THE MEDIATING EFFECT OF JOB SATISFACTION ON WORK ENVIRONMENT AND PRODUCTIVITY OF THE PUBLIC PETROCHEMICAL COMPANIES IN LIBYA

By

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ABSTRACT

Companies must step outside their traditional roles and comfort zones to look at new ways of working. The primary purpose of this study is to assess the impact of physical and behavioral environments on workers' productivity in Libya. The secondary problem is concerned with how job satisfaction mediates and affects the relationship between work environment and productivity. This study provides a basis for those who are seriously searching for the reasons that cause productivity to be low. Therefore, this study examines the physical and behavioral environments and their relationship with workers' productivity. It aims to provide critical recommendations to policy-makers in Libya to overcome this issue and improve the work environment towards boosting productivity. To achieve the objectives of this study, a questionnaire was administered. Multiple regressions were used to test the hypotheses. In line with that and to satisfy the objective of the analysis, the researcher used "stepwise regression" and "standard regression" in this study. In general, the results of the linear regression analysis reveal that all the variables under the physical environments are negatively and significantly related to workers' productivity, whereas behavioral environment has significant mixed results in relation to workers' productivity. These findings can be linked with Maslow's Need Hierarchy and Herzberg Theory. In addition, the mediating effect of job satisfaction on both physical and behavioral environments on workers' productivity indicates partial mediation, and one has perfect mediation (mistreatment behavior) as supported by the Social Exchange Theory which states that job satisfaction functions as a mediator. In relation to the practical and theoretical contributions, so far, to the best of the researcher's knowledge, no scientific research has been found regarding the physical and behavioral environments and their effects on workers' productivity by utilizing job satisfaction as a mediation between work environment and productivity. This study will help policy-makers, managers and the Libyan government to look into this phenomenon.

Keywords: physical environments, behavioral environments, productivity.

ABSTRAK

Syarikat-syarikat perlu keluar daripada peranan tradisi dan zon selesa mereka untuk meneroka aspek kerja baharu. Tujuan utama kajian ini adalah untuk menilai impak persekitaran fizikal dan perilaku terhadap produktiviti pekerja di Libya. Selain itu, kajian ini bertujuan mengenal pasti bagaimana kepuasan kerja bertindak sebagai pengantara dan mempengaruhi hubungan antara persekitaran kerja dan produktiviti. Kajian ini menyediakan kefahaman asas bagi pengkaji yang serius mencari punca berlakunya kemerosotan produktiviti. Oleh itu, kajian ini meneliti persekitaran fizikal dan perilaku serta hubung kait kedua-duanya dengan produktiviti pekerja dan bertujuan memberi saranan penting kepada pembuat dasar di Libya dalam mengatasi masalah ini serta menambah baik persekitaran kerja bagi meningkatkan produktiviti. Demi mencapai objektif kajian, soal selidik telah dijalankan. Analisis regresi berganda juga dihasilkan untuk menguji hipotesis. Di samping itu, analisis regresi *stepwise* dan regresi standard turut dijalankan bagi menyokong objektif kajian. Secara amnya, keputusan analisis regresi linear menunjukkan semua pemboleh ubah persekitaran fizikal mempunyai kesan negatif dan signifikan terhadap produktiviti pekerja, manakala persekitaran perilaku mempunyai signifikan yang pelbagai dengan produktiviti pekerja. Dapatan ini boleh dipadankan dengan Teori Hierarki Keperluan Maslow dan juga Teori Herzberg. Di samping itu, kesan pengantara kepuasan kerja terhadap kedua-dua persekitaran fizikal dan perilaku produktiviti pekerja menunjukkan pengantaraan separa, manakala satu aspek menunjukkan pengantaraan sempurna (*mistreatment behavior*), dan ini disokong oleh Teori Pertukaran Sosial yang menyatakan kepuasan kerja berfungsi sebagai pengantara. Berkenaan dengan sumbangan teori dan praktikal kajian, sepanjang pengetahuan pengkaji, masih tiada kajian saintifik dijalankan mengenai persekitaran fizikal dan perilaku serta kesan kedua-duanya terhadap produktiviti pekerja dengan menggunakan kepuasan kerja sebagai pengantara persekitaran kerja dan produktiviti. Kajian ini berupaya membantu pembuat dasar, pengurus dan kerajaan Libya dalam melihat isu ini.

Kata kunci: persekitaran fizikal, persekitaran perilaku, produktiviti.

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In the name of Allah, Most Gracious, Most Merciful. Praise and peace be upon His beloved prophet, Prophet Muhammad (SAW), his family and his companions from whom, and by the will of God we escape darkness into enlightenment.

It was in this spirit that I set out to undertake the current study, and the quest for self-actualization provided the additional push that kept me going and finally see this thesis come to its expected conclusion, Alhamdulillah.

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TABLE OF CONTENTS

Title	Pages

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abb	Full List
ASID	American Society of Interior Designers
BHE	Behavior Environments
CIA	Central Intelligence Agency
CIID	Centre for Industrial Information and Documentation
DB	Distraction Behavior
FA	Factor Analysis
FB	Fringe Benefits
GNP	Gross National Product
GDP	Gross Domestic Production
GPC	General People Congress
HRM	Human Resource Management
IMF	International Monetary Fund
JS	Job Satisfaction
KMO	Kaiser Meyer Olkin
LD	Libya Dinar
LI	Lighting
MCUB	Mistreatment Culture Behavior
MLR	Multiple Linear Regression
MSA	Measure of Sampling Adequacy
NOC	National Oil Corporation
NWPB	Nature Workplace Behavior
PCA	Principal Components Analysis
PHYE	Physical Environments
PVC	Polyvinyl Chloride
SPSS	Statistics Package for the Social Science
TB	Toxic Behavior
TM	Temperature
TPY	Tons Per Year
UN	United Nation
US	United States
VCM	Vinyl Chloride Monomer
VIFs	Variance Inflation Factors
WH	Work Hours
WP	Workers Productivity
WR	Workers Relationships

CHAPTER ONE

INTRODUCTION

1.0 INTRODUCTION

Creating a work environment that achieves company goals along with workers' goals calls for the alignment of work environment with quality of work life. This entails providing workers the opportunity for personal growth, achievement, responsibility, recognition and reward for the underlying purpose of achieving high quality productivity from them (Rector & Kleiner, 2002).

On the other hand, a poor work environment facilitates low self-actualizing behaviors, leading to the development of negative traits of the workers' behavior. This is clearly indicated by the Libyan government workers' lack of respect towards rules and regulations, preferring instead to follow their own procedures (Agnaia, 1997). The Centre for Industrial Information and Documentation (CIID) in Libya has stated that many companies in the Libyan industrial sector face serious problems, including absenteeism, indifference and failure to abide by appointments, lateness and not signing-off before the end of shifts (CIID, 2008). From 1970 until 2005, LD6 billion (US$4.91 billion) was allocated to the public industrial sector, and an actual LD4 billion ($3.27 billion) was actually spent on it (the Ministry of Electricity, Industry, & Minerals, 2006). However, notwithstanding the huge investments that were provided to the sector, its contribution to the country's Gross Domestic Product (GDP) only rated at 8% during the 1970s, dropped to 5.9 % in 2000, and eventually

dropped even more to 3.2% in 2002 (Shareia, 2006). Further, the country's attempts for economic diversifications have resulted only in marginal results (Heitmann, 1969; Yahia, 2007). Evidences show that a variety of solutions to the problem of managing the industrial sector also failed to produce an improvement in the performance of the industrial sector companies. The Libyan President attributed the system failure "to depending on unqualified workers who do not care about their country's interests. The economy has no place for sentiments and niceties, and therefore, this sector has to be reviewed as there is no one who understands it in Libya" (Arabic News, 2003).

After three decades of excessive reliance on the public sector, the government has become dissatisfied with the performance of the public firms and learned that the inefficiency associated with the public sector were higher than expected. This was clearly evident in the interposition made by Algathafi in 2000, the Libyan economic forum on the aversion of oil revenues in the future, when he said: "The hundreds of factories that we have established in order to sell their products and bring the foreign currency necessary to buy the raw materials and provide maintenance and services for their machinery, we keep spending the revenues from oil on these enterprises thinking that they will replace the dependency on oil". Instead, they as well continue to rely on oil the agriculture activities came to a standstill and so did the industry (Shareia, 2006).

It has been observed that workers are inclined to be more productive in a well-facilitated work place as their satisfaction and productivity cannot reach an optimum level unless their environment is deemed favorable (Clements, 2006). Based on the

above, it comes to reason that negative behavior at work in Libyan companies may be related to the work environment (Agnaia, 1996).

Therefore, this study attempts to examine the effect of work environment on productivity in a scenario where 86% of productivity problems stem directly from the companies' work environment (Akinyele, 2010). The prosperity of the company is often determined by the kind of work environment of the workers (Brenner, Fairris, & Ruser, 2004). It is therefore of vital importance to study the effects of work environments on workers' productivity.

Additionally, majority of the people account for 50% of their life activities indoors, which naturally impact mental status, actions, abilities and performance (Sundstrom, Town, Rice, Osborn, & Brill, 1994). It can be stated that effective and increased productivity often results from an environment that is conducive to effective and efficient work. In other words, an organization's improved work environment will work to encourage workers and consequently, increase productivity. This is the reason why various literatures focusing on office buildings highlight factors such as dissatisfaction, cluttered workplaces and the overall physical environment, as key factors to decreased worker productivity (Carnevale, 1992; Clements, & Kaluarachchi, 2000).

To address this issue, this study focuses on work environment (physical and behavioral environments) and its effects, in order to enhance workers' productivity. The study's main aim is to analyse the work environment's impact upon workers' productivity through the evaluation of the physical and behavioral environments, and

through the identification of the type of work environment that greatly enhances workers' productivity.

1.1 BACKGROUND OF THE STUDY

Libya economy mainly depends on oil as its major source of income, and for garnering foreign currency. Despite the huge investments that are being poured into the industrial sector, the sector still relies heavily on oil revenues, especially in providing foreign currency, for both investment and raw inputs (the Ministry of Industry, 2000). Nevertheless, the importance of the Libyan oil sector hinges primarily on its fiscal linkages. Revenues from crude oil constitute approximately 94% of the total foreign exchange earned by the Libyan economy. In addition, crude oil exports constitute more than 90% of total exports, and contribute the main source of foreign exchange required to finance critical imports, making up a major portion of government revenue. Between the periods of 1963 to 2006, crude oil exports contributed 60% to annual GDP.

The significance of Libya's petroleum production clearly shows that it is the constant driver of the Libyan economy, and the major foreign exchange contributor, and assists in the creation of the infrastructures and industries in the country. In other words, it can be stated that petroleum production is as significant to Libya as oxygen is to human life (Dominguez, 2003).

Libya possesses a principle-political-economic system, which is a labour system that enables workers to share the company's profits as stated by law. Hence, in principle,

the workers have a hand in corporate management (Azzak, 2009). Despite this fact, however, the industrial sector has failed to improve performance over time and still has a large number of badly performing industries (Central Bank of Libya, 2009; Vandewalle & Sakala, 2013). As the Libyan President (Alqadhafi) has stated, "this system has failed as did the former Soviet Union and Eastern Europe, because it depended on unqualified workers who do not care about their country's interests" (*Arabic News*, 2003).

The Ministry of Industry was abolished in 2000, and its competencies and responsibilities were transferred to the production affairs department at the government level. This resulted in administrative instability and an overlap in the authorities and responsibilities, which had negative impacts for the performance of the sector (The Ministry of Electricity, Industry, & Minerals, 2006). Various studies have indicated this fact **(**Agnaia, 1996; Alqadhafi, 2002**)**. Among them**,** Agnaia (1996) stated that managers reported that some of the major influencing factors in their business activities were the laws and government policies. This can be directly influenced by changes in legislation which include: changes in laws concerning wages, organizational structure and even changes in the management system.

Managers were of the consensus that unstable circumstances of the country during the 1990s were characterized by novel laws, rules, regulations, frequent changes in organizational structure and ministries (Agnaia, 1997). A case in point is at that time, two Ministries of Industry comprising light and heavy industries, were merged into one and named Ministry of Industry. In the year 1999, the government decided to

abolish the same ministry and transferred all firms to the Production Section. These changes made the policies and regulations ambiguous.

Agnaia's (1996) interviews of the managers indicated strong interference from the central authority which affected the firm's day-to-day operations, involving government's organizational budget, employment conditions, as well as personal and managerial appointments. This is further evidenced by a report conducted by the United Nations (UN) mission in 1994. It was clear that the instability of the system for the firms was one of the obstacles, including constant modifications to laws, rules, regulations, and to many unclear issues, such as productivity.

A contrasting view is provided by Abdullah, Kamaruddin and Mohamad (2009), who stated that the major cause of Libya's low efficient manufacturing companies may be attributed to the ineffective system of incentives offered and salary distribution stemming out from the outdated salary system laid down in 1981. Another reason that some studies have cited is that workers were more loyalty to their families and tribes than to the organizations they work for. Libyan managers were wary of social relationships that were being established in the work place (Agnaia, 1996). Along the same vein, researchers, such as Altarhoni (2003) and Agnaia (1996), stated that management procedures in Arab countries were often impacted by personal connections, nepotism, sectarian and ideological affiliations.

Furthermore, major schools of thought like Frederick Taylor and the Human Relations Movement have been tackling productivity since the mid-nineteenth century, and among the factors thought to impact productivity were: the growth of

organized labor unions, technological advancement and the changing role of government. For example, the government's influence on productivity has been always indirectly carried out through labor legislation, consumer protection regulations and even tax regulations, which alter the factors of production allocation.

From the viewpoint of psychology, today's environment is different from how it once was in a way that man-made objects dominate the physical surroundings. Vischer (2007) stated that traditional research on workplace stress has focused on psychosocial factors, organizational aspects, and job design and has ignored the potential effect of the physical environment. Vischer proposed that a poor fit between the physical environment and the needs of the worker may lead to job stress due to the additional effort in accommodating to that environment. The field of study that deals with the affect of surroundings on human beings is known as environmental psychology. It is a study that explains the impact of physical surroundings on the well-being of an individual (Ceylan, & Dul, 2008). In other words, it is imperative to pay attention to a company's work environmental factors because enhancement of these factors may lead to productivity improvement. Some of these physical factors that have been proven to influence creativity include lighting, colour, plants and perhaps furniture (Abdou, Elkholy, & Abdou, 2007). Studies regarding plants, lighting, indoor air, temperature, work quality of environment and even humidity report that these factors have an impact on productivity (Fjeld & Bonnevie, 2002; Abdou, Elkholy, & Abdou, 2007; Tarran, Torpy, & Burchett, 2007; Leblebici, 2012).

The solution to Libyan workers' low productivity is not unattainable, if the firms are facilitated with a favorable work environment, fringe benefits and favorable physical

conditions; factors when in combination will be effective determinants of worker productivity. On the other hand, when these factors are lacking or missing, the worker's sole reason for work is the pay check, and they would therefore come to work physically but not mentally. The importance of work environments has been addressed in the general media, in magazines and journals and in research studies. Therefore, the main aim of the study is to examine the effect of physical and behavior environments upon workers' productivity.

1.2 PROBLEM STATEMENT

According to evidence, the company's regulations, rules and policies are not enough to maintain the effectiveness of employees, and that workplaces are unique to themselves, diverse and ever-changing. The general relationship between employer-employee that was thought of in the past has now changed. In this regard, Khan, Farooq and Ullar (2010) stated that successful organizations achieve the ongoing dynamic changes happening within them and with their employees. Therefore, top management is now responsible to create a significant relationship between their employees. On one end of the continuum, organizations mandate their employees to adhere to the rules and regulations of work based on established standards and on the other end, employees expect good working environment, recognition, fair and equal treatment, career development and their involvement in making organization-wide decisions.

Workers who live in a progressive economy have opportunities to venture into any job they want. These factors help develop an environment in which the business

values employees more than the employees value a specific business (Smith, 2011). According to several theories carried, if a deficiency of need is detected an individual will behave in a manner to eliminate this deficiency or will attempt to look for a new situation with a more positive balance. Deficiencies in the workplace lead, for instance, to absenteeism, transfer requests, quitting the job or quitting the organization. In addition, a person may try to change the working environment by minimizing their inputs or accepting greater outputs changing the inputs and outcomes of other individuals, or attempting to convince others to quit the field.

Unfortunately, not much attention has been given to the issue of decline in productivity among workers in Libya. In the past, the government had turned its attention upon the Libyan industrial sector with the goal of enhancing economic diversification through the expansion of non-oil products. Hence, the Libyan industrial sector received first priority, and a massive amount of funds were appropriated for both regional development and job creation (Almher, 2008).

However, although huge expenditures were granted to the industrial sector, its contribution to the country's GDP was at 8% in 1970 and dropped to 5.9 % in 2000, to 2.2% in 2002, and to 1.9% in 2004. The free fall continued. In 2004, the industrial section contributed only 1.7% to the GDP in 2005, it was valued at 1.3%, and in 2006 it was valued at 1.1%. It eventually dropped even more to 1.2 % in 2007 (Almher, 2008; Shareia, 2006 & Central Bank Libya, 2009).In addition to that, Orna (2014) carried out the industrial sector contributed to GDP in 2012 was 3.2 %.

In the context of Libya, although the country is rich in natural resources, the production sectors are showing poor performance as they fail to employ their resources in an effective manner and thus limiting the output and income. The government of Libya controls most of the enterprises and assets in the country (directly or indirectly) and has in its oversight several poorly performing industries with low productivity (Orna, 2014; Elarabi & Johari, 2014; Masoud & Alkaa'ida, 2014; Vandewalle & Sakala, 2013; Eltaif, 2011). In addition to that, Alqadhafi (2002) wrote that the actual production of 17 of 250 companies studied went over 60% of their designed capacity while the over capacity of the rest of companies (233) ranged from 1% to 35 %. Also, some economic negative aspects such as corruption and low productivity appeared in the Libyan economy (Abderahman, 2014). Furdermore, the production quantities of certain products of petrochemical industries also showed decline in the total production from year to year. Table 1.3 shows the decrease in productivity from 1999 to 2009, and the trends of the fall of the production from 1999 to 2009.

