstrates that employees are not informed when they violate appropriate health and safety procedures, and the business must act to close this gap.

From the below table, it can be seen that the majority of respondents, 46.8%, did not agree26.5% strongly disagreed and 23.3% disagreed that workers and management cooperate to ensure the safest conditions possible, while 31.6% and 5.6% strongly agreed. The opinions of 28 respondents are unaltered. As a result, the information gathered on this subject revealed that management and employees do not cooperate. Based on these findings, the organization should make substantial efforts to close this gap.

The respondent's reaction is shown in the table below in relation to safety shortcuts. There are no significant short cuts used when worker health and safety are at danger, according to 46.5% of respondents (25.6% strongly disagree and 20.9% disagree), in contrast to 23.7% who agree and 17.2% who strongly agree. The opinions of 27 respondents are unaltered. As a result, the information gathered on this topic indicated that there is a gap and the organization should take the problem seriously.

Additionally, respondents were questioned regarding the importance of OSH. The aforementioned table shows that the respondents agree that management places a high premium on employee health and safety (29.3% agree and 16.3% strongly agree). On the matter, 43.3% of the respondents were not in agreement (24.7% strongly disagreed, 18.6% disagreed, and 11.2% were unsure). This demonstrates that management does not place a strong focus on employee health and safety. Therefore, the corporation needs to take the problem seriously.

The aforementioned chart shows that employees are not afraid to report safety issues that arise at work.20.9% disagree and 16.3% strongly disagree of the respondents, or 37.2%, said they don't agree. 28.4% of respondents agree, 17.2% strongly agree, and the remaining 17.2% had no opinion. The majority of respondents indicated in the table that they did not feel free to report safety issues. Due to the point that the case firm has a significant gap in the environment for occupational health and safety, the company is required to close this gap.

Table 4.7: Safety Climate

Variable	Categories	Frequency	Percent
New hires rapidly understand that good health and safety procedures are expected of them.	vehemently disagree	54	25.1
	Disagree	43	20.0
	Both agree and disagree	35	16.3
	Agree	53	24.7
	Strongly Agree	30	14.0
When employees don't adhere to good health and safety procedures, they are informed.	vehemently disagree	48	22.3
	Disagree	48	22.3
	Both agree and disagree	39	18.1
	Agree	55	25.6
	Strongly Agree	25	11.6
The management and employees collaborate to provide the safest environment possible.	vehemently disagree	57	26.5
	Disagree	50	23.3
	Both agree and disagree	28	13.0
	Agree	68	31.6
	Strongly Agree	12	5.6

When worker health and safety are on the line, no significant short cuts are made.	vehemently disagree	55	25.6
	Disagree	45	20.9
	Both agree and disagree	27	12.6
	Agree	51	23.7
	Strongly Agree	37	17.2
Where I work, management places a great premium on employee health and safety.	vehemently disagree	53	24.7
	Disagree	40	18.6
	Both agree and disagree	24	11.2
	Agree	63	29.3
	Strongly Agree	35	16.3
Where I work ,I feel comfortable to report any safety issues.	vehemently disagree	35	16.3
	Disagree	45	20.9
	Both agree and disagree	37	17.2
	Agree	61	28.4
	Strongly Agree	37	17.2

Source: - Own survey, 2022.

4.5.4. Hazard Management

Additionally, a question on supervisors voicing employees' concerns about OSH issues was posed to the respondents. The responders (10.7% agree and 3.3% strongly agree) that managers should inquire during rounds about worker dangers and safety problems in employees' work areas can be seen in the table 4.8. On the matter, 70.7% of the respondents were not in agreement (43.3% strongly disagreed and 27.4% disagreed), while 15.3% were uncertain. This demonstrates that managers fail to inquire from staff members about workplace dangers and safety issues. As a result, the information gathered on this topic indicated that there is a gap and the organization should take the problem seriously.

The respondent's comments regarding the analysis of the hazards for each job are shown in the table below. The fact that an analysis of the hazards for each job site is undertaken was not agreed upon by 66.5% of respondents (34.9% strongly disagreed and 31.6% disagree), whereas 11.6% and 2.8% highly agreed. The opinions of 41 respondents are unaltered. As a result, the information gathered on this topic indicated that there is a gap and the organization should take the problem seriously.

The aforementioned table shows it clearly. 60.9% of respondents disagreed (32.1% strongly disagreed and 28.8% disagreed) with the report that the company recognizes risks connected with non-routine operations and emergencies. 14% of respondents and 5.1% of them strongly concur on the topic. The opinions of 42 respondents are unaltered. This demonstrates that the business does not recognize the risks connected to emergencies and non-routine operations. As a result, the corporation must act accordingly and close this gap.

Respondents were asked question related to Applicable Ministry of Labor mandated programs. It can be It can be seen from the above table that most respondents (9.8% agree and 5.6% strongly agree) believe that any programmer required by the relevant Ministry of Labor are fully implemented.20.9% of respondents are

neutrally certain about the topic, whereas 36.7% of respondents strongly disagree and 27% disagree. This results in 63.7% of respondents not agreeing. As a result, the information gathered on this topic indicated that there is a gap, and the organization should take the problem seriously.

The below table shows that the majority of respondents, 64.6%, did not consider that the company tracks its progress in removing dangers from job sites (27.4% strongly disagreed and 37.2% disagreed), while 14% and 4.2% highly agreed. 17.2% of respondents have no opinion on the matter.

The information gathered on this subject so revealed that the organization does not track its efforts to eliminate job site dangers. Based on these findings, the organization should make substantial efforts to handy this gap.

In addition, respondents were questioned about OSH's personal protective equipment. The aforementioned data shows that the respondents agree (20% agree and 7.9% strongly agree) that employees are given personal protection equipment and specified means.30.7% of respondents strongly disagreed and 29.8% disagreed, making up the 60.5% who did not agree, while 16.3% were undecided. This demonstrates that the corporation does not supply the necessary tools and personal protective equipment. Therefore, the corporation needs to take the problem seriously. The employer inspects the physical workplace environment to find any circumstances that provide or potentially present a risk to worker safety or health and notifies employees of any risks that occur, as can be seen from the table above.10.2% of respondents agree, 3.7% strongly agree, and the remaining 14.9% are indifferent, whereas 71.1% of respondents disagree (35.3% disagree and 35.8% strongly disagree). The majority of respondents indicated, as shown in the table, that the company does not conduct physical environment inspections at the workplace. In light of the fact that the case company has a significant gap in the management of occupational health and safety hazards the company is required to handy this gap.

Table 4.8: Hazard Management

Variable	Categories	Frequency	Percent
During rounds, managers talk to workers about potential dangers and safety issues at their workplaces.	vehemently disagree	93	43.3
	Disagree	59	27.4
	Both agree and disagree	33	15.3
	Agree	23	10.7
	Strongly Agree	7	3.3
There is a risk assessment done for each jobsite.	vehemently disagree	75	34.9
	Disagree	68	31.6
	Both agree and disagree	41	19.1
	Agree	25	11.6
	Strongly Agree	6	2.8
The company recognizes risks connected to unplanned situations and unusual operations.	vehemently disagree	69	32.1
	Disagree	62	28.8
	Both agree and disagree	42	19.5
	Agree	31	14.4

	Strongly Agree	11	5.1
Applicable Any programmers required by the Ministry of Labor have been fully implemented.	vehemently disagree	79	36.7
	Disagree	58	27
	Both agree and disagree	45	20.9
	Agree	21	9.8
	Strongly Agree	12	5.6
Your business keeps track of how project site dangers are being fixed.	vehemently disagree	59	27.4
	Disagree	80	37.2
	Both agree and disagree	37	17.2
	Agree	30	14
	Strongly Agree	9	4.2
Personal protective equipment and prescribed means are made available to employees.	vehemently disagree	66	30.7
	Disagree	64	29.8
	Both agree and disagree	35	16.3
	Agree	43	20
	Strongly Agree	17	7.9
The business inspects the physical environment of the workplace to find any dangers that may have occurred and to identify any situations that present a risk to worker safety or health.	vehemently disagree	76	35.3
	Disagree	77	35.8
	Both agree and disagree	32	14.9
	Agree	22	10.2
	Strongly Agree	8	3.7

Source: - Own survey, 2022.

4.5.5. Safety Planning

Questions about the firm's identification of OSH hazards were posed to the respondents. The next table 4.9 shows that most respondents (9.8% agree and 1.9% strongly agree) believe that the company has mechanisms in place to identify risks in all employment positions. On the matter, 72.5% of respondents did not agree (35.3% strongly disagreed and 37.2% disagreed), while 15.8% were uncertain. As a result, the information gathered on this topic indicated that there is a gap, and the organization should take the problem seriously.

Responses from respondents regarding the OSH preventive plan are shown in the table below. 80.9 percent of respondents did not agree (46.9 percent strongly disagreed and 34.9 percent disagreed) that the company has a prevention plan in place for addressing occupational health and safety risks and hazards, compared to 18.4 percent who do and 4% who definitely agree. 8.4% of respondents have no opinion on the subject. As a result, the information gathered on this problem revealed that the organization does not have a prevention strategy for addressing occupation safety and health occupation safety and health risks and hazards. Therefore, the corporation needs to take the problem seriously.

Additionally, respondents were questioned regarding OSH's Prevention goals. From the above table, it can be seen that the respondents agree that preventative strategies are based on assessments of occupation safety and health hazards and risks in all jobs (8.4% agree and 7.93.7% strongly agree).On the issue, 74.9% of respondents did not agree (39.1% strongly disagreed and 35.8% disagreed), while 13% were undecided. This demonstrates

that the business does not have prevention plans based on assessments of the risks and hazards related to occupation safety and health in all jobs. Therefore, the corporation needs to take the problem seriously.

As can be seen from the above chart, 72.1% of defendants disagreed with the statement that preventative strategies should be periodically evaluated and adjusted when workplace conditions change or worker health is harmed (39.1% strongly disagreed and 33% disagreed). 9.8% of respondents agree, while 2.3% strongly concur. 15.8% of respondents have no opinion on the subject. This demonstrates that preventative strategies are not routinely assessed. As a result, the corporation must act accordingly and close this gap.