Table 1.1
Decrease in the Total Production

Years	Quantity Products (Tone)	%
1999	106182	100%
2000	114099	7%
2001	100748	-5%
2002	83856.638	-21%
2003	107765.398	1%
2004	109574.014	3%
2005	102266.177	-4%
2006	69072.195	-35%
2007	61887.47	-42%
2008	67874.096	-36%
2009	48898.34	-54%

Source: Abohutha (2010).
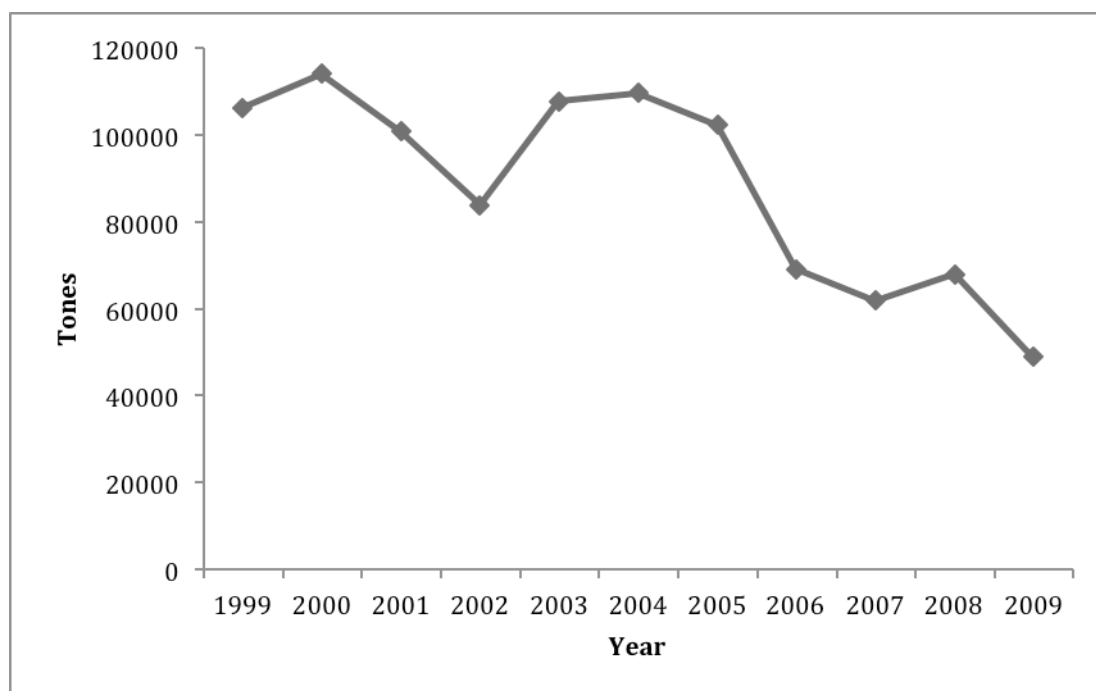
Figure 1.1
Decrease in the Production Volumes

According to Graisa (2014), the analysis results of historical production showed that

the industrial sector was operating at a very low rate of production and productivity

relative to its design capacity. Additionally, the CIID (2007) annual report evidenced

that the Libyan manufacturing companies are faced with challenges when it comes to

planned capacity production. Specifically, five of the companies including three that

operated in steel and iron, cement, and chemical industries, and two in animal feed

industry constituted 74% of the total production. This indicates that the rest of the

manufacturing firms possess very low capacity of production (CIID, 2007). Each

sub-industry's contribution is presented in Figure 1.2 below.
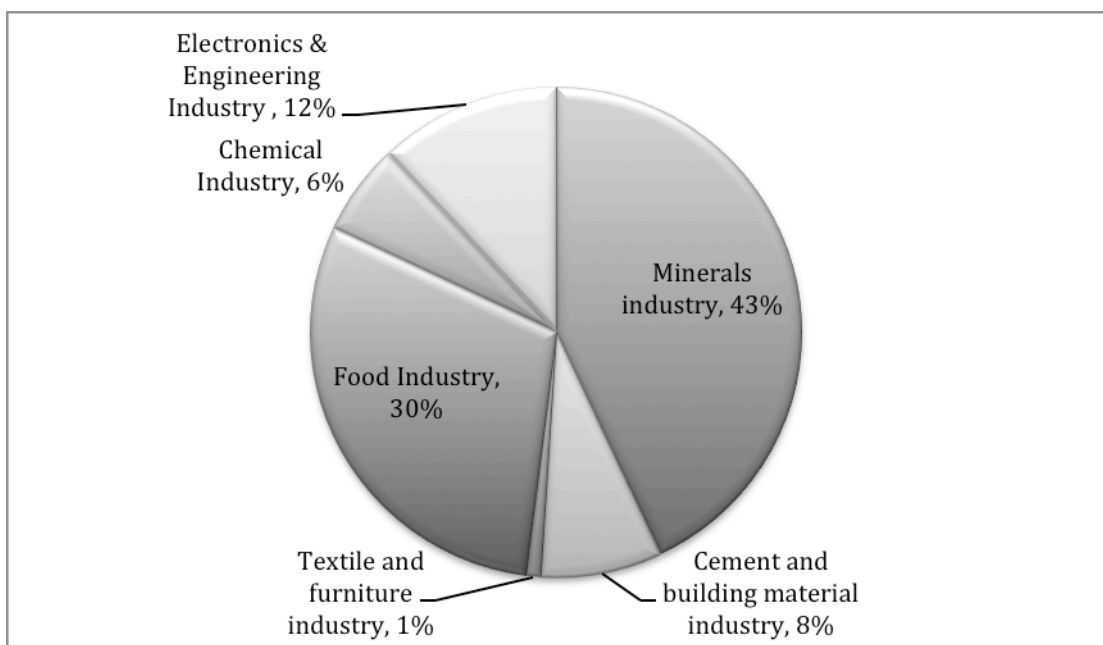
Figure 1.2
A comparison between sub-industries in terms of their contributions (production volume) to the Libyan industry sector.

Based on the figure (Figure 1.2), the greatest proportion of the production capacity

throughout the Libyan industries amounting to 43% was contributed by the mineral

industry. This is followed by food industry at 30%, electronics and engineering

industry at 12%, cement and building materials industry at 8%, and the chemicals

industry at 6%. The lowest contributing industry with regards to total production is the textile and furniture industry.

The dysfunction in production capacity is reflected by the productive employment hours, where the total hours of non-productive time in 2006 were evidenced to be 462,134 hours or 57% of the total work time. This improved by 27% in comparison to non-productive hours in the quarter reported dated 30th September 2006. Non-productive hours cover those for which an employee was paid although no work was done (CIID, 2008). With regards to the employee's negative behavior (e.g. being late at work, absenteeism, leaving before the end of work hours) in Libyan companies, several opinions have been brought forward to its relationship with the work environment (Agnaia, 1996; Altarhoni, 2003). Prior literature presented in Figure 1.3 evidenced that the total number of employees who quit was normal from 2003-2005 but showed a sharp increase to 2,140 employees at the end of 2006. In this regard, the smallest gap between the total number of employees quitting their job and those who were employed is in 2003, while the largest one is in 2006 (CIID, 2008).

Figure 1.3

31
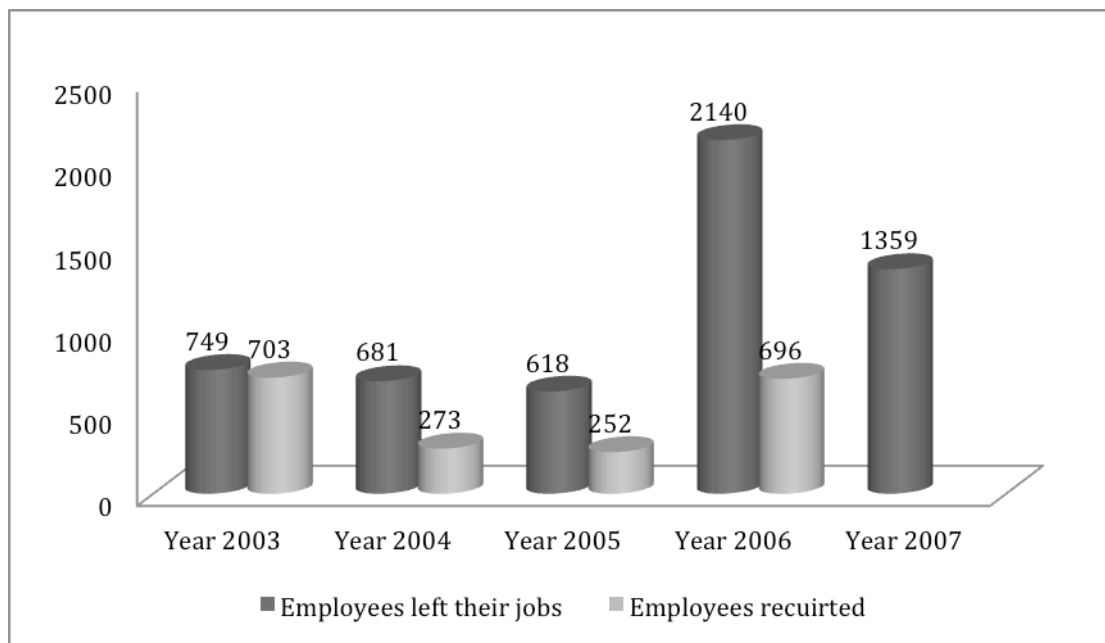
A comparison between sub-industries in terms of the number of employees.
Nevertheless, no reasons were cited as to the employees' leaving their jobs and several answers could be brought about to shed light on the phenomenon in the Libyan industrial sectors. For instance, treatment of workers, where the level of job satisfaction among them directly impacts their productivity, absenteeism, leaving jobs and turnover (Elarabi & Johari, 2014; CIID, 2008; Westover & Taylor, 2010).

According to prior studies, job satisfaction antecedes several organizational productivity aspects. Specifically, Judge, Thoresen, Bono and Patton (2001) reported a significant positive relationship between individual job satisfaction and manager-assessed performance on the job, the relationship was more significant in jobs that are highly complex. Added to this, other studies posited that job satisfaction, organizational commitment, quality of work and productivity are positively correlated (e.g. Liu & Norcio, 2008; Yousef, 2002; Podsakoff, MacKenzie, Paine & Bacharach, 2000). Meanwhile, negative work behavior was evidenced to negatively and significantly relate with job satisfaction (Anbuouli, 2012; Vischer, 2007; Dalal, 2005).

In a related study, Newsham, Brand, Donnelly, Veitch, Aries and Charles (2009) showed that greater environmental satisfaction was related with higher satisfaction with both compensation and management, which are in turn related with higher job satisfaction. They proposed and tested a model where job satisfaction was examined as a mediating variable between job stress and employee's wellbeing. The findings rejected the mediating effect but the bivariate correlations between the two variables were significant and with expected directions. They also tested a model where job stress was examined to be a mediating variables between physical conditions and

self-reported physical symptoms, like the first one, the mediating relationship was rejected. No significant correlations were found between the limited set of physical variables and job stress. But the bivariate correlation between job stress and self-reported physical symptoms was found to be significant and in the proposed direction.

Nevertheless, support for the direct relationship of variables is still lacking. In other words, the question remains whether or not the perception of their work environment directly or indirectly impact workers' job satisfaction, and ultimately result in committed workers to achieving company productivity. Researchers have also focused on the mediating relationship between work environment and organizational outcomes. Among them, Politis (2006), Yousef (2002), and Crede, Chernyshenko, Stark, Dalal and Bashshur (2010) supported the presence of potential mediators like job satisfaction that may explain the significant relationship between negative workplace behavior, organizational behavior, commitment and performance. Despite the advanced evidence of the empirical findings regarding the links, the mediating role of job satisfaction in the physical/behavioral environment-worker productivity relationship is still largely unexplored. Considering the significance of this issue, further studies are needed to investigate the mediating effect of job satisfaction on the physical/behavioral environments-worker's productivity relationship. Thus, this study attempts to determine the influence of work environments in the context of Libya to provide an insight into workers' low productivity.

1.3 RESEARCH QUESTIONS

This study responds to the urgent need to investigate the impact of the work environment as important factors that either enhance or inhibit productivity in Libyan petrochemical companies by providing answers to the following questions:

1.   To what extent do factors in the work environment affect workers' productivity?

2.   Which component of work environment (physical or behavioral) has the greater impact on productivity of the workers?

3.   To what extent does job satisfaction mediate the relationship between work environment and workers' productivity?

1.4 OBJECTIVES OF THE STUDY

The objectives of this study are to:

1.   Analyse the impact of factors in work environment on workers' productivity;

2.   Examine the most important components of work environment, which affect workers' productivity; and

3.   Investigate the impact of job satisfaction as mediating on the relationship between work environment and productivity.

1.5 SIGNIFICANCE OF THE STUDY

This study, in general, discusses the work environment factors that influence productivity in Libya. Low productivity and performance provide significance to the present study to examine the causes of low productivity in the Libyan industries, particularly the petrochemical companies. Also, under the new conditions of the Libyan environment (where local organizations are exposed to foreign investors) has urged the Libyan industries to improve their performance to ensure their position in the market place. Libya has adopted an 'open door' policy in 2003, after a long period of sanctions. The adoption of such a policy has attracted foreign and domestic investors, thereby increasing the speed of economic development. This leaves the productivity in Libya as an important subject in need of analysis and study.

Therefore, this study is critical from both theoretical and practical points of view. As for the theoretical point of view, the study cite three motivational theories that have been used in the interpretation of job satisfaction are Maslow's Need Hierarchy and Herzberg's Motivator-Hygiene Theory and Social Exchange Theory. These theories also try to identify factors contributing to a higher level of job satisfaction and its connection to productivity (Dunnette, 1976).

This study contributes to literature by enhancing the understanding of the nature of the productivity in Libya. Such an understanding is important in that it provides an insightful and useful framework for studying the productivity in some depth. In addition to the contribution to literature, the study anticipates that the findings of this

study may be influential in the formation of views and policy, and will be particularly useful in developing recommendations to regulators, academics, and other studies in general.

Furthermore, workplace environment's effect and importance on workers' productivity is explored in the present study. Human resource management (HRM) experts are convinced of the significance of the issue. In the Libyan context, this is a new topic, and as such, only a few studies have tackled it. Workplace environment in Libya and issues surrounding it have been neglected over the years as it is clear that oversight has been going on when it comes to working conditions, incentives and building assisting facilities. The situation is dire in such a way that workers refuse even to make complaints about them and this leads to the negative impact on their performance in the form of delay in work completion, frustration and effect on personal growth.

This study explores the impact of work environment in the light of physical environments (temperature, lighting, non-cash fringe benefits, and work hours), and behavioral environments (nature workplace behavior, toxic behavior, mistreatment behavior, workers relationship, distraction behavior) on workers' productivity. This study is expected to contribute to developing Libyan economy and increasing standard of living, particularly when an important policy objective of the Libyan government is addressed to poverty reduction. This study is also useful for government agencies and establishments responsible for reviewing and updating policies and legislation.

Previous studies have not examined physical and behavioral environments with mediating job satisfaction. Hence, this study contributes to the body of knowledge through the investigations of the relationship between physical and behavioral environments on productivity, by using job satisfaction (mediating) as a new contribution. In sum, this study attempts to fill the gap and comprehensively contribute to the issue of productivity in the Libyan environment.

1.6 SCOPE OF THE STUDY

The study aims to investigate the perceptions of the workers in the Libyan Petrochemical Manufacturing Industries towards physical and behavioral environments on productivity. The population frame for this study consists of two public petrochemical companies, namely: the chemical company of Ras Lanuf Complex and the General Company for Chemical Industries of Abu-Kammash Zuara.

1.7 ORGANIZATION OF THE STUDY

This study is presented in a sequence of seven (7) chapters. Chapter one (1) provides the introduction to the study. This chapter discusses the importance of work environments to workers' productivity. This chapter also outlines the background statements, identifies problem statements, questions and objectives of the study, finally the significance and scope of the study.

Chapter two (2) reviews the background of Libyan productivity. Chapter three (3) reviews the past and existing empirical works in the physical and behavioral environments, which are specifically related to workers' productivity, and the mediating effects of job satisfaction on the relationship between workplace environments and workers' productivity. Chapter four (4) includes the study framework and hypotheses development. It examines the definitions, theories and measurements pertaining to this study.

Chapter five (5) addresses the research methodology, including the study design, sample and data collection, study instrument, and method of data analysis. Chapter six (6) discusses the results of the study. In this chapter, data analysis and results of the hypotheses testing are presented. Sampling results and screening are first discussed followed by validity and reliability checks for all the variables presented. Descriptive statistics and assumptions for multivariate analysis checks are also included.

The discussion on the results of the analysis as presented in chapter six (6) is further expanded in chapter seven (7), where the study is concluded through the interpretation of data that delineates major issues related to the testing of the hypothesis. Implications of the study are put forward along with suggestions and recommendations for future study.

CHAPTER TWO

THE BACKGROUND OF LIBYA

2.0 INTRODUCTION

The Libyan economy has been constantly impacted by both the price of oil and the legacy of economic policies and structures emphasizing the State's leading role. It is without a doubt that oil and natural gas are both strengths and weaknesses of Libya, as well as that of the North African sub-region. According to the International Monetary Fund (IMF), that has been happening for decades, revenues from the two sources constitute the major portion of the economic activity and export revenue (IMF, 2008).

Libya occupies a total area of about 1,759,540 km^2 of the North African continent, spreading from the Mediterranean Sea in the north to the borders of the Republics of Chad and Niger in the south, and the Egyptian border and the Sudan in the east to the borders of Tunisia and Algeria in the west. According to the Central Intelligence Agency (CIA), based on the census of June 2013, the total population of Libya is 6,002,347 people, and the annual growth rate of population is around 4.5 %, exhibiting one of the highest population growth rates in the world (CIA, 2013).

The Libyan economy is heavily dependent on the hydrocarbon industry based on the IMF (2008), accounted for over 95 % of export earnings; an estimated 85 − 90 % of

fiscal revenues, and over 70 % of the country's GDP in 2008. This means that Libya's economy is heavily dependent on revenues from natural resources with the oil sector providing nearly all of its export earnings, constituting more than two-thirds of GDP. This lack of diversification however means that its economic growth depends on the international oil market.

However, expanded economic activity has become possible with the 2003 lifting of the UN economic sanctions against Libya. The Libyan government has decided to move to a more opening economy (IMF, 2006), and following that decision, further diversification, privatization and reforms in the banking and financial sector have been carried out (Shareia, 2006). However, the nation's unique characteristics, including its political and religious agendas, suggest that, similar to other nations emerging into global capital markets (Cooper, Greenwood, Hinings, & Brown, 1988; Caramanis, 2002).

Libya's income precludes its being classified as a developing according to World Bank guidelines, but with its first stock exchange operating since 2007, it could more accurately be categorized as an emerging economy. This term has generally been used to describe the gradual incorporation of developing economies into the venue of international financial markets (Akyüz, & Cornford, 1999). Libya, like many other emerging nations (IMF, 2007), has attempted to enter into the global economy by moving towards privatization and establishing a stock market, and by embracing the technologies of capitalism and globalization, including accounting, which brings inevitable conflicts with national politics and identity (Cooper, Greenwood, Hinings, & Brown, 1988). Consequently, it faces challenges in adopting economic policies

(including privatization) and regulatory systems prevalent in western nations. These challenges are similar to those experienced by the much less wealthy developing economies (Shareia, & Helen, 2009).

The Libyan economy depends on the oil sector, which it is solely concentrating on, thus leading to lack of efficiency in the management of other sectors (Dominguez, 2003). Libya promotes foreign investment with the integration of the globalization process. Most of the attractive sectors open to foreign investors are the tourism sector, cement and construction sectors. However, some kind of limited economic openness took place during the sanction by the UN, as private entities were allowed to participate in certain fields only, such as trade and some light industries.

Therefore, such openness emerged in a disrupted form, as the existence of monopolist institutions (supported by laws for maintaining their monopoly) continued and the powers of certain institutions expanded to an extent, making them control many policies and decisions affecting the backbone of the economy, and therefore leading to occurrence of many adverse results.

Thus, many economic activities are still subjected to numerous criteria and restrictions that have led to the occurrence of black market, corruption, and inflation. The monopolist policies adopted by certain public bodies has led to higher prices and bad quality as a result of low competition.

2.1 OVERVIEW OF LIBYAN INDUSTRY AND ITS PRODUCTIVITY

In Libya, the public sector was once in control of most economic activities, and this economic character is often attributed to countries that go through socialist transformation. The emergence of the public sector control over the economy is a result of the Libyan revolution, which purposely nationalized some private projects and construction of new projects to control the production and distribution of goods and services. Invariably, the roles of the private sector were reduced.

In the seventies and early eighties, a series of laws were enacted, and a set of economic decisions were taken, which gave the public sector complete control over all economic activities. It is clear the state dominated most economic activities. Under these legislations, the private sector was marginalized. Therefore, the major tasks in production and services were literally assigned to the public sector.

Based on the above, in the last twenty years, a number of problems arose and developed, that were related to the nature of economic performance under the control of the public sector. This was prevalent in most Arab countries, despite differences in acute problems within them and the different nature of their economies. The domination of the public sector and the effects of state control over the economic activity and within the individual initiative resulted in a number of problems, such as low productivity levels, higher production costs, and lower quality (Hokoma & Khan, 2010; Abdullah & Mohamad, 2009).

In the context of Libya, a persistent decline in productivity has become a major issue in the economy and businesses over the past years. A prime example can be found in the report of economic brief (2013) stated that a large number of badly performing industries and in the Reports of the General People's Committee People's Control and Follow-up, (1999) which stated that 250 factories comprising the industrial sector, excluding 17 locally manufactured commodities, achieved production that exceeded 60% of their maximum capacity of production, while the production rates in other industries ranged between 9 - 59% of their maximum capacities. In addition, the production proportion achieved according to maximum capacity failed to exceed 30%, the Libyan industry was contributed by the Mineral industry, followed by Food; Electronics and Engineering; Cement and Building Materials; and Chemical with 30%, 12%, 8%, and 6% respectively. The CIID (2007) annual report noted that Libyan manufacturing companies have typically faced difficulties in achieving the planned production capacity.

In an attempt to rectify the status of the factories and to increase their productivity, the government intervened in the marketplace, through liquidation, nationalization or subordination of companies. The consequence of these policies was the transfer of 31companies in the industrial sector and an investment of about 1 billion dollars. Despite these efforts, productivity has remained a major issue were that public factories and companies constantly face (Alqadhafi, 2002; Shareia, 2006; CIID, 2008; Central Bank Libya, 2009. Many studies conducted on factories have shown declining labour productivity year over year in the manufacturing sector The lower production rates in manufacturing companies and the large number of workers, clearly indicate low labour productivity, More recently, Vandewalle's (2013)

economic brief, supported notion that Libyan manufacturing suffered from poorly performance.

An increasing body of research lends support to the idea that negative behaviors at work in Libyan companies may be related to the work satisfaction (Agnaia, 1996; Altarhoni, 2003). Such negative behaviors have been evinced in non-productive time and employees leaving their jobs. For example, the total hours of non-productive time during 2006 was 462,134 hours, or 57% of the total work time. The total number of employees who left their job and those who were recruited was small in 2003, but a large gap between the two occurred in 2006 (CIID, 2008). These factors seem adequate indicators of lower labour productivity and bad performance (Ministry of Economic & Trade, 2009; CIID, 2008; Vandewalle, 2013).

The phenomena of lower productivity levels in addition to higher production costs, and lower quality of products, are considered as inevitable results of misuse of economic resources on the one hand, and bureaucracy and administrative corruption on the other.

All these phenomena represent indicators of default in the economic administration, which can only be eliminated by radical reform of such management. Moreover, this was also noted in the Report of the People's Board for follow-up 1999, regarding the study of production costs in certain companies pertaining to the strategic industries sector, such as Truck companies, Abu Kammash complex and national smelting company. Most of the national/local products are high in cost compared to similar imported products. This is attributed to certain reasons, i.e., the establishment of

certain industries without conducting adequate economic and technical feasibility studies, lower operating capacity as compared to design capacity and work in most factories for one shift. Thus, this leads to lack of optimal use of machinery, clear shortage of certain operational equipment, lack of spare parts and failure in keeping active maintenance work, shortage of training and rehabilitation programs in productive units and higher rate of administrative and service manpower as compared to workers in production, large dependence on foreign manpower and lack of attention to cost accounting system and elaboration of appropriate budgets.

Most of the companies suffer from many problems reflected directly or indirectly on the lower production capacity thereof and higher production costs, as mentioned in the Ministry of Economic and Trade, (2009). In this report, it is noted for instance, that in the Arab Cement Company, the management committee of the company lacks co-ordination between the production units, especially with respect to purchase operations from abroad. In addition to this, it lacks control over running and control of work in the factories and discipline among workers, thus resulting in, and for other reasons, suspension of production in certain factories.

The oil sector itself, despite the possibilities it enjoys, was not shielded from the problems encountered by other sectors as a result of improper management and its centralized and bureaucratic nature. The number of faulty rigs was about 14 at a rate of 41% of the total number of 34 operating rigs. This situation in oil companies has adverse effects on the exploration and production activities within the sector. It is also noted that production rate is low in certain oil sector companies. The production rate in the Zawia asphalt unit decreased, reaching about 30% of the envisaged level,

while the production rate in the Benghazi asphalt unit did not exceed 41.7% of the envisaged production and 41.5% of heavy oil/diesel.

Moreover, it is noteworthy that certain studies conducted on certain companies indicated lower labor productivity level from one year to another. Regardless, the shares of producers/workers and their salaries remained fixed and were not affected by lower productivity level. This is a clear example of misuse of economic resources. Therefore, local commodities decreased and disappeared from markets.

In an attempt to solve productivity problems, dozens of companies often apply different types of methods of innovative management (Balas, 2004). For example, some agencies hailing from the private sector carried out incentive programs to motivate workers and to maximize their productivity. However, several motivational techniques carried out in the private industry were lacking in the public ones (Moe, 1982). Public sector workers did not have the luxury of negotiating for their salaries. As a result, better performing workers received the same as poor performing ones. It can be stated that relationship between pay and job performance in the private sector was lacking in the public sector. In addition, organizations in the public sector were not driven by profits; therefore, workers' payment lacked competitiveness (Steers & Porter, 2000).

The productivity push from public sector agencies is not a novel issue (Steers & Porter, 2000). Factors affecting productivity may be important but the mid-level managers' attitude and way of management were the core factors that influenced worker productivity (Caldwell, 2001). A manager's core task is to motivate people in

the organization for optimum performance (Christensen, 2002). Moreover, the more adept a manager is in answering questions regarding worker motivation, the more desirous he will be of maximizing productivity, enhancing productivity, enhancing performance and carrying out organizational accountability (Cherniss, & Jeffrey, 1987).

2.2 THE PETROCHEMICAL MANUFACTURING INDUSTRIES IN LIBYA

The petrochemical manufacturing companies in Libya, namely Ras Lanuf, and Abu Kammash Complex.

2.2.1 The Chemical Company of Ras Lanuf Complex

The pioneering industrial zone in Libya was established in 1960 by a petrochemical complex called Marsa Al Brega; a methanol and fertilizers manufacturer. Of the refineries in the zone, Ras Lanuf refinery produces petrochemicals, through the utilization of naphtha as a feedstock to an ethylene plant having a capacity of 1.2 million TPY (Tons Per Year). The refinery's main products include: ethylene (330,000 tpy), propylene (170,000 tpy), mix C4 (130,000 tpy) and gasoline (335,000 tpy). On the other hand, the National Oil Corporation (NOC) possesses two polyethylene factories comprising High-density polyethylene and linear low-density polyethylene with individual capacities of 160,000 mt/year. These factories produce many products, which are eventually exported.

2.2.2 The Chemical Complex - Abu Kammash, Zuara

Abu Kammash Company was established in 1978 with capital of sixty million and with investment capital of 329,000,000 LD. The company is one the petrochemical producing companies in Libya with six factories at the Abu Kammash complex comprising salt plant, electrolysis plant, Vinyl Chloride Monomer (VCM) plant, Polyvinyl Chloride (PVC) Plant, Granulating Plant and Gases plant, situated at the western coast of Libya, about 150 km west of Tripoli.

2.3 SUMMARY

This chapter has discussed the Libyan economy in general and its main characteristics in particular, starting by reviewing the historical background and the political system. Moreover, this chapter has shown the issue that reflects the persistent decline in productivity over the past three decades. However, despite the efforts made by the state to diversify economic resources, it is clear that the contribution of public industrial companies to GDP has remained low compared to the huge spending on this sector and low achieved capacity of industrial sector compared to the design capacity. Therefore, this study endeavors to address and comprehensively contribute to the issue of productivity in the Libyan environment.

CHAPTER THREE

LITERATURE REVIEW

3.0 INTRODUCTION

Productivity is considered crucial in every organization. Productivity enhancements are known to affect various economic and social aspects, for instance, economic development and living standard. Hence, it is imperative that companies constantly carry out productivity enhancements to obtain sustainable profits (Hannula, 2002; Sink, 1983).

Based on this principle, productivity can be affected by a variety of internal and external variables, which are categorized as general factors, including, climate, distribution of raw materials based on geography, fiscal and credit policies, sufficiency of public utilities and infrastructure. Organizational and technical factors cover integration level, capacity in percentage, productivity size and stability; whereas human factors include labor-management relations, work conditions encompassed in social and psychological aspects, salary, incentives, physical weariness and trade union practices.

According to Brenner, Fairris and Ruser (2004), the worker's ability for knowledge sharing throughout the system in the organization hinges on the working surroundings. A survey conducted showed that corporate executives from differing

industries stated that most organizations do not take advantage of their work surroundings to increase collaboration, innovation and to enhance work effectiveness. It has also been noticed that workers are more productive in an effective work environment. It can be stated that the comfort felt from the work environment shows the degree of worker satisfaction and productivity. In other words, workers cannot be productive if the working surroundings are not conducive to the accomplishment of work tasks.

A work environment that is conducive will lead to worker productivity. For instance, offered health facilities result in workers' protection of life. If there is any hazard on the job, they are assured of some compensation. This compensation works to decrease the wariness of workers of putting a 100% effort into their work. The organization's performance reveals its sustainability and growth, which depend on the productivity of its workers. Additionally, a country's wealth and the health of its socio-economy is based on the effectiveness and efficiency of its different sub-components (in general, labor is considered as the most active of all factors that are utilized for the development and creation of wealth, as it has the ability to catalyze other resources). It can therefore be said that productivity is basic to an individual worker of any level, to the organization, both commercial and non-commercial, and finally to the national economy, to the development of the citizens' welfare and to the reduction or eradication of poverty (Akinyele, 2007).

3.1 DEPENDENT VARIABLE

3.1.1 Defining Productivity

According to Roger (1998), productivity can be defined as that which people can produce with little or no effort. In addition, Bell (2004) defined it as the maximized functional as well as the firm's performance with the inclusion of quality. It is also defined as the ratio of the level of organization proficiency in processing input resources (labor, materials and machines) into goods and services.

Bohlander and Snell (2010) argued that employee productivity is the result of combination of employees' abilities, motivation, and work environment and the technology with which they have to work, where since productivity can be defined as "the output gained from a fixed amount of inputs," organizations can increase their productivity either by reducing their inputs (the cost approach) or by increasing the amount that employees produce, by adding more human and/ or physical capital to the process.

In the services sector, performance tends to increase with less worker absenteeism, lesser workers leaving before time and less breaks. Increase in performance can be calculated through the number of units manufactured by worker for every hour. For the purpose of this study, subjective productivity measurement method is utilized where the measures do not have their basis on quantitative operation information but on personnel's subjective assessments.

Based on Wang, and Gianakis' (1999) study, subjective performance can be defined as an indicator utilized for the assessment of individuals' aggregated perceptions, attitudes or assessments towards an organization's product or service. Subjective productivity data is generally gathered through the use of survey questionnaires.

3.1.2 Low Productivity

According to Mali (1978), productivity can be considered as the measure of how organizations bring together resources and utilize them to achieve a set of results. It is described as reaching the maximum level of performance through the use of the least expenditure of resources. In addition, worker productivity refers to the volume of goods and services produced or provided per worker within a certain unit of time (year, month, week, day or hour). In other words, productivity refers to the workers' power or ability to turnout used values (goods and services) which is considered normal at a given state, technique and organization (Lambert, 2005).

According to Agnaia (1997), the administrative relationships have gradually become dependent on personal as opposed to objective evaluation in Libyan industrial companies. For instance, during the official working hours, only little focus is given to the importance of time as workers spend most of their time entertaining visitors, an activity considered akin to socialization. Additionally, they fail to observe official working hours resulting in delayed performance of duties, arriving late in the morning, absenteeism, and leaving before the work time is over. This personal physical condition has a negative impact on the work environment.

3.1.3 Importance of Productivity in an Economy

Economic productivity is referred to as the cost of factor input and its output's value. For instance, this leads to reduction of cost of production and an automatic increase in consumer welfare because of price reduction, if persistent improvement takes place in productivity. However, in practice, productivity is almost impossible to measure. On the other hand, productivity has been known to increase through unemployed labor, increasing work environment or under trying circumstances. Therefore, all hope is not lost for increasing productivity. Nevertheless, if productivity is achieved through the above-mentioned activities, then in actuality, productivity is not improved but worsened. This calls for the need to approach productivity in an appropriate manner. Moreover, the measurement of productivity services should not be taken for granted, as services output is almost impossible to accurately measure. The importance of productivity is discussed below in Table 3.1.

Table 3.1
Productivity Important in an Economy

Efficiency and Profitability	Productivity generally improves both profitability and efficiency
Economy Rate	Productivity enhances economic growth
Income Level	Productivity increases real income of workforce
Consumption Level	Productivity increases the standard of living
Investments	Productivity improvement enhances the international investors confidence

Source: Alqadhafi (2002)

Furthermore, productivity can be improved with the available quality capital and labor resources, specifically with: skilled and semi-skilled workforce, the quality of

54

social, physical and technological infra-structure, the flexibility of the labor market, capacity of private and public institutions and the incentives to innovative and consistent technological dynamic development, level of study and development and the quality of education and training system. Additionally, it may also hinge on the kind and level of business, taxation, and the regulatory system. Hence, excessive regulation of the system may have negative impact on productivity leading to discouragement of business investments in productivity enhancing activities owing to the cost and the risk involved.

3.1.4 Relationship between Work Environment and Productivity

Longman's contemporary dictionary defines work environment as encapsulating situation, events and people that impact how people work or live; and defines work as the job one is paid to do or an activity one does in exchange for money.

A definition of work environment was provided by Johnson, Lenartowicz, and Apud (2006) in its entirety, as the aggregate forces, actions and other factors that potentially affect the workers' activities and performance. It describes the totality of the interrelation among workers and their work surroundings.

Productivity for employees is very important because through the work that the employee performed it helps in the growth of the company. If the company grows and develops, the benefits will be increased so that the bosses will not only be happier but they will hire more people and give raises to those doing a good job and increase of benefits for them. Schroeder, Goldstein, and Rungtusanathan (2011)

argued productive employees are essential in delivering value to the customer. Productive employees lower the costs of operations and ensure satisfied customers when supported by management and appropriate technology and system. Daft (2008) and Haenisch (2012) confirm that increasing employee productivity means having workers produce more output in the same time period. They added that the companies can improve employee productivity by establishing the means for existing employees to do more, such as by acquiring more efficient technology, by improving work processes, or by training employees to work more efficiently and workers would eliminate bureaucracy, supervisor better, and improve communication.

Further, Brenner, Fairris and Ruser (2004) carried out that knowledge sharing in the organization depends on how the work environment is designed to facilitate organizations' leveraging of work environment as an asset. This will assist organizations in their effectiveness enhancement and it will enable workers to take advantage of the collective knowledge. Brenner (2004) and (Robbins & Judge, 2011) also stressed that work environment designed towards workers' satisfaction and free flow of exchange of ideas work as an effective medium to motivate workers towards displaying higher productivity. In other words, when suitably designed, work environment motivates workers towards better and higher productivity.

Lambert's (2005) study revealed that various management functions in the work area act as the major elements that hinder greater productivity. Lambert (2005) included provision of adequate fringe benefits, supervision and work methods in these factors. He stated that the direct measurement of labor productivity is very rarely done but it

is implied from the transformations in workers' attitude and behavior, such as organizational commitment, organizational citizenship behavior and job satisfaction.

On the other hand, Abdou, Elkholy and Abdou (2007), reported that work environment comprises factors, which either contribute positively or negatively to the achievement of maximum worker productivity. He was unable to measure the job design's effectiveness without the knowledge of the working environment's design. The factors contributing positively or negatively to worker productivity include: temperature, humidity and air flow, noise, lighting, workers' personal aspects, contaminants and working environment hazards and types of sub-environment.