Additionally, questions about the assessment of risks and hazards in work procedures with regard to OSH issues were posed to the respondents. The aforementioned table shows that the respondents (9.3% agree and 1.4% strongly agree) with the statement that work processes are founded on the evaluation of risks and hazards. On the matter, 75.8% of the respondents were not in agreement (43.5% strongly disagreed and 32.1% disagreed), while 13.5% were uncertain. This demonstrates that the business does not have work procedures based on the evaluation of risks and hazards. As a result, the information gathered on this topic indicated that there is a gap, and the organization should take the problem seriously. From the below chart, it can be understood that the majority of respondents 69.7% did not agree 36.7% strongly disagreed and 33% disagreed that the organization has a plan in place to handle emergencies, while 12.1% and 2.8% strongly agreed. 15.3% of respondents have no opinion on the subject. As a result, the information gathered on this subject indicated that the company lacks an emergency plan. Based on these findings, the organization should make substantial efforts to close this gap. The table below also shows that regular exercises are held to evaluate the effectiveness of the emergency plan. 33.5% of respondents are neutral, 35.8% are in agreement, 23.7% are very in agreement, 4.7% are in disagreement, and 2.3% are in disagreement (3.4% are in agreement and 4.7% are strongly in agreement). Because of the gaps in the example firm's occupation safety and health planning, as shown by the aforementioned questions, the company is required to close these gaps.

Table 4.9: Safety Planning

Variable	Categories	Frequency	Percent
Systems within the company help to identify dangers in every position.	vehemently disagree	76	35.3
	Disagree	80	37.2
	Both agree and disagree	34	15.8
	Agree	21	9.8
	Strongly Agree	4	1.9
Your firm has a preventative strategy in place to address occupational health and safety risks and hazards.	vehemently disagree	99	46.0
	Disagree	75	34.9
	Both agree and disagree	19	8.8
	Agree	18	8.4
	Strongly Agree	4	1.9
	vehemently disagree	84	39.1

Plans for prevention are based on assessments of the risks and hazards associated with each job's occupational health and safety.	Disagree	77	35.8
	Both agree and disagree	28	13.0
	Agree	18	8.4
	Strongly Agree	8	3.7
Plans for prevention are routinely evaluated and changed when work conditions change or a worker's health is compromised.	vehemently disagree	84	39.1
	Disagree	71	33
	Both agree and disagree	34	15.8
	Agree	21	9.8
	Strongly Agree	5	2.3
The evaluation of risks and hazards forms the foundation of work practices.	vehemently disagree	94	43.7
	Disagree	69	32.1
	Both agree and disagree	29	13.5
	Agree	20	9.3
	Strongly Agree	3	1.4
Your business has a strategy in place for handling crises.	vehemently disagree	79	36.7
	Disagree	71	33
	Both agree and disagree	33	15.3
	Agree	26	12.1
	Strongly Agree	6	2.8
Drills are run periodically to evaluate how well the emergency plan works	vehemently disagree	5	2.3
	Disagree	10	4.7
	Both agree and disagree	72	33.5
	Agree	77	35.8
	Strongly Agree	51	23.7

4.5.6. Safety Policy

The respondent's comments in relation to OSH's written policy are presented in the table 4.10. On the question of whether the organization has a documented occupational safety and health policy in place, 52.1% of respondents did not agree (25.1% strongly disagreed and 27% disagree), whereas 20.5% and 8.8% strongly agreed. 18.6% of respondents had no opinion on the matter. Therefore, the information gathered on this subject indicated that there was no formal occupational safety and health policy in place at the organization. Therefore, the corporation needs to take the problem seriously. Additionally, respondents were questioned regarding OSH's Prevention goals. The aforementioned table shows that the respondents agree that the organization's safety policy clearly outlines the accountability and obligation of managers, supervisors, and employees (30.2% agree and 14.4% strongly agree).16.3% of respondents strongly disagreed and 21.4% disagreed with 37.7% of the respondents, while 17.7% were undecided. This demonstrates that the accountability and obligation of managers, supervisors, and employees are not clearly stated in half of the organization's safety policy. Therefore, the corporation needs to take the problem seriously. According to the above data, 32.5% of respondents did not believe that the company's safety policy supports the reporting of occupational injuries and illnesses (14.4% strongly disagreed and 18.1% disagreed). 34.9% of respondents and 11.6% strongly concur

with the subject. 20.9% of respondents have no opinion on the subject. Additionally, inquiries about OSH-related coordinates were made of the replies. According to the aforementioned table, respondents are in agreement (10.2% agree and 2.3% strongly agree) that the business aligns its occupational health and safety policy with other human resource policies in order to ensure employee commitment and welfare. On the issue, 72.1% of respondents did not agree (34.9% strongly disagreed and 37.2% disagreed), while 15.3% were uncertain. This shows that the company does not coordinate its occupation health and safety policy with other human resource policies to ensure worker commitment and wellbeing. Therefore, the collected data on this issue showed that there is a gap and the company should work seriously on the issue. It can be observed from the above table that most the respondents 42.8% of the respondent did not agree (21.9% strongly disagree and 20.9% disagree) on the fact that the company's occupation health and safety policy commits to continuous improvement, i.e., attempting to improve beyond objectives already achieved, while 29.8% agree and 14% strongly agree on the issue and 13.5% respondents are neutral on the issue.

The information gathered on this subject so indicated that the corporation should make substantial efforts to close this gap.

Furthermore, it is clear from the aforementioned table that management's dedication to preserving employee health and safety is reflected in the policy document that is made available to all employees. 15.3% of respondents say they have no opinion, 69.8% disagree (of which 37.7% and 32.1% strongly), 12.1% agree, and the remaining 2.8% strongly agree. This demonstrates that not all employees have access to the corporate policy document, which reflects management's dedication to preserving employee health and safety. As a result, several of the aforementioned queries specify that the case company's occupational health and safety policy needs to be filled.

Table 4.10: Safety Policy

Variable	Categories	Frequency	Percent
Is there a formal workplace safety and health policy in place at my company?	vehemently disagree	54	25.1
	Disagree	58	27.0
	Both agree and disagree	40	18.6
	Agree	44	20.5
	Strongly Agree	19	8.8
The accountability and obligation of managers, supervisors, and employees are spelt out in detail in the organization's safety policy.	vehemently disagree	35	16.3
	Disagree	46	21.4
	Both agree and disagree	38	17.7
	Agree	65	30.2
	Strongly Agree	31	14.4
The company's safety policy encourages the reporting of sickness and accidents	vehemently disagree	31	14.4
	Disagree	39	18.1
	Both agree and disagree	45	20.9

related to the job.	Agree	75	34.9
	Strongly Agree	25	11.6
To ensure employee dedication and well-being, our organization combines its Occupation Health and Safety Policy with other human resource policies.	vehemently disagree	75	34.9
	Disagree	80	37.2
	Both agree and disagree	33	15.3
	Agree	22	10.2
	Strongly Agree	5	2.3
The occupational health and safety policy of your organization pledges to continual improvement, or aiming to go beyond goals already met.	vehemently disagree	47	21.9
	Disagree	45	20.9
	Both agree and disagree	29	13.5
	Agree	64	29.8
	Strongly Agree	30	14
	vehemently disagree	81	37.7
	Disagree	69	32.1
	Both agree and disagree	33	15.3
	Agree	26	12.1
	Strongly Agree	6	2.8

Source: - Own survey, 2022.

4.5.7. Safety Promotion

Questions about recurring meetings were posed to the respondents. The table 4.11 shows that, according to 72% of the respondents, regular meetings between employees and management are held in order to make choices that have an impact on how work is organized (36.7% disagree and 35.3% strongly disagree).On the issue, 72.5% of respondents agree (10.2% agree and 1.9% strongly agree), while 15.8% are uncertain. Since there aren't any regular meetings between employees and managers or supervisors, the information gathered on this issue indicates that the business needs to take the problem seriously. From the above table, it can be seen that the majority of respondents, or 37.6%, did not agree that incentives are frequently provided to encourage employees to adhere to occupational health and safety policies and procedures (such as the proper use of protective equipment), while 28.8% agreed and 6% strongly agreed on the issue, and 27.4% of respondents were neutral on the matter. The information gathered on this subject so indicated that the corporation should make substantial efforts to close this gap. Additionally, respondents were questioned regarding OSH's Prevention goals. The aforementioned table shows that the respondents agree that choices on occupational health and safety are frequently based on talks with or recommendations from workers (18.6% agree and 7.4% strongly agree).On the issue, 59.1% of respondents did not agree (28.4% strongly disagreed and 30.7% disagreed), while 14.9% were uncertain. This demonstrates that more than half of OHS decisions do not typically involve worker input or suggestions. Therefore, the corporation needs to take the problem seriously.

From the above table, it is clear that 37.5% of respondents disagreed 16.7% strongly disagreed and 20.9% disagreed with the statement that the company should reward or punish employees who execute the company's safety management. 28.8% of respondents agree and 6% strongly agree with the declaration. 27.4% of respondents have no opinion on the matter. As a result, some of the aforementioned queries imply that the case company has a deficit in the promotion of occupational health and safety, so the company must fill this gap.

Table 4.11: Safety Promotion

Variable	Categories	Frequency	Percent
Workers, managers, and supervisors gather on a regular basis to make decisions about how the work is organized.	vehemently disagree	76	35.3
	Disagree	79	36.7
	Both agree and disagree	34	15.8
	Agree	22	10.2
	Strongly Agree	4	1.9
Employers frequently provide incentives to motivate employees to follow occupational health and safety regulations and practices (such as the proper use of protective equipment).	vehemently disagree	36	16.7
	Disagree	45	20.9
	Both agree and disagree	59	27.4
	Agree	62	28.8
	Strongly Agree	13	6.0
Decisions about occupational health and safety are frequently made after consulting with or taking comments from employees.	vehemently disagree	61	28.4
	Disagree	66	30.7
	Both agree and disagree	32	14.9
	Agree	40	18.6
	Strongly Agree	16	7.4
Does your business offer employees who adopt its safety management procedures a specific incentive or punishment?	vehemently disagree	36	16.7
	Disagree	45	20.9
	Both agree and disagree	59	27.4
	Agree	62	28.8
	Strongly Agree	13	6

Source: - Own survey, 2022.