Through a work place index survey conducted for steel cases, Brenner, Fairris and Ruser (2004), listed what workers want and the factors that are expected to positively impact workers' productivity, including better lighting, more elbow room, creative methods for assessing space, personalization, more on-the-spot meetings for acknowledgements and worker involvement in making decisions affecting their daily work. An organization desirous of guaranteeing worker productivity enhancement will leverage tools for managing work environment within the work environment. In other words, an appropriate work environment requires the environment to be attractive, creative, comfortable, satisfactory and motivating to workers so that they may feel a sense of pride and purpose in their tasks (Vimalanathan & Babu, 2013).

An independent firm carried out a study regarding U.S. workplace environment in March 2006. The study was carried out with the help of a survey distributed to 2013 respondents and it involved the study of workplace designs, work satisfaction and

productivity. Most respondents (89%) stated work design's considerable importance in their perceptive with 90% of senior officials linking work place designs to workers' productivity. In conclusion, the survey revealed that businesses have a chance of improving their productivity if they improved their designs. In other words, approximately 22% of the respondents believed that if offices are designed effectively, this will lead to an increase in the company's performance (Gensler, 2006).

A summary of data revealed that one in every five workers stated that their workplace environment rated from 'fair to poor', while 90% of workers claimed that their work attitude is negatively impacted by the quality of their workplace surroundings. It comes as no surprise that 89% of the workers cited their working environment as the reason for job dissatisfaction (Gensler, 2006).

3.1.5 Productivity Measurement

Based on Sink's (1983) study, a company's overall performance can be categorized into the following requirements: effectiveness, efficiency, quality, productivity, quality of work life, innovations, and profitability.

Hence, productivity is essential for all organizations' success and in addition, based on Hannula's (2002) study, it is imperative to improve productivity in order to obtain profits. Thus, it comes to reason that productivity needs to be managed.

Productivity is considered as output divided by input used in the production of the output; output comprises products or services and input consists of materials, labor, capital and energy. Therefore, it can be stated that productivity is impacted by quantities of both inputs and outputs and not profitability which is a closely related concept impacted by the changes in prices of both input and output (Hannula, 2002).

The measurement of productivity is known to be one of the practical and effective tools to carry out productivity management, as total productivity can be measured. Total productivity can be defined as the total output divided by the total of all inputs. Despite the simplicity of total productivity as a concept, its measurement is almost impossible in practice. The problem lies in the various products and services and the various inputs in the form of labor, material and energy that are challenging to sum up. A clear solution is to utilize monetary values to sum them up but then, in this case, the issue of profitability measurement would arise (Hannula, 2002).

However, there are many practical methods to measure productivity and the most widely used is partial productivity measures. Partial Productivity Ratio measurement is possible through the division of the total output by an input factor. For instance, labor productivity can be calculated as the ratio between total output and labor input. However, if it is impossible to calculate partial productivity ratios due to absence of the total output figure, then an even more simple method can be utilized which involves dividing a typical output (number of serviced customers or production amount of main product) by an essential input - machine hours or labor hours (Hannula, 2002).

When the extraction of data needed for partial and physical productivity measures are impossible, then indirect or surrogate productivity measurement can be utilized. Sink (1983) stated that this type of measurement encompasses various factors and managerial ratios that are overlooked in the concept. The general idea of indirect productivity measurement is that certain phenomena are related to productivity problems, e.g., high defect rates, machine defects, unused capacity, high material scrap, unnecessary transport, poor atmosphere and long waiting times. These measures concentrate on factors that are related to productivity. Therefore, to identify these factors, specific measures are used. Some indirect factors influencing productivity include work related negative activities, like (absenteeism), work climate (worker turnover and job satisfaction), feelings or attitudes (favorable reactions), new skills (decisions made), development or advancement (request for transfer), initiative (successful completion of projects) and physical work environment (Smith, 2011 & Hannula, 2002).

Through the measurement of the productivity linked surrogate factors, one may obtain practical, surrogate productivity measures that provide indirect subjective productivity information utilized to expound on the causes of productivity changes.

The basis of subjective productivity measures is not quantitative operational information but personnel's subjective assessments. Based on Wang and Gianakis' (1999) study, subjective performance measure can be defined as an indicator utilized in the assessment of an individual's aggregated perceptions and attitudes, or assessments of the product or service of the organization. Moreover, it is a method for obtaining productivity information through the collection and analysis of the

assessments of relevant stakeholders' point of view regarding direct or indirect productivity of the measurement object.

The difference between an objective and a subjective productivity measure primarily lies on their basis; whether they are quantitative data of operations based on beliefs, perceptions, or attitudes. The collection of subjective productivity data is normally carried out through survey questionnaires, and in case they are qualitative, they are collected through interviews. They are collected from various personnel, such as workers, supervisors, and even clients, customers or suppliers (Clements & Kaluarachchi, 2000).

Smith (2011) stressed the validity and reliability of both objective and subjective productivity information and the representation of completed products and processes. However, in most cases, the output-related information is lacking, and therefore, information may be gathered from different sources.

Akin to objective productivity measures, subjective productivity measures can be in the form of direct or indirect measures. Realistically speaking, adjectives such as 'objective', 'subjective', 'direct' and 'indirect', merely describe particular features of measurement situation as presented in Figure 3.1. In other words, 'direct' or 'indirect' is a description of the approach used in measuring the object's measurement, in this case, productivity. In addition, objective and subjective measurements show the qualities of measurement data and are connected to the data collection method.
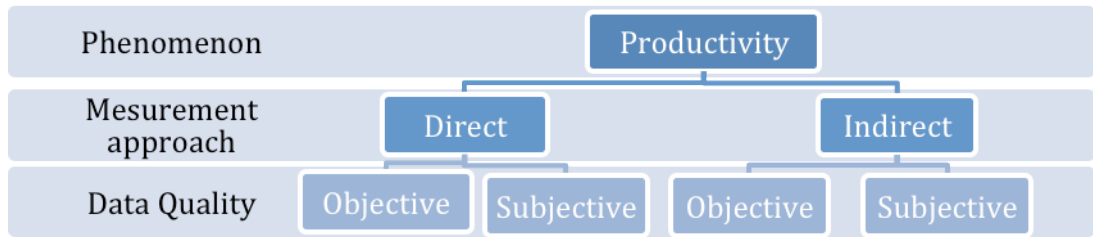
Figure 3.1
Different Approaches of Measurement

Moreover, direct subjective productivity measures offer direct information regarding productivity or productivity changes without the use of surrogate factors. Survey questions regarding a worker's own productivity constitutes a direct subjective productivity measure. For instance, such a question may be constructed as "on a scale of 1 to 4, how has your productivity changed during the last year?".

Black and Lynch (2001), and Hannula (2002) highlighted the differences in various types of productivity measures as in the Table 3.2 below.

Table 3.2
Examples of Different Productivity Measures

Productivity measures	Direct Measures	Indirect Measures
Objective	Partial and Physical Ratios	Absenteeism, Unnecessary of Transports, Unused of Capacity, and Long Times Waiting
Subjective	Survey Questions According Worker's Perceptions of Their Own Productivity	Survey Questions According to Unused Capacity, Unnecessary Transports and Long Times Waiting

On the other hand, indirect subjective productivity measures deal with surrogate factors, which include work habits, job satisfaction, waiting time and searching time. In other words, they provide subjective information about these factors, for example, a survey question regarding worker's perception of required waiting time.

On the basis of Clements and Kaluarachchi's (2000) study, the major pluses for subjective productivity measures are the fact that they are easy to implement, they have reasonable costs, and they provide a variety of methods. For example, one question can cover a whole topic and it is easy to change or add questions to the interview or questionnaire. In addition, respondents will receive the same questions and thus, fair comparisons can be carried out on most responses. Moreover, large samples may be included in the survey in a cost effective manner and data analysis and verification are simpler when large samples are involved from various different groups (Leaman & Bordass, 1999). Nevertheless, the respondent of the surveys always faces some amounts of trouble, and therefore, the survey design may take some effort and time to accomplish.

Subjective productivity measures may not possess the quantitative attraction of objective or physical measures, but they are more suitable to utilize because individuals are generally inclined to work according to their feelings no matter what the objective productivity measures imply. As Smith (2011) stated, belief itself, whether it is true or false, has the power of affecting productivity. Nevertheless, although people are fine judges of their abilities and are capable of providing a

description of their own productivity, the 'best' way to assess productivity has yet to be determined.

In addition to the discussed measures' importance, considerations, reliability and validity should also be kept in mind. Validity is the ability of the measurement to measure what it is meant to and in theory, the validity of direct subjective productivity measurement is good because related questions can be made suitable to every case. The questions can also cover the phenomenon extensively. However, practically speaking, subjective productivity measures do not possess perfect validity. Similarly, there are issues in the validity of objective productivity measures as well. In other words, any kind of measure is more or less a compromise when it comes to validity (Hannula, 2002).

On the other hand, reliability is considered as the consistency of measurement outcome. Williams (1985) stated that reliability determines the level of effective measurement. Some subjective productivity measures may prove inaccurate if there is merely one question dedicated to productivity. In other words, the use of several questions in the questionnaire may lead to equivalence improvement.

Furthermore, based on Leaman and Bordass' (1999) study, respondents normally utilize personal reference points when determining productivity questions and therefore, the measures are usually biased.

It is well-known that subjective productivity measures are used in studies concerning the determination of the relationships between work environment and productivity;

studies use two categories of subjective measures, namely direct and indirect subjective productivity measures, which signify how productivity has changed during the last year, and measures that help examine the influence of certain work environment factors on productivity, respectively.

Studies often come up with instances whereby subjective productivity measures are practically used. For instance, Woods (1981) utilized them to study the relationship between thermal environment and productivity. Additionally, studies also made use of objective productivity measure (average time for doing a task). As a whole, the questionnaire has three questions concerning productivity. On comparing the findings of subjective and objective measurement, no relation was found because of the problems in the objective measures. The questions used were: At the moment, I am working harder than I usually do or not working harder as I usually do; I have done work more than usual today or not more than usual; The leftover work I have today is more than or less than usual.

In another study by Morris and Dennison (1995), subjective productivity measures were used in the office environment survey where respondents are asked to assess the office conditions impacting on their productivity. There was no representation of scale and the assessments were aligned with the number of symptoms.

Similarly, Wyon (2004) utilized the subjective productivity measures to highlight the link between indoor air quality and workers' comfort and wellbeing in a study involving 600 workers via a telephone survey. Questions such as the following were posed: Do you face challenges in your work due to air quality? The answers were

scaled from 'often' to 'never'. The respondents provided their answers in their homes and based on the studies, the respondents probably would have been more effective in answering if they had been interviewed in their work areas.

In a related study, Leaman, and Bordass (1999) studied what they referred to as the "killer" variables, namely, personal control, responsiveness, building depth and workgroups; and how they impacted productivity. Because of the impossible way of meaningful measurement and comparison for all workers, productivity measurement was flawed. A question on productivity stated: According to your estimation, how do you think your productivity at work is increased or decreased by the environmental conditions in the building. The question was measured from a scale of 'increased by 40 % or more' to 'decreased by 40 % or more'.

In another related study, Clements and Kaluarachchi (2000) made use of the subjective productivity measure to explore the link between the working environment and wellbeing, inspiration and comfort. The questions entailed the following: to rate the degree of productivity on a seven-point scale signifying extremely dissatisfied to extremely satisfied; and to rate the percentage of increase in productivity in a problem free environment on a five-point scale.

Hameed and Amjad (2009) explored the impact of temperature on self-assessed productivity and the questions entailed answering the following: To what level has room temperature impacted your normal productivity during the last two weeks? The answers ranged from 'no effect' to 'bad effect'.

Leaman and Bordass' (1999) study used subjective productivity measures in an attempt to study the office environment. Productivity was measured through workers' rating level of how the indoor environment affected their productivity. The question entailed answering the following: Kindly rate the level of how the physical conditions at work impacted your productivity. The scale ranged from 'conditions increase this by 40 % or more' to 'conditions decrease this by 40 % or more'. They justified the validity of the scale although the actual percentage may have been erroneous, thus signifying that the most valid point is zero; a point where it is possible to conclude the absolute degree of productivity.

Kildes, Wyon, Skov and Schneider (1999) tested the validity of the questionnaire through visual analogue scales in a study involving cleaning intervention in order to find out a simpler method of analysis. According to their findings, the assessment through visual analogue scales may have been sensitive to minute changes compared to category scales for changes over time. The scales were stable when used in different ethnic and cultural groups. They stated that a visual analogue scales questionnaire might be used instead of traditional questionnaires.

Similarly, Wyon (2000) carried out a study concerning the impact of two experimental interventions on health and self-estimated productivity. These interventions lead to the decrease of the air-borne dust levels in work places. The studies utilized the same visual analogue scales for productivity used by Kildes, Wyon, Skov and Schneider (1999). The study sample was asked to state the level of their effectiveness in a particular day from a scale of 0 to 100 % of their capacity.

3.2 INDEPENDENT VARIABLES

3.2.1 Work Environment

3.2.1.1 Physical Environment (PHYE)

3.2.1.1.1 Temperature (TM)

Among the most fundamental characteristics of indoor environment is indoor temperature. Opinions have been contradictory regarding the optimum temperature suitable for the comfort of human beings (Seppanen, Fisk & Lei, 2006).

In the same line of that, Seppanen, Fisk and Lei (2006) countered the opinion by stating that the optimum temperature for productivity is less, and registers at approximately twenty two degrees Celsius. However, both sources are of the consensus that the wrong temperature will lead to less productivity, and both assert that temperature is crucial when considering work environments.

The temperature within buildings is different in different seasons and conditions. The effect of temperature on comfort has been generally categorized, but its effect on the productivity of workers should be taken more into consideration. On the basis of Federspiel, Liu, Lahiff, Faulkner, Dibartolomeo and Fisk's (2002), study, 18.4% of workers' complaints and feedback were concerning indoor environment in a data set gathered from 575 buildings in the U.S. Moreover, 77% of this category of complaints cited too hot or too cold environments. According to the authors, the rate of complaints depended on the average room temperatures and its standard deviation within the workplace.

A study conducted by Niemela, Hannula, Rautio and Reijula, (2001) indicated productivity decrement in call centre workers, corresponding to 1.8% per Celsius, when the temperature was above 25 degrees Celsius. In another experiment performed in the same call centre, a productivity decrement of 2.2% per degree of heating was reported when the temperature was increased over to 25 degrees Celsius.

Furthermore, Lan, Lain, Pan and Ye (2010) carried out an investigation of three different indoor temperatures' (17°C, 21°C and 28°C) impact on productivity, and revealed workers complaining in both the coolest and warmest of these climates, of being less motivated and experiencing work overload which consequently decreased productivity. These results are aligned with those of Niemela, Hannula, Rautio and Reijula (2002), who revealed that temperature above 25°C negatively impacts productivity. The General Services Administration claimed a 9% productivity improvement in air-conditioned offices in Washington, whereby errors and absenteeism decreased by 1% and 2.5% respectively. These improvements were lauded as they prevented the closing of offices in extreme hot weather.

Leaman (1995) carried out a survey to determine the relationship between indoor environment, dissatisfied employees, and their productivity. Based on his results, the workers' productivity is impacted as they were unhappy with the environmental aspects, including temperature, air quality, lighting, and noise levels in their offices. In addition, Several scholars have studied environmental factors. Yusof, Deros, and Rasdan (2013) carried out a study of the automotive industry showing that environmental factors such as relative humidity and illuminance significantly

impacted workers' productivity. Vimalanathan and Babu (2013) revealed that the independent and interaction effects of temperature and illumination have significant effects on office workers' productivity and that the effect of indoor room temperature has more influence than does illumination.

Rasha's (2013) study revealed that certain features in the workspace such as furniture, noise, temperature, lighting, spatial arrangement, colour, and outside view are significant to productivity and performance in the workplace. The average mean ranking indicated that furniture contributed most to the performance of employees. This means that ergonomics of office furniture has great import because an employee has to use with that furniture all the time that he is on office. If that furniture is neither comfortable nor user friendly, efficiency will be hampered considerably. Next to furniture in importance was temperature, as temperature can have a significant effect on employee performance. In hot environments, employees commonly become irritable and less efficient. The surrounding features of the workplace, including lighting, temperature, windows, free ventilation, among others, indicate that they are aspects of the physical environment that influence the employees' attitude, behaviors, satisfaction, performance and eventually, productivity (Larsen, Adams, Deal, Kweon & Tyler, 1998).

3.2.1.1.2 Lighting (LI)

Workers generally require lighting for visual tasks and indoor lighting is a must due to lack of external light inside offices and work spaces (Mills, Tomkins & Schlangen, 2007). Thus, bad lighting can be defined as lighting that is not suitable for a specific

task, while good lighting is said to result in increased productivity, reduced stress and in creating a pleasant indoor environment (Cushman, 1987).

On the basis of Cushman's (1987) study, a list of problems caused by bad lighting include headaches, eyestrain, general bodily discomfort, increased human error and reduced alertness. Based on these complaints, it is reasonable to conclude that bad lighting may negatively impact the economics of the business.

A related study by Hameed and Amjad (2009) concerning "office design factors", like furniture, noise, lighting, temperature and spatial arrangements, showed lighting to have the most impact on staff productivity before spatial arrangements.

In addition, Mills, Tomkins and Schlangen (2007) stated that natural light generally has illuminating range of 2000 to 100000 lux while typical indoor lighting has only about 500 lux. On top of that, indoor lighting is known to possess less short wave blue spectrum length compared to natural light. This type of wave length is imperative for the biological effects of the human body and is reported to have a higher color temperature that has been reported to increase mental activity. On the other hand, drowsiness has been observed to be the result of lower color temperature lighting in comparing 3000k with 5000k. Therefore, light having higher wave length may lead to improved alertness and consequently, increased productivity. Moreover, Vimalanathan and Babu (2013) postulated that illumination has significant effect on the office workers' productivity and illumination of 1000 lux improved the performance and productivity of office workers.

This result is further reinforced by Cushman who stated that lighting may have significant impact on productivity although other factors can also contribute to a decrease in productivity that were not addressed in Mills's (2007) study. These factors may include personal issues, relationship with work colleagues and lack of sleep. Participants in the Cushman study opted for the new high correlated color temperature lighting and some participants even requested to keep the new lighting.

Chandraseker (2011) compounded this contention by confirming that unsafe and unhealthy workplace environment in light of poor ventilation, unsuitable lighting and excessive noise, among others, can affect the health and productivity of workers.

In a similar study, Moloney (2011) stressed on the importance of natural light and air (free ventilation) to the productivity of workers. He showed 3 - 18% productivity gains in buildings equipped with day-lighting system. Not all investigations have found universal benefits of natural light. Veitch, Geerts, Charles, Newsham, and Marquardt, (2005) found no effects of window proximity on job satisfaction, but did find that having access to a window immediately in one's workstation had a positive effect on satisfaction with lighting and a negative effect on overall environmental satisfaction. The study' conducted by Akbari, Dehghan, Azmoon and Forouharmajd (2013), showed that there was no significant relationship between lighting and human productivity (P>0.05).

3.2.1.1.3 Non-Cash Fringe Benefits (FB)

Worker benefits are considered to be any kind of compensation given by the organization, besides wages or salaries, that are partially or completely paid by the employer. These types of benefits are important for the development of corporate industrial relations and it includes: retirement plans, child care, elderly care, hospitalization programs, social security, vacation and paid holidays (Yew, Kong, Hussin & Jusoff, 2008).

Although most employees work better in an organization if they are well paid well, money is not the only factor motivating employees to stay. Money may attract people to the front door, but something else is needed to keep them from going out the back door (Masaiti & Naluyele, 2011). Odell's (2005) case study found that non-cash awards programs work better than cash in cases such as reinforcing organizational values and cultures, improving teamwork, increasing customer satisfaction and influencing specific behaviors among employees.

Retaining employees who have skills and good knowledge of their fields impacts the bottom line, generating more profits compared to employees with less ability because skilled workers are more effective and efficient. According to Riddle (2010), increased employee productivity is a great way to build a solid team. By implementing a program to improve employee productivity, a company will get a more qualified employee who desires to continue to grow and become more productive, and who will have a higher loyalty to the company.

Vroom (1964) claimed that everyone generally works expecting some type of reward (both spiritual and material), and that welfare is included in these expectations. It can be stated that the level of reward impacts the quality and quantity of work and thus, productivity. Therefore, the exploration of the provision of stimulus for the purpose of promoting work motivation and productivity becomes a must.

In addition, Yew, Kong, Hussin and Jusoff (2008) recommended that mandatory as well as fringe benefits, have a significant and positive link with organizational commitment, with the latter having a stronger link compared to the former; implying that workers having greater fringe benefits are more committed to the organization. This shows the importance of fringe benefits in strengthening organizational commitment, motivation, productivity and job performance.

Generally speaking, companies offer a number of fringe benefits and the types of worker benefit program based on Maslow's hierarchy theory can be classified as follows:
Employment benefits security encompasses unemployment insurance, technological adjustment pay; health protection benefits; old age and retirement benefits; educational facilities; services for beauty parlor; income tax aid; counseling; quality bonus; recreational programs; counseling for stress; safety measures among others.

Additionally, Lambert (2005) identified that of the management functions including provision of sufficient fringe benefits, work method and organization as main reasons for higher productivity.

According to Black, Lynch and Krivelyova's (2004) findings, firms incorporating more high performance practices in their workplaces are gifted with higher productivity. Also, profit sharing and/or stock options are linked to increased productivity and workers' voice has a significant positive effect upon productivity when done through unionized establishments.

In addition, Harald's (2005) study revealed sensitivity between workers quit behavior and fringe benefits offerings. It can therefore be stated that fringe benefits may be crucial devices in the firm's workforce management. The study further showed that establishments reach higher productivity because they offer more fringe benefits although it is ambiguous if this may be caused by saving recruitment costs.

Nevertheless, the employer's decisions to provide more benefits does not depend on workers' demands, but on how the employers are convinced of the impact of these benefits on their bottom line. When the Owens Corning company in the U.S. decided to implement a family benefits package at the end of 1994, the managers stated the outcome in Kwasha Lipton's study. Based on the findings, 82% of the managers were convinced that work/life benefits will gradually become crucial to ensuring productivity and reducing absenteeism and stress (Rose & Ahrens, 1996).

It is apparent that majority of employers expect family-supportive fringe benefits to provide personal value to workers, as well as to improve (or at least not hurt) productivity and profitability. In a related study, Baughman, Dinardi and Holtz, (2003) attempted to expand the small body of literature concerning the impact of family supportive benefits policies upon productivity and profitability by using a

survey distributed to 120 randomly-selected employers in Dagga County, New York. The authors attempted to detemine the impact of benefits, such as family leave, jobs sharing and child care upon worker's productivity, whereby based upon the economic theory, these fringe benefits could be met by productivity from the workers and lower wages, even though the empirical results of the study were too weak to support the theory.

3.2.1.1.4 Work Hours (WH)

Studies dedicated to providing empirical findings on the difference between part-time and full-time workers with regards to productivity are few and far between. On top of this, the findings appear to be contradictory and difficult to compare owing to the diversity of the analytical techniques used (Lewis, 2003). Existing studies depend on quantitative as well as qualitative analyses, where measures of productivity differ with regards to performance indicators, ranging from the objective (sales and gross revenue) to the subjective (employment, commitment and stress).

Nelen, de Grip and Fourage's (2011) analysis is also a case in point. Their study involved the matching of employer-employee cross-sectional dataset of Dutch pharmacies in 2008. They applied instrument variable analysis for the assessment of causality and addressing potential endogeneity of employment shares, while keeping observable characteristics under control. Based on their results, the larger the proportion of part-time employment, the greater is the firm's productivity when the latter is gauged through the number of prescriptions delivered to customers.

Some studies found no significant impact of part-time work on productivity. For instance, Stavrou (2005) made use of data of the economic sectors of 14 European Union member states and estimated the logistic regressions, but found no relationship between part-time and subjective performance measures.

3.2.1.2 Behavior Environments (BHE)

3.2.1.2.1 Nature of Workplace Behavior (NWPB)

According to Johnson, Lenartowicz, and Apud (2006), there are factors that potentially affect worker's activities and performance, and these encapsulate the interrelation among workers and their work environment. Spector (2008) found that the work environment is an important determinant of job satisfaction and performance of employees.

Brenner, Fairris and Ruser (2004) stated that knowledge sharing in the organization depends on the way the work environment is designed to enable its leveraging as an asset. This will help organizations in their improvement of effectiveness and will allow workers to obtain the necessary knowledge. They further stressed on the importance of designing the work environment to satisfy the workers and to facilitate free flow of ideas in order to motivate workers to work towards higher productivity. Increased access to information may be a positive development in terms of enabling employees to increase their knowledge and helping them deal with the specific issues that they might have at work. But providing this access might also pose challenges for organizations and managers (Broughton, Higgins, Hicks, & Cox, 2010).

In addition, Haynes (2008), stated that behavioral office environment has the highest affect on office productivity. Among the work patterns, interaction was revealed to be the most significant component when it comes to positively impacting productivity, whereas distraction was the most negative.

Chandrasekar (2011) also argued that the relationship between work, workplace and work tools has become a significant aspect of work itself. Management's dictation of how to maximize employee productivity is centered on two primary, namely personal motivations and the work environment infrastructure. Motivation workplace can be defined as an employee's intrinsic enthusiasm about and interior drive that causes a person to decide to take action and drive to accomplish activities related to work (Chaudhary & Sharma, 2012). Workplace motivation can be defined as an employee's intrinsic enthusiasm and interior drive that causes him to decide to take an action and have the drive to accomplish activities related to work (Chaudhary & Sharma, 2012). Motivated employees will have better performance and able to increase the productivity of work that, in turn, can help a company improve workplace effectiveness. Razavi, Emamgholizadeh, and Emami (2012) demonstrated that a positive and significant correlation existed between stress management and workforce productivity.

Similarly, independent study conducted by the American Society of Interior Designers (ASID, 1999). The study findings showed that physical workplace design is among the top three factors affecting worker's performance and job satisfaction. Specifically, 31% of workers were satisfied with their jobs and work environments

78

that are conducive to superior performance, and 50% of workers were seeking jobs that they believe to have a good physical environment.

Gensler (2006) also conducted a study involving 200 business managers in the U.K. The results supported the claim that an enhanced work environment would lead to increased employee productivity by 19% and worker's productivity by 17%. These enhancements can have huge impact on the economy, if proven. This study was followed up by another by the same author (Gensler, 2006), which he conducted among 1,000 office workers in the U.S. The results showed that 90% of the surveyed respondents were convinced that better workplace design and layout lead to positive overall employee performance.

Similarly, ASID (1999) conducted a study in which both employees and management were requested to provide their feedback concerning the importance of physical workplace environment. Employees revealed that the effective use of space and workplace enables their efficient performance. On the other hand, management concentrated on issues of privacy and flexible workspaces including personal comfort and visual appeal as significant to their workspace design.

Sajuyigbe, Olaoye and Adeyemi (2013) also maintained that working conditions are only likely to have a significant impact on job satisfaction and performance when, for example, the working conditions are either extremely good or extremely poor. In another survey, Hameed and Amjad (2009) examined 31 bank branches only to reveal that comfortable and ergonomic office design encourages employees and maximizes their performance significantly.

3.2.1.2.2 Toxic Behavior (TB)

In the dawn of competition, employee behavior has emerged as an important concern of organizations. It refers to what people say and do at their workplaces (Hiriyappa, 2008). According to Brown (2004), there are two categories of work environment: those that are conducive and those that are toxic work environments. Conducive work environment is characterized by a pleasurable experience provided to workers to encourage them to actualize their abilities and behavior. This environment also supports self-actualizing behaviors, e.g., an irresponsible worker can become a responsible worker through a favorable work environment.

Lynn Brown (2004) claimed that the latter type of workplace has entered the perimeter of management concepts in the 21st century, and similar to majority of management concepts, its definition lacks structure. However, its structured definition can be even more difficult to analyze. In 2004, an executive round table conference, discussing toxic or poisoned work environments.

The literature on counterproductive work behavior is vast. Although many theorists and researchers have conceptualized the metrics measuring such behavior differently, agreement exists on the way in which counterproductive behavior has been defined. Counterproductive behavior is mostly seen a set of negative behaviors that are destructive to the organization because they disturb operational activities or assets or harms workers in such a way that reduces their efficiency (Bashir, Nasir, Qayyum, & Bashir, 2012; Idiakheua & Obetoh, 2012; Robbins, 2008).

Workplace behavior is the consequence of many factors. Counterproductive behavior can result from personal traits personality traits like narcissism, agreeableness and dissatisfaction (Fatima, Atif, Saqib, & Haider, 2012; Muafi, 2011), envy (Khan, Quratulain, & Peretti, 2009) and negative emotions (Krischer, Penney, & Hunter, 2010; Khan, Quratulain, & Peretti, 2010). Other factors include unclear job descriptions, employment insecurity, lack of internal career opportunities and inappropriate appraisal systems (Shamsudin, Subramaniam, & Ibrahim, 2011), lack of motivation (Osezua, Daniel, & Emmanuel, 2009), abusive supervision (Shoss, Eisenberger, & Zagenczyk, 2013), stressful conditions, intention to quit and company contempt (Muafi, 2011), perceived injustice (Fatima, Atif, Saqib, & Haider, 2012), lack of acceptance of peer group (Wing, Cheng, Wong, Rochelle, & Kwok, 2011), job stress (Aftab & Javed, 2012), protest (Kelloway, Lori, Matthew & James, 2010) and leader mistreatment (Mayer, 2011).

Moreover, behaviors that are not conducive to good performance at the workplace, bullying is one of them. Thus, if improperly managed in an organization, this type of people is encouraged to exercise their need to control (Harvey, Heames, Richey & Leonard, 2006).

Additionally, Namie and Namie's (2004) findings shed light on a toxic workplace environment. They revealed that both genders could be bullies and bullies' targets. Targets comprise various groups of normal and skilled employees. Toxic behavior methods can be dangerous to the career of the target and destroy the target on a physical, emotional, and economical manner. Employers should take partial

accountability of the disintegration of once-skilled employees falling to the hands of ignoble bullies.

Typical bully is described as an individual exhibiting aggressive behavior that is aimed at causing harm/distress, repetitively over time, and arises in a relationship where imbalance of power exists (American Psychological Association, 2005). In this study, 'toxic behavior' is a term referring to a scenario where one or more individuals feel/s that they are consistently, persistently and repetitively exposed to negative acts that are meant to cause them harm. One or more individuals, such as co-workers, supervisors, or subordinates, causing dissatisfaction on the side of the target, may conduct these acts.

In a related study, Einarsen and Raknes (1997) revealed that toxic behavior is significantly related to various elements of organizational and social work environment, specifically role conflict and work control. Toxic behavior covers different types of work mistreatment. The environment wherein toxic behavior thrives is related to dissatisfaction with management, role conflicts, and a low level of control over the work situation (Needham, 2003). The results carried out by Anjum (2013) concluded that increased job satisfaction diminishes counterproductive behaviors.

A toxic workplace promotes negative behavior impacting individual or collective workers. The elements characterizing a toxic workplace are: increases in absenteeism, health problems and use of worker assistance programs, higher levels of

stress on managers and workers, apathy, lethargy and fewer face-to face communications.

On the other hand, How employees are treated, which reflects factors such as trust, respect, and fairness, is vital too (Dessler & Huat, 2009). A conducive work environment that ensures the well being of employees enables those employees to exert themselves in their roles more vigorously and may translate to higher productivity (Akinyele, 2007). Safe workplace conditions starts with management commitment that involves managers in safety activities (Dessler & Huat, 2009).

3.2.1.2.3 Mistreatment Culture Behavior (MCUB)

A technique utilized to control workers' productivity in the private sector is disciplinary action, and it is revealed to be ineffective in the public sector, as firms consider public workers to be more difficult to discipline (Fisk, Price, Faulkner, Douglas & Dibartolomeo, 2003). Disciplinary action is described as conducting an action that will result in laying off the worker. Termination is easier in private sectors compared to the public sector.

Additionally, targets expend more time safeguarding themselves against harassment from bullies and less time in completing their duties. Bullies may continue to receive a salary, but they often do not fulfill their duties and obligations, and some of them thrive by copying or stealing their colleagues' work and obtaining credit for it. In other words, bullies hinder other workers from fulfilling their duties (Namie & Namie, 2004). Painoli and Joshi (2013) concluded that managers must be careful

about the working conditions of employees, which includes both the working environment and working hours. Another factor that is important is fair treatment; if treated fairly, employees will feel more motivated. Thus, unbiased behavior by managers is critical.

3.2.1.2.4 Workers' Relationships with Managers and Colleagues (WR)

Human environment consists of peers, individuals related to the employee, teams, and work groups, issues of interaction, leadership, and management. Human environment is created in a manner that urges informal interaction in the workplace so that the chances for knowledge sharing and ideas exchange could be improved. This is the origin of attaining high productivity (Opperman, 2002).

According to Brown (2004), President of a Florida-based consulting group, a poor supervisor is the core factor that causes low productivity. A good supervisor generally motivates, inspires, encourages and rewards good performance, while a poor one does the opposite in multiples. Workers who work in a detached manner with the company lose all of their motivation to do extra work and to spend additional time to do something worthwhile.

The major factors that can lead to maximized employee productivity include active and effective leadership, effective two-way communication, establishment of clear goals and objectives, mitigation of bureaucracy, development of teamwork and positive motivation via recognition of worker's achievement (Haenisch, 2012).

In a contrasting environment, Yeung (2006) conducted an interview of one of the general managers at the Portzman Ritz-Carlton hotel and revealed the secret behind the hotel's successes. The environment in the Portzman Ritz-Carlton facilitates employees' communication and their working as one unit. Management meetings are frequently informal; so employees are more in tune with their tasks. The hotel provides employees autonomy in their jobs enabling them to do what is needed to provide service to customers. Communication refers to the process of transferring information via meaningful symbols for others to understand the message being relayed. It influences companies wherein effective communication is possible to steer clear or to minimize resistance to change in the organization (Dyck & Neubert, 2009).

Moreover, job satisfaction level of employees is expected to increase when supervisors understand employees and are friendly to them, when they acknowledge employees for their performance, and they encourage feedback from them, and when they are interested in their personal well-being (Robbins & Judge, 2011). Therefore, leadership has a key role in the company in order to facilitate effective and efficient performance. Contrastingly, insensitive, incompetent and uncaring supervisors are more likely to affect subordinate's job satisfaction (Luthans, 2005). Added to this, Parvin and Kabir (2011) conducted an evaluation of job satisfaction among employees working in various pharmaceutical firms and concentrated on the relative importance of job satisfaction factors and their influence on the employees' job satisfaction. They revealed that efficiency in work, fringe supervision and co-worker relationship were the top factors that impact job satisfaction.

Also, Chandrasekar (2011) proposed that sufficient information with mean value of 5.28 which indicates that every employee in the organization is obtaining sufficient information concerning the work to be performed. The aim is set by the organization, where they share sufficient information with their employees regarding their work. Hence, employees are motivated to achieve the target. Sufficient help and equipment with the mean value of 4.69 indicating that the company equips the workplace with the necessary equipment and information to work in an effective manner.

In a related study, Sajuyigbe, Olaoye and Adeyemi (2013) supported other studies' findings that several people reported satisfaction when they are ensured of their future prospects. This may transform into advancement and growth opportunities in their present workplace, or improve the opportunity of finding another employment. According to them, if workers perceive that they have limited opportunities when it comes to career advancement, they may experience decreased satisfaction. Similarly, Sunmilola, Sola and Olusola (2013) showed that the supervisor-subordinate relationship quality significantly and positively affects the job satisfaction of employees and in turn, their work performance. They also revealed that promotion opportunities of employees influence their both their job satisfaction and performance. They concluded that the when employees are provided with advancement opportunities in their work, it would improve both their job satisfaction and performance.

Moreover, organizational culture plays a key role in the organization as the culture is described as the way employee interacts with his co-workers and the way he achieves his work and in so doing contribute to achievement of company goals (Robbins &

Judge, 2011). However, communication and relationship variables were not found to significantly affect employee productivity at the Regional Office of Bank Negara, Indonesia Manado, in a study conducted by Pricilia (2013). In the contrary, factors in the internal work environment particularly, the job related pressures have their negative effect on labor productivity. Coupled with these are the human factors, namely, the worker's relationship with management and, or coworkers, (Akinyele, 2010).

Finally, effective communication eliminates confusion and wasted time that would have been spent on additional explanation/argument. This makes for an enjoyable workplace, less anxiety among workers, positive attitude towards work and increased productivity (Tayler, 2012). Texas and Dallas Industries employs a unique way to value their workers and to keep them involved. A single wall in the company is filled with workers' photographs who have been with the company for more than five years. Due to their constant support for their workers, Texas and Dallas, January 19, 2012 – For the 15th consecutive year, TD Industries has been named to Fortune magazine's "100 best companies to work for" list with a ranking of number 64. TD Industries is one of only 13 companies to have made the list every year since its inception in 1998, earning the firm the distinction of being a Fortune "All Star.".