4.5.8. Safety Training

A question on employee training on OSH issues was posed to the respondents. From the table 4.12, it is strong that the mainstream of respondents (7.4% agree and 3.7% strongly agree) believe that workers receive enough training in occupational health and safety when they join the company, switch jobsites, or use a new technique. 151 respondents were not in agreement (36.3% strongly disagreed, 34% disagreed, and 18.6% were neutrally certain). This demonstrates that the mainstream of respondents disagreed with the statement that workers

receive adequate occupational health and safety training when they join your firm, switch workplaces, or use a new technique. Therefore, when beginning a new job, switching work sites, or utilizing a new technique in the organization, occupation health and safety training and instruction are supplied to all employees. As seen in the aforementioned table, 64.7% of respondents disagreed with the declaration that employees are permitted to participate in Occupational Health and Safety Management training decision making, while 14.4% of respondents agreed with the declaration (11.6% agreed and 2.8% strongly agreed). The opinions of 45 respondents are unaltered. As a result, the information gathered on this topic indicated that there is a gap, and the organization should take the problem seriously. The aforementioned table shows that, overall, 69.3% of respondents did not agree 40% strongly disagreed and 29.3% disagreed that employees are aware of their rights and obligations with regard to occupational health and safety and are informed about work related injury compensation. However, 11.2% of respondents did. The opinions of 42 respondents are unaltered. The information gathered on this subject has revealed a gap, and the organization should take action to close it in order to reduce the likelihood of workplace accidents. Additionally, a question about an OSH training program was posed to the respondents. The aforementioned table shows that the mainstream of respondents (12.6 agree, 3.7% strongly agree) believe that occupational health and safety training is ongoing and based on a training plan. 150 respondents were not in agreement (29.8% strongly disagreed, 40% disagreed, and 14% were neutrally certain). This demonstrates that the mainstream of respondents did not concur that OHS training should be ongoing and based on a training plan. In order to provide continual training in occupational health and safety, the organization has prepared a training plan additionally; respondents were questioned regarding the choice of employee training strategies. From the above table, it can be seen that the respondents agree that Occupational Health and Safety training plans are decided jointly with employees or their representatives (such as unions) (18.1% agree and 2.8% strongly agree).136 respondents did not agree with the statement (31.2% strongly disagreed and 32.1% disagreed), while 15.8% were uncertain. This demonstrates that the majority of respondents were not in favor of Occupational Health and Safety training plans being made in consultation with employees or their representatives. Consequently, the business needs to consult with employees or their representatives before deciding on job health and safety training courses. Responses from respondents on safety training and seminars are shown in the table above. While 14.4% of respondents agree that the employer conducts Occupational Health and Safety training and seminars, 71.6% of respondents do not (32.1% strongly disagree and 39.5% disagree). The opinions of 30 respondents are unaltered. As a result, the information gathered on this topic indicated that there is a significant gap, and the organization should take the problem seriously. The company promotes worker training opportunities in occupational health and safety, as may be seen from the table above (for example, through scholarships).37.7% of respondents disagree, and 34% strongly disagree, making up the remaining 71.7%. 10.2% of respondents agree, 4.2% strongly agree, and agree, while

14% of respondents have an unaffiliated opinion. As the majority of respondents indicated in the table, the company does not promote possibilities for workers to receive Occupational Health and Safety training. In light of the fact that the case company has a significant training gap in occupational safety and health, the firm is required to rectify this gap.

Table 4.12: Safety Training

Variable	Categories	Frequency	Percent
A person receives sufficient training in occupational health and safety whether they join your company, transfer to a new location, or use a unique technique.	vehemently disagree	78	36.3
	Disagree	73	34.0
	Both agree and disagree	40	18.6
	Agree	16	7.4
	Strongly Agree	8	3.7
The decision-making process for occupational health and safety management training is open to all employees.	vehemently disagree	69	32.1
	Disagree	70	32.6
	Both agree and disagree	45	20.9
	Agree	25	11.6
	Strongly Agree	6	2.8
Employees are aware of their benefits available for work-related injuries as well as their rights and responsibilities surrounding occupational health and safety.	vehemently disagree	86	40.0
	Disagree	63	29.3
	Both agree and disagree	42	19.5
	Agree	18	8.4
	Strongly Agree	6	2.8
A training schedule is used to guide ongoing training in occupational health and safety.	vehemently disagree	64	29.8
	Disagree	86	40
	Both agree and disagree	30	14
	Agree	27	12.6
	Strongly Agree	8	3.7
Employees or their representatives (such unions) are consulted when choosing plans for Occupational Health and Safety training.	vehemently disagree	67	31.2
	Disagree	69	32.1
	Both agree and disagree	34	15.8
	Agree	39	18.1
	Strongly Agree	6	2.8
A seminar and training in workplace health and safety are organized by the company.	vehemently disagree	69	32.1
	Disagree	85	39.5
	Both agree and disagree	30	14
	Agree	21	9.8
	Strongly Agree	10	4.7
Your company offers employees the chance to receive occupational health and safety training (for example, through	vehemently disagree	73	34
	Disagree	81	37.7
	Both agree and disagree	30	14

scholarships).	Agree	22	10.2
	Strongly Agree	9	4.2

Source: - Own survey, 2022.

4.5.9. Internal Communication and Awareness

The respondent's reaction regarding being well informed of OSH is shown in the table 4.13. On the question of whether employees are fully informed of potential safety and health concerns, 47.9% of respondents did not agree (24.2% strongly disagreed and 23.7% disagreed), whereas 16.7% and 7% strongly agreed. 28.4% of respondents had no opinion on the matter. Therefore, it was evident from the information gathered that workers are not fully aware of the risks to their safety and health. Therefore, the corporation needs to take the problem seriously. Questions about creating written circulars for employees were posed to the respondents. As seen in the above chart, 42.3% of respondents did not strongly disagree (20% disagreed and 22.3% definitely disagreed) with the idea of meetings and written circulars being developed to educate employees on the hazards involved with their jobs and how to prevent accidents. Twenty five percent of respondents (20.5%) are neutrally certain about the topic, whereas 37.2% of respondents agree (28.8% agree and 8.4% strongly agree). The information gathered on this subject so indicated that the corporation should make substantial efforts to close this gap.

The table above shows that occupational health and safety rules and procedures are openly discussed at regular meetings and through presentations and publicity efforts. On the issue, 20.9% of respondents are indifferent, 47.9% disagree (21.9% disagree and 26% strongly disagree), 38.6% agree (17.7% agree and the remainder 113.5% strongly agree), and 20.9% strongly disagree.

The response from the responder regarding notifying employees of any changes in operational procedures is shown in the table above. The systems are in place to warn employees of any changes in operation processes or jobs before the changes are done, yet 54% of the respondent did not agree with this statement (22.8% strongly disagreed and 31.2% disagreed), whereas 19.5% and 6% strongly agreed. 20.5% of respondents have no opinion on the subject. As a result, the information gathered on this topic revealed that no methods exist to inform employees of any changes to operational procedures or employment duties. Therefore, the corporation needs to take the problem seriously .The aforementioned table shows that the majority of respondents, or 49.3%, did not agree with the statement that employees are informed about occupational health and safety hazards through written materials and meetings, while 20% and 6.5% strongly agreed with the statement, and 24.2% of respondents were neutral on the matter. As a result, the information gathered on this subject revealed that a significant portion of large workers are not informed about workplace health and safety risks through meetings and written materials. Therefor the above questions mention that the case company has gap in the control, monitoring and review so that, the company must be fulfilling this gap. Therefor more of the above questions

mention that the case company has a gap in the Internal Communication and Awareness so that, the company must be fulfilling this gap.

Table 4.13: Internal Communication and Awareness

Variable	Categories	Frequency	Percent
Every employee is adequately informed of any hazards to their health and safety.	vehemently disagree	52	24.2
	Disagree	51	23.7
	Both agree and disagree	61	28.4
	Agree	36	16.7
	Strongly Agree	15	7.0
Workers were informed about the dangers involved with their jobs and how to prevent accidents through written circulars that were developed and meetings that were held.	vehemently disagree	48	22.3
	Disagree	43	20.0
	Both agree and disagree	44	20.5
	Agree	62	28.8
	Strongly Agree	18	8.4
Regular meetings, presentations, or campaigns are used to effectively explain occupational health and safety policies and procedures.	vehemently disagree	56	26.0
	Disagree	47	21.9
	Both agree and disagree	45	20.9
	Agree	38	17.7
	Strongly Agree	29	13.5
Systems are in place to alert staff members in advance of any changes to operational procedures or job duties.	vehemently disagree	49	22.8
	Disagree	67	31.2
	Both agree and disagree	44	20.5
	Agree	42	19.5
	Strongly Agree	13	6
Through discussions and written materials, workers are informed about the risks to their occupational health and safety.	vehemently disagree	54	25.1
	Disagree	52	24.2
	Both agree and disagree	52	24.2
	Agree	43	20
	Strongly Agree	14	6.5

Source: - Own survey, 2022.

4.5.10. Control, Monitoring and Review

The respondent's reaction regarding being well informed of OSH is shown in the table 4.14. The majority of respondents (47.9%) did not think that employees are fully aware of their potential (24.2% strongly disagreed and 23.7% disagreed). Therefore, according to the data gathered on the subject of safety and health threats, 16.7% of respondents agree and 7% strongly agree. Employees are not completely informed of potential safety and health threats, as seen by the 28.4% of respondents who expressed neutrality on the matter. Therefore, the corporation needs to take the problem seriously. Questions about creating written circulars for employees were posed to the respondents. As seen in the above chart, 42.3% of respondents did not strongly disagree (20% disagreed and 22.3% definitely disagreed) with the idea of meetings and written circulars being developed to educate employees on the hazards involved with their jobs and how to prevent accidents. Twenty five percent of

respondents (20.5%) are neutrally certain about the topic, whereas 37.2% of respondents agree (28.8% agree and 8.4% strongly agree). The information gathered on this subject so indicated that the corporation should make substantial efforts to close this gap. The response from the responder regarding notifying employees of any changes in operational procedures is shown in the table below. The systems are in place to warn employees of any changes in operation processes or jobs before the changes are done, yet 54% of the respondent did not agree with this statement (22.8% strongly disagreed and 31.2% disagreed), whereas 19.5% and 6% strongly agreed. 20.5% of respondents have no opinion on the subject. As a result, the information gathered on this topic revealed that no methods exist to inform employees of any changes to operational procedures or employment duties. Therefore, the corporation needs to take the problem seriously. The aforementioned table shows that the mainstream of respondents, or 49.3%, did not agree with the statement that employees are informed about occupational health and safety hazards through written materials and meetings, while 20% and 6.5% strongly agreed with the statement, and 24.2% of respondents were neutral on the matter. As a result, the information gathered on this subject revealed that a significant portion of large workers are not informed about workplace health and safety risks through meetings and written materials. Therefore, the answers to the aforementioned queries indicate that there is a control, monitoring, and review gap within the organization, which must be filled.