3.2.1.2.5 Distraction Behavior (DB)

Distraction is considered as anything that attracts attention from the work to be done, and it originates from an unexpected stimulus, either through a noise or visual disturbance or extreme temperature conditions. It may stem from system or service

failure that prevents the effective performance of tasks. The level of distraction impact is based on the individual's ability to concentrate and motivate, and the extent of the individual's coping strategies. With the persistence of the distraction, overload arises. Distraction should however be considered to be advantageous to some as some people consider distraction as pertinent to their concentration. For instance, some people concentrate well with background music while others find music a distraction.

The idea of boosting productivity through spatial arrangements was proposed by Brill and Weidemann (2001), who found spatial arrangements favouring spontaneous interaction to be significant to productivity. They highlighted the ability of the worker to work individually without being distracted. On the other hand, Haynes (2007) posited that interaction and distraction are both behavioral elements of the workplace having the most crucial effect upon self-assessed productivity.

In a similar study, Haynes (2008) looked into the extent of work processes role in workers' productivity. Following his definition of the four work patterns based on autonomy and interaction, he examined the extent of environmental factors of comfort, office layout, interaction and distraction's (negative or positive) impact upon productivity. The findings revealed that interaction was considered by all groups as positively impacting their work, most particularly by the "transactional knowledge" workers. All groups also considered distraction as having a negative impact on their productivity.

Noise is among the leading reasons behind distraction of employees, which lead to minimized productivity, errors and heightened job-related stress. Bruce (2008) stated that workplace distractions negatively impact productivity by as much as 40%, and heightened errors by 27%. The above discussion of prior studies results in this study's investigation of the relationship between distraction behavior and productivity.

3.3 MEDIATING VARIABLE

3.3.1 Job Satisfaction (JS)

Employee satisfaction is the terminology used to describe whether employees are happy, contended and fulfilling their desires and needs at work (Sageer, Rafat & Agarwal, 2012). There is no consistent definition of job satisfaction. Job satisfaction has been defined as a single global concept referring to the overall satisfaction levels (Yiing & Ahmad, 2009), or a multiple dimensional concept that refers to the psychological or sociological factors. Multiple dimensional concepts have been applied to discover how workers are affected by, for example, intrinsic and extrinsic elements of their jobs (Ssesanga & Garrett, 2005).

Parmar (2010) said that job satisfaction represents a feeling that appears as a result of the perception that the job helps fulfil material and psychological needs (Robbins & Judge, 2011). Robbins and Judge (2011) expressed job satisfaction as an individual's general attitude towards his/her job. Masud (2008) claimed that job satisfaction was a general attitude towards that person's job and could be seen in regard to that person's feelings or state of mind regarding the nature of his/her work. Job satisfaction is

important because many scholars believe that satisfied employees are more committed to their jobs than their dissatisfied counterparts are.

Similarly, job satisfaction is defined as a situation when a worker begins to compare the actual job outcome to desired job outcomes, which is the result of an affectionate reaction to a given job satisfaction (Mosadeghrad & Yarmohammadianices, 2006). Job satisfaction is a psychological sense of confidence and satisfaction to fulfil personal needs, desires and expectations with the work itself and the work environment, improved job satisfaction leads to improved loyalty to work (Schultz, 2010; Thompson & Phua, 2012). Furthermore, Robbins and Judge (2013) described job satisfaction as positive feelings about a job, resulting from an evaluation of its characteristics. A person with high level of job satisfaction holds positive feeling about his or her job, while a person with a low level holds negative feelings.

Generally, academic studies would prefer to define job satisfaction based on the dual theory of Herzberg (Ssesanga & Garrett, 2005; Mosadeghrad & Yarmohammadian, 2006). As such, job satisfaction studies have been based on the notion that the academicians' source of satisfaction comes from intrinsic factors which are related to job content and extrinsic factors that are associated with the working environment.

Workers' satisfaction can originate from the work, the work content, complexity, required knowledge and skills, degree of autonomy, or the social working environment of colleagues, management style, or from the conditions of employment, wages, leave arrangement and career prospects, or lastly, from the physical working environment, such as, workplace, lighting, daylight, view; and

interactions between these aspects (Voordt, 2004).In addition, workplace is an important factor in job satisfaction that affects the way in which employees work, and many organizations have implemented open-plan work to encourage teamwork (Hameed & Amjad, 2009).

Based on Robbins and Judge (2011) study, at the organizational level, having more satisfied workers can result in more effectiveness compared to organizations having less satisfied workers. It was noted that satisfied workers are inclined to be more productive, creative and committed to their employers. Bhatti and Qureshi (2007) revealed that job satisfaction often results in productivity because it brings high quality motivation and workers' improved working capabilities. This study adopts the definition of job satisfaction as the reaction of individuals towards their jobs, and the source of satisfaction that comes from the intrinsic and extrinsic factors pertaining to the job contents.

3.4 SUMMARY

There is a large amount of literature available on the effect that work environments have on workers' productivity. Some of these studies have been presented within the literature review.

Work environments do not only have an impact on productivity but on the health and wellbeing of workers. Toxic work environment, temperature, and lighting have an effect on the health of workers. Companies are able to implement healthy environments/favorable work environment that will increase productivity and perhaps even wellness. It was found that an environment that is conducive to work offers the workers a pleasurable experience, helps them in actualizing their abilities and behavior and reinforces self-actualizing behaviors. An irresponsible worker can change his ways for the better in a favorable work environment.

In sum, effective work environments assist workers to the best of their abilities and in contrast, non-work conducive environments create insurmountable problems for users and confine them within their physical or mental limitations.

Not much literature is available on the effects of work environment in a Libyan context. As such, further study is required in this area to test whether workers in the Libyan manufacturing industries are affected by their work environments, particularly in the petrochemical industries. It would therefore be useful to conduct study in this area.

As mentioned above, there is lack of study that focuses on the relationship between physical and behavioral environments as mediated by job satisfaction and productivity. Moreover, a lack of studies is also noted in the examination of the relationship between distraction behavior and productivity at an individual level. As such, this study attempts to investigate and achieve all of the above objectives.

CHAPTER FOUR

THEORITICAL FRAMEWORK AND HYPOTHESES

DEVELOPMENT

4.0 INTRODUCTION

This chapter describes the research framework; underpinning theories that are used in this study and hypotheses development . The purposes of this study were to examine the mediating effect of job satisfaction on work environment and productivity in the public petrochemical companies in Libya.

4.1 RESEARCH FRAMEWORK

The independent variables of this study are the physical components: temperature, lighting, non-cash fringe benefits and work hours; and the behavioral components: nature of work environment, toxic behavior, workers' relationship with management or subordinates and distraction behavior. In addition, this study also includes mediating variable: job satisfaction and the dependent variable: workers' productivity.

The schematic diagram that shows the relationship between the independent variables (physical and behavior environment), mediating variable (job satisfaction)

and dependent variable (productivity) is portrayed in Figure 4.1. According to Sekaran (2003), a study model is the theoretical framework that conceptualizes how one theorizes the relationships among the several factors that have been identified as important to the problem. This framework looks into the impact of physical and behavior environment on workers' productivity.

Consequently, the definitions of each attribute presented in the framework are discussed in the following sections. Figure 4.1 shows the theoretical framework of the study.

4.1.1 Theoretical Framework
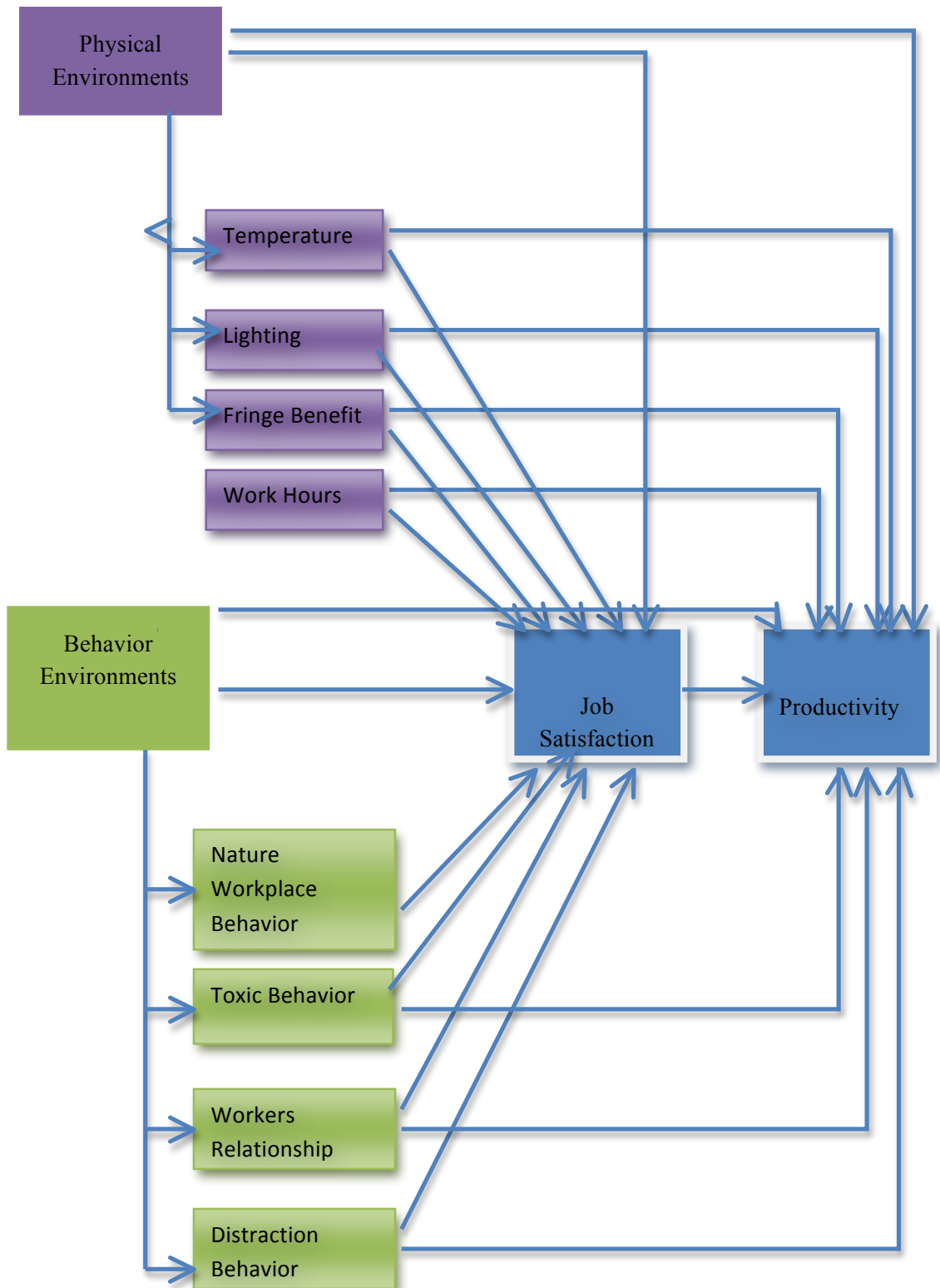
Figure 4.1
The Effect of Eight Basic factors on Productivity

According to literature, the link between work environment and productivity is shown in Figure 4.1. The relationship is considered in a way that a group of factors affect an individual, which leads to the determination of the final outcome in the form of the individual's increased or decreased productivity.

The proposed model is based on the workplace environment and its impact on productivity, and hence it represents the dependent variable. Therefore, it is imperative to pay attention to a company's work environment factors because enhancement of these factors may lead to productivity improvement. As for the independent variables, the study derived them from previous studies as shown in this chapter. On the other hand, the new variables in this model are physical and behavioral environment with job satisfaction as mediating the relationship between work environments and workers' productivity in Libyan environment.

The present study's model is developed according to the Maslow's Need Hierarchy, Herzberg's Motivator-Hygiene Theory and Social Exchange Theory. According to these theories, the physical setting is significant only when it fails to meet the basic needs. On the other hand, it also postulates that the surrounding is considered significant, and this indicates that environmental factors facilitate a positively satisfying individual need.

The social exchange theory posits that the basic organizational values are bureaucratic and they are shallow and impersonal. They result in adverse factors, such as mistrust, conflict, lowered efficiency and ineffectiveness. According to Chris (1974), instead of just being spoon fed with these values, managers should be

capable of developing competence in understanding and appreciating the new values, such as expression of individual feelings, personal trust and personal concern. These theories identify factors contributing to job satisfaction and its connection to productivity (Dunnette, 1976).

4.2 UNDERPINNING THEORIES

4.2.1 Social Exchange Theory (Mediating Theory)

Social-Exchange Theory considers that job satisfaction functions as a mediator. The Theory of Social Exchange suggests that employees engage in either positive or negative behaviors toward the organization only in response to either positive or negative actions that are seen to originate from the organization (e.g., favourable or unfavourable working conditions for fair or unfair treatment). This would, in turn, suggest that job satisfaction mediates the relationship between actual working conditions and workplace behaviors (Thibaut & Kelley, 1959).

The exchange theory lays down the conditions in which people feel that it is their duty to return the favor when they benefit from the services of some person or entity. These duties/obligations generally define and produce balance sheets that are not easily created, and therefore, they depend on relationships that withstand times of imbalance of benefits provided to exchange partners (Blau, 1964; Emerson, 1976 & Gouldner, 1960).

The exchange theories view the operation of an organization as the establishment of a balance or equilibrium between the individual workers and the formal organization.

Both parties give something to the other, and in turn, receive something in return for what they have given.

The main pioneer in the development of the theory is Homans (1958), a sociologist, who mainly focused on people and their behavior. His core view is that the basis of sociology is in the study of individual behavior and interaction. Homans generally ignored different types of large-scale structures and institutions considered by most sociologists. His core interest lay in the support of patterns, the history of rewards and costs, leading people to do what they do. Homans' basic argument is that people continue to do what they have initially found to be rewarding and cease doing what they have initially found to be costly. To comprehend behavior, the individual's history of rewards and costs should first be understood. The theory's name implies that it is not concerned with one sole individual behavior but interaction among people involved in an exchange of rewards and costs. The essence lies in the premise that interactions would continue as long as there is exchange of rewards. On the other hand, interactions that prove costly to one or both parties are more likely to end.

Generally, people create social relations only if there is a probability of gaining profit, Homans (1961) considered these stable interactions as social relations whereby each participant obtains profit. On the contrary, if the relationship is likely to end in loss for any of the participants, then withdrawal is inevitable. But once the initial relation has been made, the rewards received work to maintain and improve the bonds. For the opposite scenario whereby rewards are insufficient, these scenarios will likely lead to weakened or broken association. Additionally, rewards can be either intrinsic (for instance, love, affection and respect) or extrinsic (for

instance, money and physical labor) and they cannot always be equally exchanged. Inequality of exchange results in power difference within the association.

Earlier, scholars have gone through early works on social exchange and due to this, renewed interest has been rekindled in comprehending and enhancing the quality of the relationship between workers and employers, as well as promoting the types of performance-pro social behavior, organizational citizenship behavior, and extra role performance that were neglected by models of motivation based on the mechanisms of economic exchange (Moorman, 1991; Settoon, Bennett & Liden, 1996). These efforts serve as novel evidence supporting the basic tenets of social exchange theory in the workplace that states positive actions of the organizations towards the workers play a crucial part in the development and creation of interrelationship, and hence result in the creation of worker obligations to reciprocate in positive, beneficial ways (Settoon, Bennett & Liden, 1996).

Furthermore, these novel efforts make it possible to cater to subtleties of the theory that were overlooked in the earlier era. The most notable activity is that several scholars considered Gouldner's (1960) assertion that complementarities, or a balance between the parties to social exchange, can only be realized if there is reciprocity of a similar nature and significance to both partners and each partner tries to reciprocate towards the other. Studies having these refined notions of complementarities as a basis have revealed two crucial things; Firstly, workers tend to differentiate between the various partners they have to the exchange in the workplace, for instance co-workers, supervisor, organization and their effort is aimed to reciprocate toward a particular partner whereby other partners may benefit but to a lesser degree

(Moorman, 1991 & Reichers, 1986). Secondly, the currency of exchange depends on the partner as workers tend to utilize various behaviors and attitudes to reciprocate their organizations and their co- workers or supervisors (Moorman, 1991; Settoon, Bennett & Liden, 1996).

This line of reasoning implies that in consideration of the worker benefits offered by the organization, the worker's efforts should be reciprocated more to the organization as opposed to their co-workers or supervisors, because worker's reciprocation should be of similar value to the organization. In other words, workers should be motivated to reciprocate something extra back to the organization in exchange for the extra benefits they are receiving.

Therefore, this tenet of social exchange theory implies that a worker's benefits are varying even in cases when all workers are encompassed in the same plan because the value placed by the workers on these benefits are different which consequently incur different levels of obligations to the organization. This is especially true in how useful workers find a benefit plan that encompasses work-life benefits in light of their personal as well as professional life, and according to how it helps members of their families. The more useful the extra benefits are considered by the workers, the more inclined they are to give something back to the organization.

4.2.2 Abraham Maslow Theory

Abraham Maslow (1954) attempted to conduct a synthesis of a significant amount of study dedicated to human motivation. Prior to his study, studies generally

concentrated on distinct factors, like biology, achievement, or the power to explain what drives, direct and maintains human behavior. According to Maslow (1954), human needs are organized into a hierarchy of two groupings, namely deficiency needs and growth needs. Each lower need must be satisfied prior to moving to the next level. After all the needs have been satisfied, if a deficiency is detected in the future, the individual will behave to eliminate this deficiency. Maslow's needs hierarchy theory is one of the most widely used theories when it comes to work motivation in the contemporary times. Although the theory was introduced in the mid-1940-1950, it was confined to clinical psychology, which was Maslow's center of work development.

According to Maslow, deprivation motives are organized in the developmental hierarchy in the following way: physiological needs consist of homeostasis (the body's effort to maintain normal functions), like the satisfaction of hunger and thirst, the requirement for oxygen and the maintenance of temperature regulation; this also includes sleep, sensory pleasures and maternal behavior; safety needs which include safety and security, pain/threat-free existence, safeguard from danger and deprivation and the requirement for predictability and organization; love needs include a sense of belonging, affection, friendships, social activities and the giving and receiving of love; esteem needs, commonly known as ego needs, include self-respect and esteem of other individuals. Self-respect refers to the desire for confidence, independence, freedom and strength, as well as achievement, while the esteem includes prestige, recognition, status, attention, and appreciation; and finally, self-actualization needs which refer to the development and realization of an individual's full potential.

According to Maslow, this is what humans can be or become everything that they are capable of becoming.

A normal person is described as being spontaneous, creative, and appreciative of others. People who fail in self-actualization are more likely to display hostile and disastrous behavior.

4.2.3 Herzberg Theory

Herzberg's two-factor (motivation-hygiene) theory is closely linked to the needs theory. Frederick Herzberg proposed it. While Maslow's analysis focused on the man's motivation from his birth, at the workplace, at leisure, in the family and in many social groups, Herzberg's theory focused on how Maslow's needs operate at the workplace in the situation of employment. Herzberg divided the needs into two groups. The first group comprises company policies and administration, work conditions, supervision, salary, status, interpersonal relations, job security and personal life. Second group consists growth; work itself, responsibility, achievement, advancement, and recognition.

Herzberg contended that all these factors must exist in any work environment as their lack may result in dissatisfaction and in behavior that could adversely affect the organization, like decreased productivity, laxity, or strikes. The presence of these factors would, on the other hand, result in normal productivity, although not always, significant productivity. This indicates that their existence does not cause motivation in any way when it comes to producing satisfaction.

Although several theories can explain human motivation in the workplace environment and their satisfaction, this study primarily upholds the Maslow's Need Hierarchy, Herzberg's Motivator-Hygiene Theory and Social Exchange Theory. These theories identify factors contributing to job satisfaction and its connection to productivity (Dunnette, 1976).

4.3 HYPOTHESES DEVELOPMENT

The study's hypotheses address physical environment (temperature, lighting, non-cash fringe benefits and work hours), and behavioral environment (nature of work environment, toxic behavior, mistreatment culture behavior, workers' relationship with management or subordinates and distraction behavior).

4.3.1 Physical Environment (PHYE)

The environment constitutes man's surroundings, which he could manipulate to suit his existence. Often times, this manipulation could bring about hazardous results to the environment, making it unsafe, thus preventing the worker from carrying out his work in an effective manner. Hence, the workplace requires an environment conducive to effective performance (Chapins, 1995), where it facilitates worker's achievement of management's expected results (Mike, 2010 & Shikdar, 2002).

Physical environment impacts the way employees in the organization interact among themselves, carry out their tasks, and are managed by managers. As an aspect of the

work environment, physical environment directly impacts the human sense and changes interpersonal interactions, and in turn, productivity. This is because the characteristics of the room/place of meetings affect the level of productivity and satisfaction of workers. The workplace environment is a significant fact in maintaining employee satisfaction. Study conducted by Leblebici (2012) shown that while the employees are unhappy with the physical conditions of the workplace, they have remarkable satisfaction with the workplace by having strong behavioral workplace conditions. According to the survey results it is proven that workplace environment affects employee performance but behavioral workplace environment has greater effect on employees' performance.

Brill's (1992) estimate that improvements in the physical design of the workplace may result in a 5 to 10% increase in employee productivity. Similarly, ASID (1999), said that physical workplace design is one of the top three factors, which affect performance and job satisfaction. This is consistent with Gensler's (2006) study, in which he reported that 89% of the respondents stressed the significance of workplace design, and 90% of senior officials related workplace designs to the productivity of workers. Also, around 22% of the respondents in Gensler's (2006) study were convinced that if offices were effectively designed, increased performance would be noted. Thus, businesses are likely to improve their productivity if they enhance their workplace designs.

Srivastava's (2008) finding that workers who perceived their physical work environment to be adequate were more satisfied with their jobs. Social-Exchange Theory considers that job satisfaction functions as a mediator. The Theory of Social

Exchange suggests that employees engage in either positive or negative behaviors toward the organization only in response to either positive or negative actions that are seen to originate from the organization (e.g., favourable or unfavourable working conditions for fair or unfair treatment). This would, in turn, suggest that job satisfaction mediates the relationship between actual working conditions and workplace behaviors (Thibaut & Kelley, 1959). Based on the above, this study proposes the following hypotheses:

H1: There is a relationship between physical environments and workers' productivity.

H1a: Job satisfaction mediates the relationship between physical environments and workers' productivity.

4.3.1.1 Temperature (TM)

Abdou, El-Kholy and Abdou, (2007); and Niemela, Hannula, Rautio and Reijula (2002) agree that incorrect temperature decreases productivity, and both suggested that temperature is an important factor to consider when analysing work environments.

Specifically, Abdou, El-Kholy and Abdou, (2007) stated that it is therefore imperative to determine the effect of an individual's temperature requirement upon his co-worker's productivity. Majority of the offices in the present times utilize air conditioning to enable air circulation and to help cool down workplace

environments. In Washington, a study revealed a 9% improvement in productivity when air conditioning was utilized in the workplace.

Seppanen, Fisk and Lei (2006) measured productivity in an apparel factory. They found a reduction of 8.9% in productivity in swing work as the temperature increased from 23.9 to 32.2℃. However, Federspiel, Liu, Lahiff, Faulkner, Dibartolomeo and Fisk (2002) identified the measurement of productivity of the workplace under study (call center) in the U.S., and their findings presented no significant relationship of temperature to productivity in the workplace.

Rasha (2013), who revealed that temperature could have a significant effect on employee performance. In hot environments, employees commonly become irritable and less efficient. In addition, Yusof, Deros, and Rasdan's (2013),study empirically demonstrated that environmental factors such as: relative humidity and lighting significant impacted workers' productivity.

The results carried out by Vimalanathan and Babu (2013), revealed that the independent and interaction effect of temperature and illumination have significant effect on the office workers' productivity. The effect of indoor room temperature has more influences than the effect of illumination. The optimum level of indoor room temperature for a comfortable environment registers at twenty-one degrees Celsius. Based on the aforementioned discussion, the following is hypothesized;

H1b: There is a relationship between temperature and workers' productivity.

H1c: Job satisfaction mediates the relationship between temperature and workers' productivity.

4.3.1.2 Lighting (LI)

Cushman (1987) revised the study conducted by the Rensselaer Polytechnic Institute. The study was accordingly carried out involving office workers and the impact of lighting on their productivity. Findings revealed that workers asked for more breaks owing to poor lighting conditions resulting in a total of 80 minutes of lost time per week for every worker. Hence, it was concluded that lighting improvements may lead to increased productivity. This was further compounded by evidence revealing that 16% productivity improvement was attributable to lighting improvement at a West Bend Mutual Insurance facility. Suitable lighting design and sufficient daylight were also related to 15 to 20% of productivity. Added to this is the significant savings pertaining to energy costs attained through an integrated methodology of lighting design.

Similarly, Rocky Mountain Institute conducted a study that analyzed the environment of workers and revealed that lighting; heating and cooling positively impact worker's productivity, and produce a negative correlation with performance as well as absenteeism (Pickett, 2000). Also, Moloney (2011) confirmed that, establishing that controllability of a work environment for both thermal comfort and lighting improved productivity of workers between 2% and 3%.

In another study, Majekodunmi's (2012) findings revealed that a quality lighting program encouraged productivity and performance, minimized fatigue and eyestrain (workers' good health assurance) and hence, maximized organizational productivity.

Superior workplace lighting will assist in the prevention of accidents, assist workers in enhancing their eye-hand coordination, and improve their productivity, while lowering rate of rejections and defects. This also leads to intangible benefits related to higher employee morale and minimal rates of accidents, as workers are more aware of what they are doing.

Henri, Marius, and Tenner (2007), who stated that the effect of increased or decreased illumination affects the productivity, psychology and biological aspects of workers. Chandraseker (2011) confirmed that an unsafe or unhealthy workplace environment in terms of poor ventilation and unsuitable lighting could affect the health and productivity of workers. Conversely, Ceylan and Dul's (2008) study revealed a link between lighting and creativity. However, they found that majority of participants of their study claimed that lighting has no impact on their productivity (Akbari, Dehghan, Azmoon, & Forouharmajd 2013; Ceylan and Dul, 2008). According to the above reasoning, the following hypotheses are proposed:

H1d: There is a relationship between lighting and workers' productivity.

H1e: Job satisfaction mediates the relationship between lighting and workers' productivity.

4.3.1.3 Non-Cash Fringe Benefits (FB)

Based on Herzberg' (1954) theory, also known as motivation and hygiene theory, a worker benefits program is necessary for sufficient working conditions, where the hygiene factors affect workers' motivation and consequently, productivity.

Therefore, worker benefits are crucial elements for the maintenance of worker satisfaction and for the increase of worker commitment.

Hong, Yang, Wang, Chiou, Sun and Huang (1995) stated that the effect of worker benefit on work-motivation is higher than upon productivity. On the basis of the four separate aspects, the order of impact was stated as: commitment, effort, work-quality promotion and command of work. On the other hand, Eslami, Minaeibehzad and Fakhar (2014), found out that providing welfare facilities for staff prepare cause of their intrinsic motivation this can finally cause increase job satisfaction and improve their performance.

It has been established that fringe benefits, not mandated benefits, increase both worker loyalty and production. While some state that this notion is incorrect, others believe its authenticity. The level of fringe benefit particularly the non-cash benefits, as well as factors associated with the workers' place of residents have negative effect on labor productivity. A challenge arises in examining the impact of all the fringe benefits, and therefore, only a few them are examined for their impact on productivity (Akinyele, 2010). In this study, non-cash fringe benefits and its impact on productivity are investigated. It is therefore posited that:

H1f: There is a relationship between non-cash fringe benefits and workers' productivity.

H1g: Job satisfaction mediates the relationship between non-cash fringe benefits and workers' productivity.

4.3.1.4 Work Hours (WH)

Edwards and Robinson (2000) conducted a qualitative analysis of the U.K. nursing profession through a questionnaire distributed among nurses and management. According to respondents, some of the primary advantages of part-time employment include retention of mature staff, less stress, coverage of demand peaks, less absenteeism and harder work; some of its disadvantages include communication problems, increase in administrative costs and overheads related to training and difficulties with service continuity. Additionally, part-time nurses were less satisfied compared to their full-time counterparts with superior opportunities in terms of qualification and promotion.

In addition, Arvanitis (2003) developed a cross-section estimate of data gathered through a survey among Swiss companies in the business sector and found that part-time work is negatively related to sales per employee (while keeping technology, workplace organization and industry affiliation under control). In the same way, Branine's (2003) study, based on data gathered through a questionnaire and interviews among U.K., France and Denmark hospital staff, indicated mixed results. Part-time work, according to the respondents, is often related with low absenteeism and less stress, but at the same time, it is also related to higher turnover, lack of service continuity, low commitment of employment and relatively lower skills.

Moreover, Konrad and Mangel, (2000) stated that reduced productivity and the occurrence of mental and physical fatigue can be controlled to some level through the break times (number, length and reorganization).

111

The Libya's culture is characterized by less work hours (e.g., from 8 am – 2 pm) compared to other manufacturing companies in other countries such as US, UK, Malaysia, Indonesia, Japan, Hong Kong, China, India, and Singapore, where normal work hours are from 8 am – 5 pm. So, this study investigates the impact of short work hours on productivity. Therefore, the following is hypothesized:

H1h: There is a relationship between work hours and productivity.

4.3.2 Behavior Environments (BHE)

The condition of the environment can be considered as a tool that leverages improvement of business outcome (Mohr, 1996), and the wellbeing of employees (Huang, Robertson & Chang, 2004). It is important to ensure that sufficient facilities are provided to employees in order to produce employee commitment and productivity.

According to the survey results, it is proven that workplace environment affects employee performance but behavioral workplace environment has greater effect on employees' performance (Leblebici, 2012). A work environment that caters to the needs and requirements of its workers provides a feeling of pleasure to the workers and encourages their abilities and positive behavior. This work environment also supports their self-actualizing behaviors in such a way that an irresponsible worker may change into otherwise in a favorable workplace. Based on the above, it is hypothesized that:

H2: There is a relationship between behavioral environments and workers' productivity.

H2a: Job satisfaction mediates the relationship between behavioral environments and workers' productivity.

4.3.2.1 Nature of Workplace Behavior (NWPB)

Roelofsen's (2002) extensive scientific study produced indicators that enhancing working environment leads to the minimized complaints and absenteeism and maximized productivity. According to his results, indoor environment has the highest impact on production in terms of job stress and dissatisfaction.

Similarly, Govindarajulu and Bonnie (2004) contended that in the 21ˢᵗ century, businesses are adopting a more strategic method to environmental management to improve their productivity through improved level of workers' performance. It is also evident from Huang, Robertson and Chang's (2004) findings that the higher the satisfaction of workers with their jobs, the more likely the company will perform better in terms of profitability and productivity. The work environment should be redesigned so that workers achieve satisfaction and practice a free-flow of ideas to increase both motivation and productivity (Brenner, Fairris, & Ruser 2004; Anbuoli, 2012).

Haenisch (2012) found that the key factors that can increase employee productivity is positive motivation through frequent recognition of employee achievements. Otherwise, an employee experiencing high levels of stress may be unable to function

effectively in his/her job (Nagar, 2012). Sheikh, Ali, and Adan (2013), who found that working conditions could have both positive and negative impact on productivity. Bornstein (2007) stated that, in organizations in which employees are exposed to stressful working conditions, productivity is negatively influenced. On the other hand if working conditions are good, productivity increases and produces a positive impact on the delivery of service. Kaplan, Ogut, Kaplan, and Aksay (2012) who stated that organizational factors such as working conditions were negatively related with job satisfaction. This leads to the following hypotheses:

H2b: There is a relationship between nature of workplace behavior and workers' productivity.

H2c: Job satisfaction mediates the relationship between nature of workplace behavior and productivity.

4.3.2.2 Toxic Behavior (TB)

Toxic companies can lead to a number of negative consequences, and they seem to fail often compared to non-toxic companies owing to workers' low morale, the inability to bring forth great ideas, or higher absenteeism and turnover. This type of companies also has higher costs linked to lower productivity and less cooperation among workers (Appelbaum & Roy, 2007). In addition, toxic organizations have significant negative impacts on their workers as their workers may psychologically suffer owing to difficulty of sleeping, depression, anxiety, impaired judgment and impaired memory. They may also have physiological consequences, such as high

blood pressure, increased awareness of the environment and muscle tension (Appelbaum & Roy, 2007).

Toxic behavior in the workplace is described as a persistent, unwelcome, intrusive behavior of one or more than one individual/s who prevent/s others from completing their duties (Isaac, 2013). Moreover, a toxic work environment is characterized by one that provides unpleasant experiences and de-actualizes workers' behavior. This is the type of environment that supports low self-actualization which leads to the gradual appearance of negative traits in the worker's behavior. In this type of environment, responsible and sensible workers may become irresponsible for the sake of survival.

Additionally, Rayner, Hoel and Cooper's (2002) study is considered the most extensive study of workplace bullying in the context of western countries. They revealed that one out of four people experiences workplace bullying. Another study showed the negative impact of aggressive behavior on an organization, including loss of employees' morale, a great degree of absence due to depression, anxiety and physical illnesses, minimized productivity and profit, a great degree of attrition, loss of customers, negative reputation in the industry, adverse media attention, legal action, negative emotions, such as anger and frustration and workplace violence (Porath & Erez, 2009). Similarity, counterproductive work behavior has been shown to have a significant negative association with job satisfaction (Dalal, 2005). Anjum's (2013), results concluded that job satisfaction has a diminishing effect on counterproductive behaviors. It is therefore, posited that:

H2d: There is a relationship between toxic behavior and workers' productivity.

H2e: Job satisfaction mediates the relationship between toxic behavior and productivity.

4.3.2.3 Mistreatment Culture Behavior (MCUB)

The workplace in public companies is characterized by an extensive array of opportunities for the development of mistreatment behavior. Developed countries are more proactive compared to their developing counterparts in passing legislation against work environments rife with mistreatment. There have been incidents of co-workers witnessing many bullying incidents and they remained passive and hence seem to be supporting the bullies – they believe that bullying behavior at the workplace is none of their concern (Middleton & Zadawski, 2002).

Bullying behavior thrives in the company if the company culture facilitates it. As mentioned, autocratic behavior may lead to rigid hierarchies and autocratic executives may facilitate similar behaviors in middle management. Moreover, mistreatment behavior is an issue of performance that requires discipline but targets of bullying behavior are often hesitant in reporting the issue (Brenner, 2006). Majority of targets remain quiet, as they are afraid of retribution and being laid-off due to negative behavior; this is more significant in the private sector compared to the public sector.

Newsham, Brand, Donnelly, Veitch, Aries and Charles's (2009) study indicated that increased environmental satisfaction was associated with increased satisfaction with

compensation and with management, which were associated with increased job satisfaction, The model came close to full mediation. In addition, they tested a model with job satisfaction mediating the relationship between job stress and employee wellbeing. Therefore, based on the above, the researcher hypothesizes that:

H2f: There is a relationship between mistreatment behavior culture and workers' productivity.

H2g: Job satisfaction mediates the relationship between mistreatment behavior culture and productivity.

4.3.2.4 Workers' Relationship with Management and Colleagues (WR)

Bad attitudes of managers are close enough to affect the worker performance and high enough to spread their effect to the whole organization. This behavior of managers decrease worker retention, kills morale and discourages workers from sharing new ideas and cooperating. Negative managers more often than not, make use of unskilful, disrespectful communication with their workers, take credit for their work and exaggerate their mistakes. They often concentrate on outcome and hence, are aggressively focused on short-term goals. Toxic managers force workers to be less engaged in their work, and encourage increased absenteeism, higher turnover, and lower levels of productivity (Appelbaum & Roy, 2007).

Leblebici's (2012) study examined employee-supervisor relationship, fair treatment, and communication in banks to ensure that behavioral environment component is significant to employees. Almost all the attendees in the study strongly agreed that

the above factors are important to them. In a more recent study, Taylor (2012) confirmed that effective workplace communication assists organizations in their selection and tailoring of programs and policies to satisfy the particular needs of their employees. Satisfying employees' needs leads to boosting their morale, and providing them psychological and emotional stability in the workplace, which eventually translates to organizational productivity. Complementing this finding is Dunne's (2011) study, which confirmed that effective communication leads to inform and trusting employees of their colleagues and that dependent work is taking place. This situation makes the organizations assertive of their survival and their employees' wellbeing.

Along a similar line of study, Gruneberg (1979) shed light on the differences between employee-oriented and task-oriented supervisors. The former is more likely to develop personal and supportive relationships with their staff, take an interest in them, offer them advice and assist them in goal achievement (Luthans, 2005); while the latter consider their main function as the initiation and organization of work and consider employees as key to achieving organizational aims. Even though supervisors may be high in task orientation, they are often low in employees' orientation and vice versa. This is not always the case; according to Luthans (2005), participation/influence is a dimension of supervisory style that impacts job satisfaction. This is a situation where management enables employees to participate in making decisions that impact their jobs. Employee participation in a work environment has a higher significant impact on the satisfaction of employees compared to employees' participation in making specific decisions (Luthans, 2005).