Table 4.14: Control, Monitoring and Review

Variable	Categories	Frequency	Percent
Your company's occupational health and safety preventive plans are regularly audited for efficacy.	vehemently disagree	62	28.8
	Disagree	58	27.0
	Both agree and disagree	27	12.6
	Agree	35	16.3
	Strongly Agree	33	15.3
Your company's compliance with laws and regulations is routinely audited.	vehemently disagree	47	21.9
	Disagree	59	27.4
	Both agree and disagree	31	14.4
	Agree	55	25.6
	Strongly Agree	23	10.7
Exist any ways to check if managers are accomplishing their Occupational Health and Safety goals?	vehemently disagree	44	20.5
	Disagree	60	27.9
	Both agree and disagree	35	16.3
	Agree	49	22.8
	Strongly Agree	27	12.6
Accidents and incidents are reported, investigated, assessed, and recorded.	vehemently disagree	60	27.9
	Disagree	47	21.9
	Both agree and disagree	23	10.7
	Agree	62	28.8
	Strongly Agree	23	10.7
Independent parties (such consultants	vehemently disagree	60	27.9

and ISO auditors) regularly audit the occupational health and safety management system.	Disagree	54	25.1
	Both agree and disagree	45	20.9
	Agree	38	17.7
	Strongly Agree	18	8.4

4.5.11. Safety culture

It is evident from the table 4.15. 42.3% of the respondents disagreed (22.3% strongly disagreed and 21.4% disagreed) that supervisors should take action as soon as they notice an employee operating in an unsafe manner. 22.8% of respondents agree with the statement, and 13.5% strongly concur. 20% of respondents had no opinion on the matter. This demonstrates that when a supervisor observes an employee working in an unsafe manner, more than half of them do not intervene to correct the situation. The respondents were also questioned regarding the involvement of staff in hazard detection. As seen in the above table, employees actively participate in danger detection, prevention, and control activities, which is agreed upon by 50.7% of respondents (41.4% agree and 9.3% strongly agree).13% of respondents are neutrally certain about the topic, whereas 14.3% and 22.3% of respondents disagreed with the statement. Additionally, inquiries about OSH related coordinates were made of the replies. According to the aforementioned table, respondents are in agreement (10.2% agree and 2.3% strongly agree) that the business aligns its occupational health and safety policy with other human resource policies in order to ensure employee commitment and welfare. On the issue, 72.1% of respondents did not agree (34.9% strongly disagreed and 37.2% disagreed), while 15.3% were uncertain. This demonstrates that, in order to ensure employee commitment and wellness, the company does not link its occupational health and safety policy with other human resource policies. As a result, the information gathered on this topic indicated that there is a gap, and the organization should take the problem seriously. The company involves workers in establishing and developing the worker health and safety program structure, as can be seen from the table above. 12.6% of respondents are undecided, 48% disagree (of which 23.3% disagree and 24.7% strongly disagree), 23.7% agree, and the final 15.8% strongly agree. The respondent's comments regarding the safety manual and OSH orientation are shown in the table below. The fact that the company employees have a copy of the health and safety manual and orientation programs for health and safety given by the organization was not agreed with by 49.3% of the respondent (27.4% strongly disagreed and 21.9% disagree), whereas the issue was agreed upon by 23.7% and strongly agreed upon by 14.9%.12.1% of respondents have no opinion on the subject. This demonstrates that 50% of employees do not have access to the organization's orientation programs for health and safety and health and safety manuals. Therefore, the corporation needs to take the problem seriously. The above table shows that the masses of respondents, or 39.1%, disagreed with the declaration that employees are aware of their rights and obligations with regard to OSH and are informed about work-related injury compensation. However, 27.4% of respondents agreed with the declaration, 17.2% strongly agreed, and 16.3% of respondents were neutral on the matter. As a result, more

of the questions mentioned above point out that the example firm's safety culture is lacking, and as outcome, the organization must fix this gap.

Table 4.15: Safety culture

Variable	Categories	Frequency	Percent
When managers observe a worker performing unsafely, they promptly take corrective action.	vehemently disagree	48	22.3
	Disagree	46	21.4
	Both agree and disagree	43	20.0
	Agree	49	22.8
	Strongly Agree	29	13.5
The management of the business follows a set policy.	vehemently disagree	44	20.5
	Disagree	52	24.2
	Both agree and disagree	29	13.5
	Agree	63	29.3
	Strongly Agree	27	12.6
Employees actively participate in actions that involve danger identification, prevention, and control.	vehemently disagree	30	14.0
	Disagree	48	22.3
	Both agree and disagree	28	13.0
	Agree	89	41.4
	Strongly Agree	20	9.3
Employees are involved in the definition and structural development of the worker health and safety program	vehemently disagree	50	23.3
	Disagree	53	24.7
	Both agree and disagree	27	12.6
	Agree	51	23.7
	Strongly Agree	34	15.8
Employees of the company have access to the organization's health and safety manual and orientation programs.	vehemently disagree	59	27.4
	Disagree	47	21.9
	Both agree and disagree	26	12.1
	Agree	51	23.7
	Strongly Agree	32	14.9
Employees are informed of their OSH rights and responsibilities as well as compensation for work-related injuries.	vehemently disagree	34	15.8
	Disagree	50	23.3
	Both agree and disagree	35	16.3
	Agree	59	27.4
	Strongly Agree	37	17.2

4.5.12. Firm productivity

Responses from respondents about OSH employee performance are shown in the table 4.16. The extent to which a corporation regards employee training as a factor that favorably influences employee performance was not something that 34.4% of the respondent agreed with (15.8% strongly disagreed and 18.6% disagreed).13.5% of respondents are neutral on the topic, while 52.1% of respondents agree (34.4% agree and 17.7% strongly agree). The aforementioned table also shows how an employee views the working environment, namely how

well they get along with their managers and coworkers. Regarding the topic, 15.3% of respondents are neutral, 29.2% disagree (12.6% disagree and 17.2% definitely disagree), and 54.8% agree (38.1% agree and the remaining 16.7% strongly agree).Responses from respondents about employee communication are shown in the table below. On the question of whether a supervisor should inform a communication employee about his performance level e, 36.3% of respondents did not agree (20% strongly disagreed and 16.3% disagreed), while 32.1% and 13.5% strongly agreed and 18.1% of respondents expressed no opinion. From the above table, it can be seen that the majority of respondents, or 37.2%, did not agree that the company willingly adjusts on-the-job behavior or appearance in order to comply with or show respect for others' values and customs, while only 29.3% and 13% strongly agree on the issue, respectively, and 20.5% of respondents are neutral on the matter. Therefore, several of the aforementioned queries suggest that the case organization has a productivity gap that needs to be filled.

Table 4.16: Firm productivity

Variable	Categories	Frequency	Percent
the degree to which a company views employee training as an element that enhances employee performance	vehemently disagree	34	15.8
	Disagree	40	18.6
	Both agree and disagree	29	13.5
	Agree	74	34.4
	Strongly Agree	38	17.7
An employee's perception of the work environment, in particular the nature of relationships with managers and coworkers	vehemently disagree	37	17.2
	Disagree	27	12.6
	Both agree and disagree	33	15.3
	Agree	82	38.1
	Strongly Agree	36	16.7
How much a manager communicates with a communication employee on his performance	vehemently disagree	43	20.0
	Disagree	35	16.3
	Both agree and disagree	39	18.1
	Agree	69	32.1
	Strongly Agree	29	13.5
Company willingly changing one's on-the-job conduct or appearance as required to follow or respect the ideals and traditions of others	vehemently disagree	41	19.1
	Disagree	39	18.1
	Both agree and disagree	44	20.5
	Agree	63	29.3
	Strongly Agree	28	13

4.6. Confirmatory Factor Analysis (Measurement model)

Confirmatory factor analysis (CFA) is a method for analyzing whether the data support a given hypothesized model, which is used to confirm or refute the measurement hypothesis. These techniques were applied in the current study to evaluate concept validity. The CFA offers two original models. The measurement model is used to evaluate the construct's reliability, convergent validity, and discriminant validity as well as to determine whether the data are compatible with the model (Moosa, 2018). The structural model is used to explain the

relationship between the variables. When doing confirmatory factor analysis (CFA), which frequently uses a measurement model, researchers must adhere to the rule that the factor loading for an item must be 0.50 or above (Mohamad et al., 2013). To evaluate the reliability of presumptive relationships, a structural model is developed. Convergent and discriminant validity must be shown in order to prove concept validity (Moosa, 2018).

4.6.1. Convergent validity

A model's capacity to include the variance of the indicator is referred to as convergent validity. The AVE can be used to show convergent validity (Wong, 2015). Researchers that are examining convergent validity must look at the average extracted variance (AVE). An optimal level of convergent validity is indicated by an AVE value of 0.50 or higher, which shows that the latent variable (constructs) accounts for more than half of the variances of its indicators. Furthermore, they assert that compared to another latent variable, a latent construct in the structural model shares more variation with its assigned indicators. The average variation extracted (AVE) is the distinction between the level of variation a construct captures and the level brought on by measurement error. A level of.50 is considered adequate, whereas values above 0.7 are regarded as being quite good (Moosa, 2018). The AVE for each construct included in the study, which must be higher than the least acceptable threshold of 0.50, can be calculated to achieve this. As a result, convergence validity was established.

$$\boldsymbol{AVE = \frac{Sum\ of\ Standardized\ Loadning\ Square}{Sum\ of\ Standardized\ Loadning\ Square + measurement\ error}}$$

$$\boldsymbol{Measurement\ error\ = 1 - (Standardized\ Loading)^2}$$

The **Average Variance Extracted (AVE)** for construct ξ_j is defined as follows:

$$AVE\xi_j = \frac{\sum_{k=1}^{K_j} \lambda_{j_k}^2}{\left(\sum_{k=1}^{K_j} \lambda_{j_k}^2\right) + \Theta_{j_k}}$$

Where:
K_j is the number of indicators of construct ξ_j.
λ_{j_k} are factor loadings
Θ_{j_k} is the error variance of the k^{th} indicator $(k = 1, \ldots, K_j)$ of constuct ξ_j

$$\Theta_{j_k} = \sum_{k=1}^{K_j} 1 - \lambda_{j_k}^2$$

Figure 4.1: Average Variance Extracted (AVE)

Table 4.17 shown that the Average Variance Extracted (AVE) for the different constructs in the study exceeded the required criteria of 0 .5.

Table 4.17: Average Variance Extracted (AVE)

Constructs	AVE
Safety Performance	0.502
Safety Leadership	0.503
Safety Climate	0.563
Hazard Management	0.501
Planning	0.521
Safety Policy	0.501
Promotion	0.73
Training	0.501
Internal Communication and Awareness	0.525
Control, Monitoring and Review	0.618
Safety culture	0.581
Firm productivity	0.509

4.6.2. Composite Reliability

The revised structural model's confirmatory factor analysis (CFA) findings are used to calculate composite reliability. The formula for calculating composite reliability is as follows: (Omar, 2013)

$$\text{Composite Reliability} = \frac{(\sum \text{Standardized Loading})^2}{(\sum \text{Standardized Loading})^2 + \varepsilon.\sum j}$$

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + (\sum \epsilon_i)}$$

Figure 4.2: Construct reliability/ Composite Reliability

Where, (lamda) is the item i's standardized factor loading and is its corresponding error variance. Based on the standardized loading's value (λ), the error variance (ε) is calculated as follows:

$$\epsilon_i = 1 - \lambda_i^2$$

Omar, (2013) states that a statistic of 0.70 is the lowest acceptable number for composite reliability; Table 4.18 shows that the overall reliability for the different constructs included in the analysis was higher than the required level of 0.7.

Table 4.18: Composite Reliability results Constructs

Constructs	CR
Safety Performance	0.837
Safety Leadership	0.81
Safety Climate	0.885
Hazard Management	0.875
Planning	0.882
Safety Policy	0.861
Promotion	0.914
Training	0.877
Internal Communication and Awareness	0.846
Control, Monitoring and Review	0.89
Safety culture	0.892
Firm productivity	0.806

4.6.3. Discriminant validity

The degree to which the study's constructs differ from one another is referred to as discriminant validity (Straub et al., 2004). The degree to which a latent variable discriminates against other latent variables (such B, C, and D) is known as discriminant validity (Moosa, 2018). Two metrics have been employed to assess discriminant validity: the square root of AVE and the correlation of latent constructs. To be considered valid, a measurement model needs correlation coefficients for each construct to be lower than the square root of the AVE (Mohamad et al., 2013).

$$DV = \sqrt{AVE}$$

Figure 4.3: Discriminant Validity

The association between the constructs and the square root of the AVE were assessed to determine the discriminant validity in the current study. According to Wong (2015), the requirement for evaluating discriminant validity is that this kind of validity be demonstrated when the square root of the AVE is greater than the correlations between the components. The current research did not show the discriminant validity of the PL, PR, and PO constructs, in contrast to the stated criterion to prove discriminant validity. The study found a weaker correlation between a concept and its AVE square root.

Further research revealed that the majority of respondents frequently choose options 1 and 2 for every question in the survey. It illustrates how a low degree of answer variety leads to a high construct correlation. The table also showed that the correlation of variables. Correlation analysis is a degree of relationship between two variables, 1 perfect, 0.8 to 1.0 very strong, 0.60-0.80 strong, 0.40-0.60 moderate/ adequate, 0.20-0.40 weak .00-0.20 none to extremely weak some outer also said -1 is -veg .

Table 4.19: Discriminant validity results

	SP	LD	SC	HZ	PL	PO	PR	TR	CA	CR	SCU	FP
SP	**0.709**											
LD	0.68	**0.709**										
SC	0.631	.615**	**0.75**									
HZ	0.559	.657**	.741**	**0.708**								
PL	0.568	.670**	.679**	.784**	**0.722**							
PO	0.631	.662**	.695**	.737**	.791**	**0.713**						
PR	0.538	.570**	.649**	.684**	.764**	.752**	**0.856**					
TR	0.49	.528**	.601**	.684**	.769**	.774**	.748**	**0.712**				
CA	0.508	.541**	.605**	.697**	.756**	.706**	.692**	.731**	**0.725**			
CR	0.571	.576**	.596**	.659**	.704**	.712**	.674**	.704**	.599**	**0.787**		
SCU	0.556	.489**	.570**	.579**	.596**	.646**	.663**	.687**	.680**	.674**	**0.762**	
FP	0.418	0.389	0.565	0.499	0.536	0.62	0.567	0.587	0.592	0.577	0.688	**0.714**

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

❖ **Correlation analysis**

with respect to authors 0.8 to 1.0 is measured to be a very strong correlation, followed by 0.60-0.80 strong correlation, 0.40-0.60 moderate/adequate correlation, and 0.20-0.40 weak correlation. It is clear from the following table that there is a strong correlation between every variable.

Table 4.20: correlation matrix

	SP	LD	SC	HZ	PL	PO	PR	TR	CA	CR	SCU	FP
SP	1											
LD	.680**	1										
SC	.631**	.615**	1									
HZ	.559**	.657**	.741**	1								
PL	.568**	.670**	.679**	.784**	1							
PO	.631**	.662**	.695**	.737**	.791**	1						
PR	.538**	.570**	.649**	.684**	.764**	.752**	1					
TR	.490**	.528**	.601**	.684**	.769**	.774**	.748**	1				
CA	.508**	.541**	.605**	.697**	.756**	.706**	.692**	.731**	1			
CR	.571**	.576**	.596**	.659**	.704**	.712**	.674**	.704**	.599**	1		
SCU	.556**	.489**	.570**	.579**	.596**	.646**	.663**	.687**	.680**	.674**	1	
FP	.418**	.389**	.565**	.499**	.536**	.620**	.567**	.587**	.592**	.577**	.688**	1

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

4.7. Measurement Model Assessment

Prior to the execution of structural models, the fitness of measurement models can be evaluated using three different types of fitness indices. Absolute, incremental, and parsimonious fitness measures are used to verify reliability and validity. The chi-square, the Root Mean Square Error Approximation (RMSEA), and the Goodness Fit Index (GFI) are three different sorts of indices offered by absolute fit. Adjusted Good of Fit (AGFI), Comparative Fit Index (CFI), Tucker Lewis Index (TLI), and Normed Fit Index (NFI) are the four indices that Incremental Fit gives. Last but not least, chi-square over degree of freedom is the only index that a scant fit recommends. Depending on the supporting evidence, every fitness category should be attained. According to Mohamad et al.'s (2013) research, the data on the fitness index category, their level of approval, and comments are displayed in the following table.

Name of Category	Index	Level of acceptance	Literature	Comments
Absolute fit	Chisquare	P > 0.05	Wheaton et. al. (1997)	Sensitive to sample size > 200
	RMSEA	RMSEA < 0.08	Browne and Cudeck (1993)	Range 0.05 to 1.00 acceptable
	GFI	GFI > 0.90	Joreskog and Sorbom (1984)	GFI = 0.95 is a good fit
Incremental fit	AGFI	AGFI > 0.90	Tanaka and Huba (1985)	AGFI = 0.95 is a good fit
	CFI	CFI > 0.90	Bentler (1990)	CFI = 0.95 is a good fit
	TLI	TLI > 0.90	Bentler and Bonett (1980)	TLI = 0.95 is a good fit
	NFI	NFI > 0.90	Bollen (1989)	NFI = 0.95 is a good fit
Parsimonious fit	Chisq/df	Chisq/df < 5.0	Marsh and Hocevar (1985)	Should be beyond 5.0

Figure 4.4: model fitness index

4.8. Structural model and result

The fit indices are summarized here based on table 4.18, and Figure 4.5 shows the structural model. ChiSq or CMIN/DF = 4.132, RMR = 0.019, GFI = 0.971, TLI = 0.906, CFI = 0.986, RMSEA = 0.121, and PCLOSE = 0.001 are all acceptable fit values for the model as a whole.

In SEM, the structural model is created and put to the test in order to evaluate the suggested relationships between the various study subject components. Based on statistical analysis and the findings from the previous chapter's section, it was decided that the study model had an adequate fit and had shown appropriate reliability and validity.

Table 4.21: model Goodness-of-fit indices

CMIN/DF	GFI	TLI	CFI	RMSEA	PCLOSE	RMR
4.132	0.971	0.906	0.986	0.121	0.001	0.019

Once the model has been assessed by the study, the structural model will then be examined to confirm the proposed model or linkages between the various research variables. In the current work, the structural model and the pursuing hypotheses were advanced:

4.9. Hypotheses Testing

The structural model was evaluated using a variety of statistical methods. These included computing p values to determine which proposed associations were supported and model fit indices to determine whether the data fit the model. To assess the proposed correlations, the unstandardized path coefficients must be significant at the p 0.05 level. The results of the proposed hypothesized relationships are compiled in the section that follows. Six

of the eleven hypotheses were statistically supported, as shown in Table 4.4. Below is a description of the findings for each of the hypotheses.

- ✓ H1: Safety performance is directly impacted by safety leadership

The first hypothesis (H1) is to determine whether safety leadership directly affects safety performance. The data confirm hypothesis 1 by showing that the safety leadership factor has a direct impact on safety performance (p =.001).

- ✓ H2: The safety environment directly affects firm productivity

The hypothesis (H2) is to determine whether the safety climate directly affects firm productivity. The data confirm hypothesis 2 by showing that the safety climate factor has a direct impact on firm productivity (p = 0.001).

- ✓ Managing safety hazards has a direct impact on firm productivity, according to H3.

  The third hypothesis (H3) aims to determine whether safety hazard management directly affects firm productivity. The data disprove hypothesis 3 by showing that the safety hazard management factor has no direct effect on firm productivity (p = 0.112).

- ✓ H4: Safety Planning directly affects the productivity of the firm

The hypothesis that academics are aiming to prove is that H4 Safety Planning directly affects Firm Productivity. Because safety planning has no direct impact on firm productivity, the statistics refute claim 4 (p = 0.885).

- ✓ H5: Firm production is directly impacted by safety policies.

This hypothesis seeks to ascertain whether safety policy has a direct impact on business productivity. The statistics are consistent with H5, as they demonstrate that the safety policy component directly affects company production (p = 0.003).

- ✓ H6: Safety performance is directly impacted by safety promotion.

The hypothesis (H6) aims to determine whether safety promotion affects firm productivity directly. The data support H6 by showing that safety promotion has a direct impact on safety performance (p = 0.0.23).

- ✓ H7: Safety education directly affects firm productivity

The purpose of Hypothesis (H7) is to determine whether safety training directly affects firm productivity. The results show that the safety training element has no directH8: Safety communication and awareness has direct effect on Safety performance

- ✓ The hypothesis (H8) aims to determine whether safety awareness and communication directly affect safety performance.

The findings disprove H8 by showing that safety knowledge and communication have no direct effect on firm productivity (p = 0.110).

✓ H9: Firm Productivity is directly impacted by safety control, monitoring, and evaluation.

The hypothesis (H9) aims to determine whether firm productivity is directly impacted by safety control, monitoring, and review. The data disproves hypothesis 9 because safety control, monitoring, and review do not directly affect firm productivity (p = 0.206).

✓ H10: A company's productivity is directly impacted by its safety culture.

The H10 hypotheses examine the direct relationship between safety culture and corporate production. The findings are consistent with hypothesis 10 because they demonstrate that the safety culture factor directly affects company production (p = 0.001).

✓ H11: Safety performance has a direct impact on business productivity.

Finding out whether safety performance has a major impact on business productivity is the goal of the hypothesis (H11). Given that safety performance has a direct bearing on business production (p = 0.011), the findings are consistent with hypothesis H11.

Table 4.22: The Structural Model Results Hypotheses

`		Estimate	S.E.	C.R.	P	Result
SP	LD	0.496	0.057	8.722	***	Accepted
SP	PR	0.133	0.059	2.274	0.023	Accepted
SP	CA	0.095	0.059	1.599	0.11	Rejected
FP	SP	-0.196	0.077	-2.548	0.011	Accepted
FP	PO	0.314	0.105	2.993	0.003	Accepted
FP	HZ	-0.168	0.108	-1.552	0.121	Rejected
FP	TR	0.021	0.097	0.221	0.825	Rejected
FP	SCU	0.582	0.087	6.704	***	Accepted
FP	CR	0.111	0.088	1.266	0.206	Rejected
FP	SC	0.308	0.092	3.338	***	Accepted
FP	PL	-0.015	0.106	-0.144	0.885	Rejected

*<0.05, **<0.01 and ***<0.001

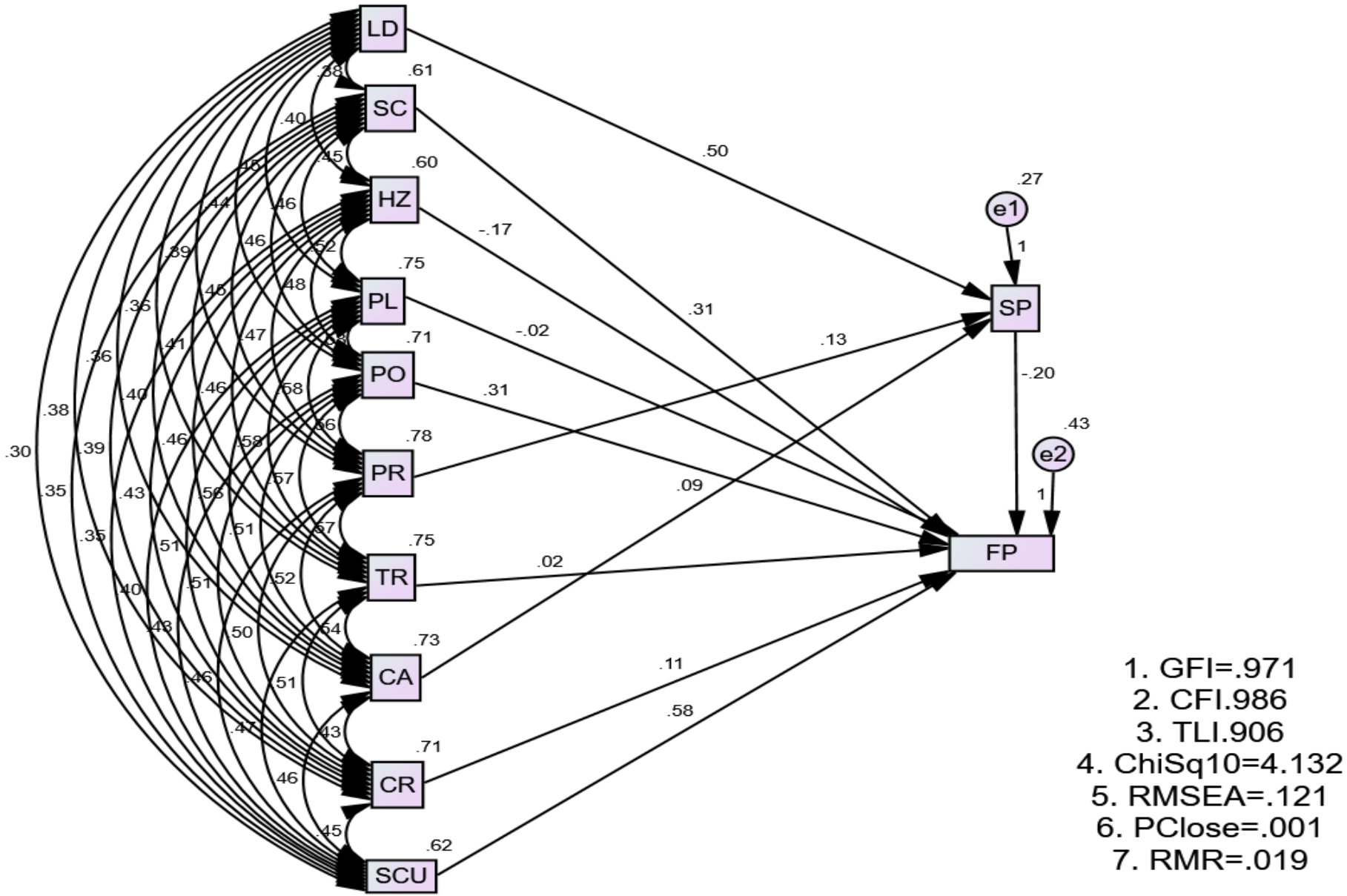


Figure 4.5: The Structural Model Result

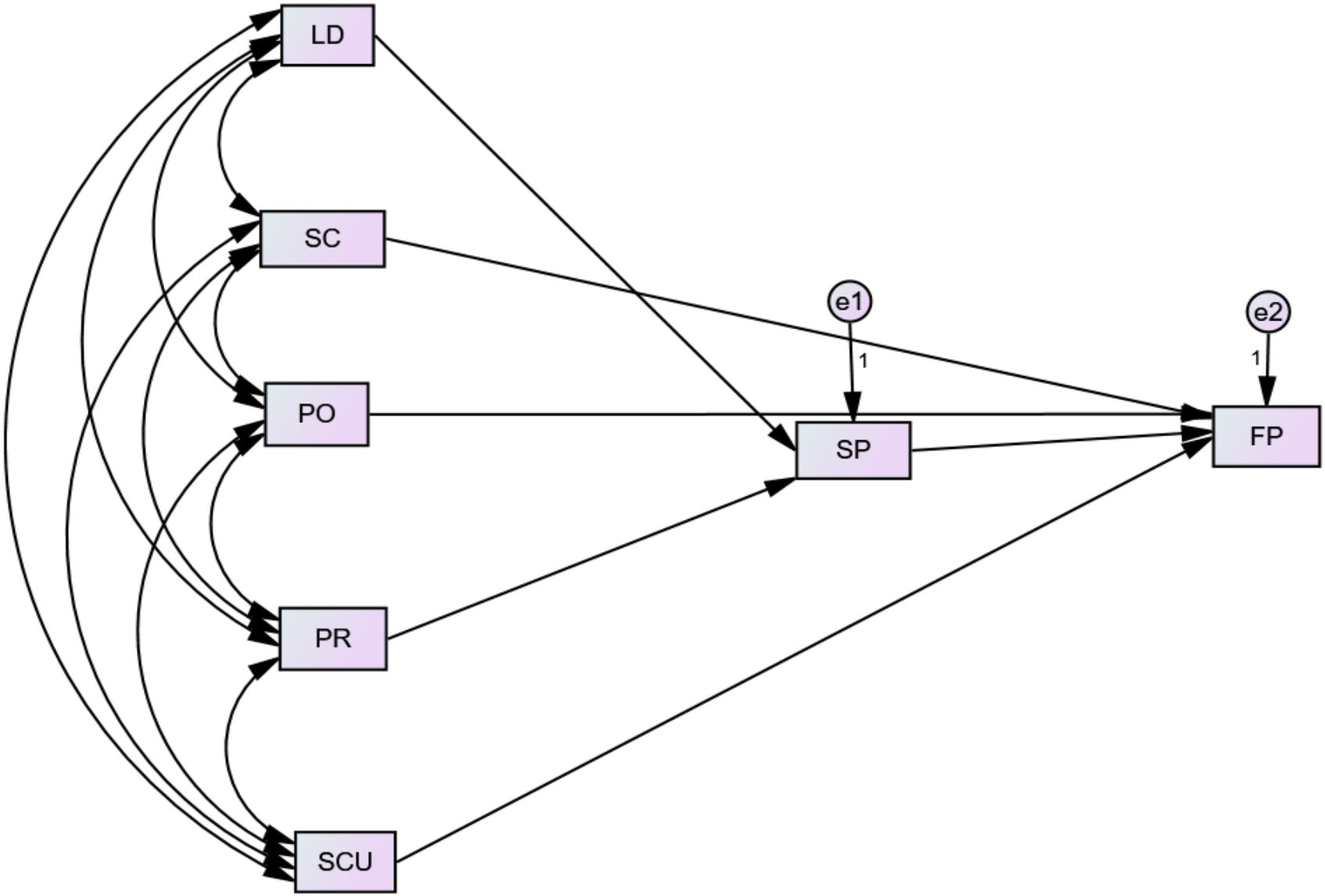


Figure 4.6: Occupational Safety and Health Model Result

CHAPTER FIVE

5. DISCUSSION CONCLUSION AND RECOMMENDATION

5.1. Summary of finding

The thesis primarily focused on a series of correlational experiments using the SEM approach to completely test a suggested safety model. The research findings from the preceding chapter are critically examined in this part. The findings' applicability to the study questions, academic writing, and industrial practice are all thoroughly evaluated. The following is explained in this chapter's conclusion. Following discussion and contextualization, the results were first presented and critically evaluated. The second's summary literature review's findings were thoroughly examined. The third paragraph covered potential restrictions and provided remedies. This last action is made evident in the fourth section of this chapter, which offers potentially fruitful areas for more investigation. The main conclusions of this inquiry are briefly presented in the conclusion.

- **Research question one**

“What are the various kinds of hazards, injuries and accidents happening in Metal Industry?” Secondary data were canvassed in order to respond to the initial study topic. According to Shikdar & Sawaqed (2003), the metal production industry had more problems than other types of industries. The high frequency of occupational injuries in the metal production sector is a significant public health concern. In addition to instances of compression and crush, eyes, fingers, ankles, and feet were mentioned (Gulhan et al., 2012). The category of chemical and biological dangers, followed by the category of physical hazards, has the highest exposure rate, per a study by Miwano et al. (2018). Psychosocial and ergonomic hazards had lower rates, according to the study's findings. This topic is examined and addressed more briefly in the section on literature reviews.

- **Research question two**

"What are the factors that affect Occupational Safety and Health Practices at Akaki Basic Metal Industry?" was the second research question. The following elements have an impact on occupational safety and health practices in the Akaki basic metal business.

1. The results of this thesis showed positive correlation between safety leadership and performance. According to Kheni's (2008) research, when management gives workplace health and safety a high priority, workers can tell that the company cares about their lives. People try to act more safely at work as a result, and they work to do so. The study also shows that when workers feel comfortable discussing concerns or ideas for workplace safety improvements with management or supervisors, they are more ready to contribute to workplace health and safety. Additionally, when asked about safety during sessions regarding workplace safety and health, employees are more inclined to act safely. Effective and successful management of workplace health and safety depends on good leadership .Tenacity, a desire for healthier health and safety, a willingness to work with others to advance health and safety, and an understanding that others' participation and efforts are necessary for good health and safety are among the qualities of these leaders. In terms of occupational safety and health, this suggests that good leadership improves workplace performance. The significance of safety leadership on worker safety performance has been established in earlier studies. According to Gümüş et al. (2023), safety performance will increase when management's commitment to safety values encourages worker safety attitudes. The majority of organizations, according to Berhan's (2020) research, had higher levels of management commitment, which, to a certain extent, assisted them in decreasing hazard and disease-affecting factors like physical and ergonomic causes, personnel and management causes, risk and disease (physical disease, psychological diseases, injury or accident), and risk and disease.
2. The other finding of the study is that safety promotion was the most significant element to contribute to the safety performance of employees in Akaki Basic Metal Industry. According to the findings presented above, a program for promoting work abilities was created based on four main actions: alterations to the physical environment, alterations to the psychosocial environment, alterations to one's lifestyle, and promotion of one's health (Gilkey, 2014).
3. The workplace safety culture has the biggest impact on firm productivity, according to this study's second finding. Mohammed et al. (2022) found that the efficiency of a safety culture is influenced by the organizational situation. The study found that safety culture had a much bigger impact than safety outcomes. Owners, managers, and employees'

responses to questions about health and safety in their workplaces included expressions that highlighted the importance of the sociocultural context. According to Kheni (2008), the study's findings show that culture can have a significant impact on how people interact at work. The terms "culture," "adapting to culture," "ill fate," "traditions," "destiny," and "mystery" are frequently used when addressing attitudes towards workplace health and safety as well as the occurrence of accidents. According to Achieng's (2018) research, an employee's impression of safety has a major impact on how involved they are in the execution of the occupational safety and health management system. Mohammed et al.'s findings from 2022 showed that the influence of safety culture was far more significant than the impact of safety outcomes.

4. The results of this thesis also indicated a negative relationship between firm productivity and safety performance. The study concluded that there were either indirect correlations between safety performance and firm productivity or that there was no direct relationship between them. Although there should be a direct correlation between safety performance and business productivity, this thesis only shows an indirect correlation because more employees of the company responded with significant disagreement. According to Adjotor's (2013) study, production levels inside a company are positively impacted by health and safety. This shows that employees believed that their health and safety had a substantial impact on their ability to perform at work.
5. The study also found that the safety climate played the biggest role in influencing employees' firm productivity in the Akaki Basic Metal Industry. This demonstrated how the case company's safety conditions influence firm productivity. Gümüş et al. (2023) discovered a strong correlation between accident rates, performance in terms of safety, and the safety atmosphere. Employee impressions of the safety climate at work are influenced by how management and supervisors' policies and procedures are perceived by employees and how well they are put into daily practice. Numerous studies have demonstrated the significance of an organizational safety climate in ensuring adherence to policies and procedures as well as encouraging staff involvement in safety.
6. The study's main finding is that safety police directly affect firm productivity. The workplace should be secure for employees. Health and safety regulations must be enhanced to meet the expanding needs of various public and private sector organizations

(Kheni, 2008). The OSH regulations were well-organized and easy to comprehend. Their well-organized approach, particularly when it comes to enforcement and ligation activities, makes them user-friendly (Ncube & Kanda, 2018). Jilcha (2017) came to the conclusion that the country must construct OSH policies, regulations, rules, programs and proclamations that are implemented in proportion to the model in order to maintain the manufacturing industries' gradual innovation and sustainable development. The majority of sectors need to strengthen their organizations' health and safety policies in order to achieve good performance indicators, according to Adjotor's (2013) research. Therefore, if employers wish to satisfy high expectations for worker productivity, they must integrate health and safety regulations into their organization's mission and vision. Additionally, he adds that the outcomes show that the nation's health and safety are suffering since there is no uniform policy on occupational safety and health. In order to lower the prevalence of OHS, the organization must use these constructs in its safety policies and strategic choices. The factors and circumstances that could lead to disease and accidents will be reduced when managerial safety policies and procedures are successfully developed and put into practice. According to Berhan's (2019) study, management was pressured by OHS policy and strategy to enhance OHS practices and implement them in the workplace.

- Therefor all above variables' are factors affect occupation safety and health practice in the Akaki Basic Metal Industry

❖ **Research Question three**

The third research question posed was, "What Industrial Occupational Safety and Health Model is Appropriate for Akaki Basic Metal Industry?" The output of the structural model demonstrates that the occupational health and safety model for the Akaki Basic Metal Industry was constructed using the concepts discussed in the preceding chapter. Based on the data gathered from the earlier study carried out for this project, a model for OSH enhancement has been developed in this section. The section has also made an effort to evaluate how each OSH component and the suggested model relate to the study's overarching goals. Safety culture was the first component of the model element, which was intended to increase business efficiency. The adoption of a safety policy was the second action done to increase firm productivity. The third part of the model element was the safety climate, which tries to boost firm production. In

order to increase success factors and firm productivity, the final two elements safety promotion and safety leadership were connected to safety performance. The paradigm for enhancing industrial workplace safety and health has positive benefits in the direction of sustainable development, according to past studies Jilcha (2020). The findings point to advancements in the management of workplace safety and health, including decreased work-related diseases, accidents, and costs. Making them high goals for OSH reforms was the formation of the OSH strategic plan, the steering committee team, funding and enforcement allocation, policy formulation, and the adoption of management standards.

- **Research question four**

The final research question asked "To what extent do factors that affect firm productivity at the work place?" The investigation also demonstrated the complexity of factors that influence firm productivity. The findings indicate a significant impact, but that the positive influence on safety laws, culture, and environment has overcome the negative impact on company productivity and safety performance. The magnitudes of the factor loading coefficients for the health and safety variables in the multiple regression models served as evidence for this. The thesis's consequences indicated that the degrees to which safety culture, safety police and safety atmosphere all existed all had a bearing on a firm's production ranged from higher to lower factor loading coefficients. Safety performance increases by 0.185 and 0.519 for every increase in safety promotion, respectively. According to this, safety performance was positively impacted by leadership and advancement in the field, however as safety performance increased, business productivity decreased by 0.186, making safety performance a poor predictor of firm productivity. As shown by the fact that when safety culture increases by 1, firm productivity rises by 0.612, 0.3 when safety police increases by 1, and 0.246 when safety climate increases by 1, safety culture, safety police, and climate were, respectively, the degree of factor loading coefficients for firm productivity. Employee productivity is impacted by the aforementioned elements. According to a prior study by Susananto et al. (2023), understanding organizational effectiveness requires analyzing personnel performance. Employee productivity and a company's competitive edge are greatly influenced by organizational performance.

5.2. Qualitative Result

The following findings were provided in light of employee interviews, workplace observations, and an open-ended study question: Due to a lack of safety measures, industrial workers were unprotected to heat and flying projectiles. Absence of personal protective equipment (PPE) and inadequate ventilation in the forging and surface treatment rooms Since most of the workers in the Founder workshop's furnace area were not shielded from fire and dust by chemical masks or gauze, they were all exposed to smoke. Additionally, when workers were observed in numerous industrial zones, they were functioning without PPE and only sporting overcoats. There were few safety signs displayed, and several of them were scrawled in a way that made them impossible to read. In the fabrication shop, when employing ray welding and cutting machines, there is no personal protective equipment (PPE) to shield the radiation from damaging the fertility of both male and female workers. Other difficulties brought up by employees were the absence of an occupational health and safety department at the business as well as a department in charge of safety planning, training, encouraging communication, controlling, monitoring, reviewing, and managing workplace safety hazards. The other employees complained about their meager salary or the company's low profits. Workers that receive low pay are not happy in their jobs. According to Alamneh et al. (2020), Ethiopia has a higher risk of occupational accident due to a lack of supervision, personal protective equipment, and training in occupational health and safety. According to the previous study by Jilcha (2020), a community cannot expect to achieve its development goals without healthy employees, secure workplaces, and pleased citizens. In other words, underperforming workers are unable to achieve the requirements for output and effectiveness. The responses above show that corporate employees are not knowledgeable about the essential components of the worker safety and health management system or how to participate in it. An unexpected outcome of this was that these components were eliminated from the model analysis. It is suggested that the business and the local government officials in charge of the issue implement corrective action.

Absence of an OSH department, unexpected outcomes of safety communication and awareness, safety control, monitoring, and review, Safety hazard management, safety planning and safety training components were eliminated from the model analysis.

5.3. Conclusions

The following suggestions were drawn as a outcome of the study's findings on "Occupational Safety and Health Model Development in Manufacturing in the Akaki Basic Metal Industry". The study's ultimate objective was accomplished through the employment of a well-organized research strategy. This study also hypothesized and cross validated the complex correlations between indicators of twenty-one observable variables and latent components in a developing region. Data (n = 215) on the relevant variables were gathered from the Akaki Basic Metal Industry using a specifically created questionnaire. To test and validate the proposed model, CFA was applied to the calibration and validation using AMOS. The findings from the CFA provided a clear grasp of the causal link between distinct constructs. GOF indices, construct dependability, and convergent and divergent validities were all obtained by the constructed model. The developed model acquired construct dependability, convergent and divergent validities, and the required GOF indices. The metal industry sees a lot of accidents and injuries, such as those to the eyes, fingers, ankles, and feet as well as compression and crush. In the metal industry, physical risks outweigh chemical and biological ones in terms of frequency. The findings demonstrate that Akaki Basic Metal Industry's occupational safety and health practices are influenced by variables like safety leadership, climate, policy, promotion, culture, performance, and firm productivity. These factors are important and exhibit a high degree of association in the study. Additional factors like safety hazard management, safety communication and awareness, safety control, monitoring and review, safety planning, and safety training had little to no impact on the outcomes. Our findings indicate that these variables have no impact on the occupational safety and health protocols used by Akaka's basic metal industry The case company did not have an occupational safety and health department, and the majority of respondents disagreed and strongly disagreed with statements 1 and 2, proving that those variables were not significant, according to the qualitative discussion in the previous chapter. However, they are essential for implementing workplace safety and health. However, the organization strengthens these elements by incorporating occupational safety and health in the workplace. The results of this thesis propose that safety leadership and safety promotion are, respectively, the most significant elements influencing safety performance. Since they contribute to a decrease in workplace accidents and injuries as well as an improvement in employee performance and firm productivity, safety culture, safety laws, and safety environment

evaluation are also significant elements that have an impact on firm productivity. The ideal idea for the Akaki Basic Metal Industry has been found through an earlier discovery. The variables in the model that were employed to boost firm productivity were safety climate, policy, and culture. To enhance safety performance, the final two components safety promotion and safety leadership were integrated. The relationship between firm productivity and safety performance however is opposite. The inclusion of metal workers in workplace safety and health initiatives enhances their performance in terms of safety which is one of the study's significant contributions. Additionally, unless management is genuinely committed to workplace safety, safety legislation and practices won't be effective on their own. Therefore, how an organization fosters a safety climate and culture at work has a big impact on how people behave in terms of safety. Employees are more likely to abide by safety rules if administrative professionals are seen as being concerned about OHS. A worker safety and health program has also been created and put into place. However, without the cooperation of both employers and a thorough occupational safety and health program were unachievable.

5.4. RECOMMENDATIONS

The study's findings and the conclusions listed above lead to the following recommendations:

- ✓ To improve the management of occupational health and safety and other factors that reduce workplace accidents and injuries, management must implement occupational health and safety. The management of Akaki Basic Metal Industry should plan and conduct regular workshops, seminars, and refresher trainings on workplace health and safety, monitor health and safety concerns, release safety-related documents, and take a variety of other actions to instill a sense of safety awareness in employees. Certain accidents might have been avoided if workers had been properly supervised while doing their duties at the job. The management must inform other employers about risks and hazards.
- ✓ The management provides personal protective equipment for new employees as well as the usage of ray welding and cutting machine procedures in order to avoid radiation from damaging both male and female employees' fertility. Management is responsible for creating internal policies and procedures governing working conditions, adhering strictly to the safety measures put in place to prevent accidents, and routinely verifying that workers are wearing the provided protective gear before

performing their duties. The safety of the workplace can be substantially improved if employees are aware that management and they are both responsible for safety and health procedures. Management should create and maintain suitable, secure, and health-risk-free facilities and systems for the workplace.

- ✓ Additionally, the government needs to put in place monitoring teams that will visit firms on a regular basis to see if they are adhering to the rules outlined in the nation's labor proclamation. Akaki Basic Metal Industry would be more effective in terms of program evaluation and improvement if it conducted a formal annual review of the workers' safety and health management program and modified the program as necessary to address flaws.

5.5. LIMITATION OF THE STUDY AND DIRECTIONS FOR FUTURE RESEARCH

There are some restrictions on this research, including: First, although this study does not take into account these aspects, employee behavior, employee contentment, and employee income have a significant impact on employee productivity and business productivity. Second, because this study only looked at the Akaki Basic Metal Industry, other industries in Ethiopia or other nations may have different results. The researcher's final data collection methods included an open-ended questionnaire and the observational approach. Amos needs more than 200 research questions to analyses the data in accordance with the research question. Occupational health and safety must be implemented by management in order to improve management of these two areas and other factors that reduce workplace accidents and injuries. The management of Akaki Basic Metal Industry should plan and conduct regular workshops, seminars, and refresher trainings on workplace health and safety, monitor health and safety issues, release safety-related documents, and take a variety of other actions to instill a sense of safety awareness in workers.

The researcher suggests conducting additional research on organizational safety and health of firm productivity of Akaki Basic Metal Industry in order to develop additional measured variables like employee behavior, employee income, and employee satisfaction. Future researchers could then base their research on this gap. Future research on the issue could include metal plants in other parts of Ethiopia or in other nations. This might entail putting the model to the test with sample populations taken from outside the Akaki Basic Metal Industry (more than 215 questions).

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APPENDICES

Addis Ababa University School of Mechanical and Industrial Engineering

Industrial Engineering Stream

Greetings, responses this survey is being created to collect pertinent information from Akaki Basic Metal Industry in order to research its workplace safety and health policies. The objective of this research is to partially fulfill the requirements for an Addis Abeba University MSc in industrial engineering. Protecting the safety, health, and welfare of those who are employed or working is the focus of the cross disciplinary field of occupational safety and health. The productivity of the organization at all sites is directly correlated with the health and safety of all employees. Job satisfaction has an impact on employee performance.

Note: Only academic purposes will be served by using your comments.

Part one: Socio demographic details and information on the respondents

This part aims to gather data on the demographic background of the respondents.

S. No.	Information in General	Replies from the employee
1	Gender	
2	Age	
3	Education Level	
4	Work Experience	

Part two: Occupational Safety and Health Affecting Factors

Please mark the response that, in your opinion, best fits your organization by selecting from the available options.

vehemently disagree	Disagree	Both agree and disagree	Agree	Strongly Agree
1	2	3	4	5

1. **Safety Performance (SP)**					
Both employees and managers have the knowledge they need to perform safely.	1	2	3	4	5
Decisions that influence an employee's health and safety involve them at all times.	1	2	3	4	5
The safety authorities have the power to implement the adjustments they have determined are required.	1	2	3	4	5
Those who behave responsibly are commended.	1	2	3	4	5
Everyone has the equipment and/or tools required to finish their work safely.	1	2	3	4	5
Every employee at this company appreciates the constant advancement of safety.	1	2	3	4	5
Formal safety audits are conducted formally on a regular basis as part of our operations.	1	2	3	4	5
2. Safety Leadership (LD)					
The safety program is strongly supported by top management.	1	2	3	4	5
The senior management team supports the safety manager, also known as the person in charge of health and safety.	1	2	3	4	5
Your company spends time and money on improving safety performance.	1	2	3	4	5
Safety is just as vital to the company as operations and the caliber of the work performed.	1	2	3	4	5
To pinpoint reasons and provide remedies, the company examines injury and illness data (such as claims data, first aid logs).	1	2	3	4	5
The task of identifying and resolving safety issues falls under the purview of the safety committee or program.	1	2	3	4	5
3. . **Safety Climate (SC)**					
New hires rapidly understand that good health and safety procedures are expected of them.	1	2	3	4	5
When employees don't adhere to good health and safety procedures, they are informed.	1	2	3	4	5
The management and employees collaborate to provide the safest environment possible.	1	2	3	4	5

When worker health and safety are on the line, no significant short cuts are made.	1	2	3	4	5
Where I work, management places a great premium on employee health and safety.	1	2	3	4	5
Where I work, I feel comfortable to report any safety issues.	1	2	3	4	5
4. . **Hazard Management (HZ)**					
During rounds, managers talk to workers about potential dangers and safety issues at their workplaces.	1	2	3	4	5
An analysis of the hazards for each jobsite is performed.	1	2	3	4	5
The company recognizes risks connected to unplanned situations and unusual operations.	1	2	3	4	5
Applicable Any programmers required by the Ministry of Labor have been fully implemented.	1	2	3	4	5
Your business keeps track of how project site dangers are being fixed.	1	2	3	4	5
Employees are provided with prescribed means and personal protective gear.	1	2	3	4	5
The business inspects the physical environment of the workplace to find any dangers that may have occurred and to identify any situations that present a risk to worker safety or health.					
5. Planning (PL)					
Systems within the company help to identify dangers in every position.	1	2	3	4	5
Your business has a preventative strategy in place to address occupational health and safety risks and hazards.	1	2	3	4	5
Plans for prevention are based on assessments of the risks and hazards associated with each job's occupational health and safety.	1	2	3	4	5
Plans for prevention are routinely evaluated and changed when work conditions change or a worker's health is compromised.	1	2	3	4	5
The evaluation of risks and hazards forms the foundation of work practices.	1	2	3	4	5

Your business has a strategy in place for handling crises.	1	2	3	4	5
Drills are run periodically to evaluate how well the emergency plan works	1	2	3	4	5
6. Safety Policy (PO)					
Is there a formal workplace safety and health policy in place at my company?	1	2	3	4	5
The accountability and obligation of managers, supervisors, and employees are spelt out in detail in the organization's safety policy.	1	2	3	4	5
The company safety policy encourages the reporting of work-related injuries and illnesses	1	2	3	4	5
The company's safety policy encourages the reporting of sickness and accidents related to the job.	1	2	3	4	5
To ensure employee dedication and well-being, our organization combines its Occupation Health and Safety Policy with other human resource policies.	1	2	3	4	5
The occupational health and safety policy of your organization pledges to continual improvement, or aiming to go beyond goals already met.	1	2	3	4	5
7. **Promotion (PR)**					
Workers, managers, and supervisors gather on a regular basis to make decisions about how the work is organized.	1	2	3	4	5
Employers frequently provide incentives to motivate employees to follow occupational health and safety regulations and practices (such as the proper use of protective equipment).	1	2	3	4	5
Decisions about occupational health and safety are frequently made after consulting with or taking comments from employees.	1	2	3	4	5
Does your business offer employees who adopt its safety management procedures a specific incentive or punishment?	1	2	3	4	5
Teams of workers from various parts of your company are frequently used to solve problems about working conditions	1	2	3	4	5
8. **Training (TR))**					
A person receives sufficient training in occupational health and safety whether they join your company, transfer to a new location, or use a unique technique.	1	2	3	4	5

The decision-making process for occupational health and safety management training is open to all employees.	1	2	3	4	5
Employees are aware of their benefits available for work-related injuries as well as their rights and responsibilities surrounding occupational health and safety.	1	2	3	4	5
A training schedule is used to guide ongoing training in occupational health and safety..	1	2	3	4	5
Employees or their representatives (such unions) are consulted when choosing plans for Occupational Health and Safety training.	1	2	3	4	5
A seminar and training in workplace health and safety are organized by the company.	1	2	3	4	5
Your company offers employees the chance to receive occupational health and safety training (for example, through scholarships).	1	2	3	4	5
9. **Internal Communication and Awareness (CA)**					
Every employee is adequately informed of any hazards to their health and safety.	1	2	3	4	5
Workers were informed about the dangers involved with their jobs and how to prevent accidents through written circulars that were developed and meetings that were held.	1	2	3	4	5
Regular meetings, presentations, or campaigns are used to effectively explain occupational health and safety policies and procedures.	1	2	3	4	5
Systems are in place to alert staff members in advance of any changes to operational procedures or job duties.	1	2	3	4	5
Through discussions and written materials, workers are informed about the risks to their occupational health and safety.	1	2	3	4	5
10. **Control, Monitoring and Review (CR)**					
Your company's occupational health and safety preventive plans are regularly audited for efficacy.	1	2	3	4	5
Your company's compliance with laws and regulations is routinely audited.	1	2	3	4	5
Exist any ways to check if managers are accomplishing their Occupational Health and Safety goals?	1	2	3	4	5

Accidents and incidents are reported, investigated, assessed, and recorded.	1	2	3	4	5
Independent parties (such consultants and ISO auditors) regularly audit the occupational health and safety management system.	1	2	3	4	5
11. **Safety culture**					
When managers observe a worker performing unsafely, they promptly take corrective action.	1	2	3	4	5
The management of the business follows a set policy.	1	2	3	4	5
Employees actively participate in actions that involve danger identification, prevention, and control.	1	2	3	4	5
Employees are involved in the definition and structural development of the worker health and safety program.	1	2	3	4	5
Employees of the company have access to the organization's health and safety manual and orientation programs.	1	2	3	4	5
Employees are informed of their OSH rights and responsibilities as well as compensation for work-related injuries.	1	2	3	4	5
12. Firm productivity					
the degree to which a company views employee training as an element that enhances employee performance	1	2	3	4	5
An employee's perception of the work environment, in particular the nature of relationships with managers and coworkers	1	2	3	4	5
How much a manager communicates with a communication employee on his performance	1	2	3	4	5
Company willingly changing one's on the job conduct or appearance as required to follow or respect the ideals and traditions of others	1	2	3	4	5

- Please list additional factors that could have an impact on workplace safety and health at this organization that I haven't listed previously

  :