Haenisch (2012) postulated that the top factors that limit productivity include poor supervision and management, ineffective communication, low budget, insufficient staff, poor pay structure and no recognition. In this regard, other workplace factors were also mentioned like autonomy and freedom, the job, sense of achievement, and teamwork, and when asked, workers replied that if they were in charge, they would get rid of bureaucracy and red tape, enhance supervision and management, increase effective communication, and acknowledge and reward performance in order to maximize productivity. Robbins and Judge (2011) who stated that employee job satisfaction would more likely increase when the supervisors were understanding and friendly, praised satisfactory performance, encouraged feedback from subordinates and displayed personal and genuine interest in employees. On the other hand, Baron and Kenny (1986) found that job satisfaction did not mediate the relationship between worker relationship and worker productivity. This leads to the following hypotheses:

H2h: There is a relationship between workers' relationship with management and colleagues or peers and workers' productivity.

H2j: Job satisfaction mediates the relationship between workers' relationship with management and colleagues or peers and productivity.

4.3.2.5 Distraction Behavior (DB)

Behavior that distracts staff is worth noting in this sub-section. For instance, closed office floor plan, whether each of them has a separate office or a few share a closed office, enables staff higher level of privacy compared to just an open plan office

layout. In the former layout, workers have the opportunity to work in peace and quiet, keeping them task-focused without being distracted by their colleagues' activities. It provides employees a thinking frame without distraction (Mubex, 2010).

On the other hand, in the open office plan, the existence of noise leads to workers' stress and de-motivation, high degree of distraction and disturbance along with degree of privacy (Evans & Johnson, 2000). Akbari, Dehghan, Azmoon and Forouharmajd (2013), showed that the relationship between noise level and human productivity is negative and significant (P<0.05). So, in order to increase employee productivity, noise control and reduction it. Bruce (2008) found that workplace distractions negatively impacted productivity by as much as 40% and heightened workplace errors by 27%. The above discussion leads to the present study's examination of the link between distraction behavior and productivity. This leads to the following hypotheses:

H2k: There is a relationship between distraction behavior and workers' productivity.

H2L: Job satisfaction mediates the relationship between distraction behavior and productivity.

CHAPTER FIVE

RESEARCH METHODOLOGY

5.0 INTRODUCTION

This chapter describes the methods and procedures of inquiry that are used in this study. The purposes of this study were to examine the effect of work environment on productivity in the public petrochemical companies in Libya. This chapter is divided into two sections: the study methodology (study design; sample and data collection; study instrument; and method of data analysis) and chapter summary.

5.1 METHODOLOGY OF THE STUDY

The study used quantitative approach using questionnaire to validate the theoretical model discussed in chapter three.

5.1.1 Study Design

The basic study design utilized for this study was a survey design. There is one set of data collection: primary data. The collection of primary data was accomplished using a personal survey instrument. Data was collected using personal survey instrument (questionnaires) to measure the effect of work environment on productivity in the Libyan Public Petrochemical Industry, namely Abu Kammash Chemical Complex and Ras Lanuf Chemical Complex. To validate the model discussed in chapter three,

quantitative study was considered relevant. Survey questionnaire was designed and distributed to get response from the selected sample. The questionnaire was distributed to the six factories of the Abu Kammash Chemical Complex and Ras Lanuf Chemical Complex. A quantitative cross-sectional analysis survey was employed for this study over a period of 30 days within July and August 2012. About 600 questionnaires were distributed from a total population of one thousand (1000). An appropriate sample size of over 269 was gathered. Hand-to-hand questionnaire distribution was employed and the total response rate was reported at 47%.

5.1.2   Sample

This study focused on the two Public Petrochemical Companies in Libya, i.e., the Abu Kammash Chemical Complex and the Ras Lanuf Chemical Complex. Six hundred respondents participated in this study — 300 each from the two companies. Three categories of workers: management staff, senior staff, and junior staff were included in the sample drawn from the two companies. The study distributed six hundred questionnaires to the samples from the factories of the Abu Kammash Chemical Complex and factories of the Ras Lanuf Complex. The reason for choosing only the petrochemical companies for this study was because of homogeneity of the samples and also the similarity in work environments, policies and procedures. The other reasons for choosing these companies were due to their large size; they were strategic companies and geographically located in Libya. The Abo Kammash chemical complex is located in the western area of Libya and has branches in the capital city (Tripoli); the Ras Lanuf chemical complex is located in the eastern area. Additionally, most public industrial companies have been converted to private

122

companies due to low performance. As Colonel Algathafi at the General People Congress (GPC) in Sirte in January 2000, said, "the system is finished. I have to step in today to stop this wheel from spinning in a rut and wasting fuel" (Otman & Karlberg, 2007).

This current study selected the public petrochemical companies in Libya for several reasons. The first reason was that the public petrochemical companies in Libya have the lowest proportion (6%) of the achieved production capacity across all Libyan industries. The second reason is that most Libyan industrial companies have been privatized. This process was done into several stages. One group comprised 191 companies to be privatized through employee buy-outs, (Tashrukiyya), and special bidding (Sharika Musahima). The second group comprised 58 mother companies, while the third group consisted of eleven companies. Both of these groups were to be liquidated through bankruptcy proceedings because of their large external debts and their obsolete technologies (Aldroish, Khajiji, & Al Kdar, 2005). As a result of this process the recommendation was to keep strategic companies required for economic development within the Libyan industrial companies as shown in Table 5.1.

Table 5.1
Strategic Public Industrial Companies

Public Company	Product
Public Company for Chemical Products	Chemical
Public Company for Petroleum	Oil
Libyan Company for Iron and Steel	Iron and Steel

5.1.3 Data Collection and Measurement

Data collection is the action whereby information is gathered from the participants of a study using a specific tool. The tool used in this study was a questionnaire. The data was collected from the Abu Kammash Chemical Complex and Ras Lanuf Chemical Complex in Libya. Using this method is also consistent with the claim that surveys are conducted to quantify certain factual information (Pallant, 2011). Moreover, productivity measure based on self-productivity assessment (also defined as perceived productivity or self-reported productivity) is a measure that is both subjective and indirect. A direct subjective productivity measurement will concern the workers' own productivity. A five-point Likert Scale was used to measure all the variables. The Scale varied from 1(strongly agree) to 5 (strongly disagree) for some of the questions, and some questions were measured, also using the five-point Likert Scale, but ranging from 1 (always) to 5 (not at all). This was fair to all respondents to answer the questionnaires.

5.1.4 Study Instrument

For the purpose of the study, a questionnaire was distributed. The questionnaire used in this study consisted of the physical environment: temperature, lighting, non-cash fringe benefits and work hours; as well as the behavioral environment: nature workplace behavior, toxic behavior, mistreatment culture behavior, workers' relationships with management or coworkers and distraction behavior. The variables in the questionnaire were selected based on previous questionnaires and literature review. The respondents were asked to state their feelings and experience. Arabic

124

language was used in the questionnaire. It was translated by professional translators from the Almagrive Centre from English to Arabic.

In addition, a five-point likert-type rating scale was employed to engage such indices as: (1) the extent of an activity ranging from 1 (always), 2 (mostly), 3 (often), 4 (to some extent), and 5 (not at all); and (2) the degree of agreement the Scale varied from 1(strongly agree) to 5 (strongly disagree) for some of the questions. Appendix A shows an example of the questionnaire that was sent to the workers. Reliability test of pilot study was conducted on a sample of 40 workers as shown in Table 5.2 and the validity, correlation analysis, and regression analysis were conducted.

5.1.5 Method of Data Analysis

The gathered data was run through Statistical Package for Social Science (SPSS) package to generate results. The data was then summarized through descriptive statistics and analyzed through inferential analysis. Descriptive analysis encapsulates means, standard deviations, and percentages. According to Pallant (2011), the mean refers to the sum of the entire scores in a distribution over the number of observations, whereas the standard deviation refers to the average distance of every distribution score from the mean analyzing the descriptive approach, the reliability and validity, normative, correlation and regression. Data involved responses on a five-point Likert Scale. The responses for all the 236 respondents were displayed in various forms - raw information, frequency distribution, graphs, means and standard deviation.

The study carefully examined the data and discovered and corrected some errors made during the data entry. In line with that, the study used both descriptive and inferential analysis.

5.1.5.1 Statistical Techniques

The aim of this analysis is to understand the characteristics of each construct. It is utilized to illustrate frequencies, mean value, and standard deviation of every study construct.

5.1.5.2 Inferential Analyses

The researcher designed the questionnaire according to previous questionnaires and literature review depending on these authors; temperature and lighting items were adopted using a questionnaire designed by Hameed and Amjad (2009); nature of workplace behavior and fringe benefits by Akinyele (2010); distraction behavior by Mawson (2002); workers relationship with management and colleagues were developed; and toxic behavior, mistreatment behavior, job satisfaction and workers productivity were adopted (Namie, 2007). However, it is necessary that the contents be revalidated (Sekaran, 2005), especially if the instruments have been used in different environments, different contexts, on different sets of respondents and characteristics from the original studies carried out. Hence, a pilot study was done to guarantee that the survey materials, as well as procedures, were not ambiguous to the participants. The complete study procedure was conducted in the pilot study including the data analysis and interpretation. The pilot study benefits the study by

enhancing data collection and scoring methods, revising developed measures and determining the expected data patterns. Moreover, the pilot study conserves time and money prior to carrying out of the actual study, helps in establishing the sensitivity of instruments in collecting/constructing data required for analysis, and in establishing the procedures' soundness. In other words, the pilot study assists in determining whether or not the design will do what it is expected to (validity of the complete study).

The instrument was tested by 40 respondents. The respondents represented workers in petrochemical complexes in Libya. The participants were requested to go through the survey to confirm the clarity of questions and time needed for the survey completion. The respondents stated that the survey length was vital, but the researcher was convinced that the length of the survey was justified by the requirement to establish valid measures for the survey concepts. Consequently, the results of the pilot study were metioned in section 5.1.5.2.3.

5.1.5.2.1 Data Preparation and Screening

Before the data analysis is conducted, it is important to take into consideration the accuracy of the data entered into the file and also the output that would produce non-distorted correlations (Tabachnick & Fidell, 2001). This section discusses the necessary data screening procedures prior to data analysis, which are the detection of missing data and detection of outliers. Validity and reliability of study constructs and other assumptions are to ensure that the analysis of data is done precisely to test the hypothesis to be discussed.

5.1.5.2.1.1 Detection of Missing Data

Hair, Anderson, Tatham, Black and Babin (2006) defined missing data as "information not available for a case about whom other information is available". Missing data for this study was reduced as much as possible by checking for errors in all the variables that fell outside the range of possibilities at the point of time they were collected. According to large sample of the questionnaires, to ensure that the questions were fully answered and to prevent missing data, uncompleted answers were dropped from being submitted. There were 33 cases with missing data, which were excluded. There were sufficient samples for further analysis even after the decision to drop the cases of the missing data as recommended by Babbie (2005). To ensure that the data was "clean", frequency distribution, and missing value analysis for each variable's understudy were conducted. There was no missing data reported.

5.1.5.2.1.2 Detection of Outliers

Outliers as defined by Hair, Anderson, Tatham, Black, and Babin (2006) are an observation with "unique combination of characteristics identifiable as distinctly different" from the other observations. Standardized Z-score values have indicated that no extremes outliers were detected of the data set in the cases exceeding +_3.29 as shown in Appendix C.

In addition, Tabachnick and Fidell (2001); and Field (2009) also recommended graphic methods of detecting outliers, such as histograms, box plots and normal

probability plots. For this study, the box plot was utilized as shown in Appendix D. No extreme outliers were detected. However, there were a few cases of outliers detected that lay at a considerable distance from the edge of the box. After checking the original means and 5 % trimmed mean through the SPSS procedure, and given the fact that the values were not too much different from the remaining distribution, the cases were retained as suggested by Pallant (2011), as shown in Appendix E.

In order to ascertain that there are no further unusual multivariate outliers, inspection of Mohalanobis Distance has identified the residual value of Further checks on the Cook Distance has indicated that the maximum value was 0.031 (see Appendix F) which is far lower than 1.0 (Tabachnick & Fiedell, 2001) and which suggests that there is no potential problem. Therefore, no outliers were deleted from this study.

5.1.5.2.2 Instrument Validity

Several validity tests were also conducted to ensure that measurement scale measures what it is supposed to measure (Davis & Consenza, 1998; Hair, Wolfinbarger, Ortinau & Bush, 2010). Validity tests can be in external or internal forms. External validity refers to the data that should have the ability to be generalized across persons, time and setting. Internal validity is concerned with one type of error variation which may prevent the study instrument from measuring what it was originally supposed to measure (Blumber, Cooper & Schnidler, 2005). Two major validity tests that are widely accepted in business study are: content or face validity, and construct validity.

Content and face validity is related to the degree that the scale items represent the domain of the concept under study (Davis & Consenza, 1998). It involves a systematic and subjective assessment (Hair, Wolfinbarger, Ortinau & Bush, 2010). Content validity that is used to assess the measurement instruments was done in the pre-test stage by soliciting the expert opinions of three academic staff from Gerian University, and three academic staff from Alzawia University. The validity of the instrument was tested by them. Before the pilot study conducted a set of questionnaires was distributed to them for feedback and evaluation on the design of the questionnaires, grammar, phrasing of sentences and understanding. They judged the suitability of each item, clearance, and linguistic style.

5.1.5.2.3 Instrument Reliability

To affirm the instrument reliability, the study applied it on a sample of fourty (40). The reliability of the instrument used in this study was tested using Cronbach's Alpha. For the purpose of this study, reliability estimate of 0.7 or higher suggests good reliability, but reliability between 0.6 and 0.7 may be acceptable (Hair, Anderson, Tatham, Black & Babin, 2006). All the measurement scales for this study had empirical evidences that internal consistency was far above the acceptable level; only work hours had lower value of Alpha as mentioned below. Accordingly, the reliability results were as follows:

Table 5.2
Cronbach's Alpha Test

No. of items	Variables	Cronbach's Alpha
4	Temperature	.867
4	Lighting	.933
6	Fringe benefits (non-cash)	.925
3	Work Hours	.663
3	Nature Workplace Behavior	.753
13	Toxic behavior	.797
7	Workers Relationship	.848
4	Distraction behavior	.789
6	Job Satisfaction	.917
6	Productivity	.927

In addition to that, the study also conducted normality and linearity tests after collecting the data from the population of the study (236 respondents). Another inferential analysis was also done as follows:

a) **Factor Analysis**

Although the above procedure was carried out, it could not guarantee the content validity of the scale, but it gave the study some degree of confidence (Davis & Consenza, 1998). Therefore, to ensure that the scale measures what it is supposed to, another validity test is suggested by most studies. This is the construct validity. Construct validity deals with two aspects in assessments: theoretical and statistical.

Theoretical aspect involves the natured aspect which calls for the justification of the concept. The evidence of finding the variables of the construct was from previous literatures. The variables in this study are related to literatures on physical components of work environment, behavioral component of work environment and job satisfaction, which in turn were derived from organizational behavior. The statistical aspect of the construct validity can be accessed through convergent validity. Convergent validity checks "what is the extent or degree of association between two maximally different measurements which purports to measure" the same construct (Hair, Wolfinbarger, Ortinau & Bush, 2010). In other words, convergent validity can be ascertained by correlating one instrument with another that it is designed to measure.

In order to ascertain that all the measurements in this study exhibit some degree of construct validity, factor analysis (FA) was performed on all the constructs under study. All the variables in this study are two-dimensional and therefore the purpose is not only to validate the scales but also to assess the variables set so that only the most important information found in the relationships of the variables are reproduced (Davis & Consenza, 1998). In other words, FA is a multivariate technique that confirms the dimensions of the concept that have been operationally defined, as well as indicating which of the items are most appropriate for each dimension (Sekaran & Bougie, 2009).

It also reveals interrelationship patterns among variables, detects variable clusters and reduces a large number of variables to smaller statistically uncorrelated variables, and to the factors of FA that are individually linearly linked to the original

variables (Agresti & Finlay, 1997). FA is generally used for measuring construct validity (Hair, Anderson, Tatham, Black & Babin, 2006). FA process conducted in four stages, there are the correlation matrix for all variables is computed, factor extraction, factor rotation, and make final decisions about the number of underlying factors (Khelifa, 2009). It is frequently employed in inferential study and is robust in deterring type-one errors. Factor extraction is also employed with Eigen value of more than one (1) adopted as per recommendation. For further simplification of the interpretation, the orthogonal method and the varimax rotation were conducted. The advantage of this technique is that it has the tendency to reapportion the variance among factors so that they become relatively equal in importance (Tabachnick & Fidell, 2001).

After the orthogonal rotation was performed on all the important variables of the physical components of environment: temperature, lighting and fringe benefits; as well as the behavioral components of environment: nature of workplace behavior, toxic behavior and workers' relationships with management or coworkers and distraction behavior, they were submitted to FA to determine their analysis. As a rule of thumb, only variables with factor loadings of 0.32 or more are considered viable (Tabachnick & Fidell, 2001). However, Byrne, Stewart, and Lee (2004) stated that factor loadings exceeding 0.71 are "excellent", factor loadings of 0.63 are "very good", 0.55 are "good", 0.45 are "fair", and for those that are 0.32, they are considered "poor". Tabachnick and Fidel (2001) recommended that the cut-off point for loading size depend on the preference of the study. For this study, because the loading size is influenced by the homogeneity of sample scores, an interpretation of a greater loading of 0.4 would be sufficient. This analysis is explained in chapter Five.

b)   **Test of Reliability of the Instrument**

Instrument reliability refers to the level to which the variables encapsulate the construct that it is intended to measure. In this study, Cronbach's Alpha was employed to test the instrument's reliability. In addition, reliability analysis was run on the factors extracted through the recommendation of Hair, Anderson, Tatham, Black, and Babin (2006). It tested the internal consistency of the instrument's measurement ability.

Cronbach's Alpha is utilized in order to test the response credibility of the questionnaire and to guarantee harmony between the responses of the study sample. The statistically accepted value of this measurement is 60% - any lesser value is deemed poor (Sekaran, 2003; Hair, Anderson, Tatham, Black & Babin, 2006).

c)   **Multiple Regressions**

Multiple regression techniques are used to determine whether the independent variables: Physical components of environment (temperature, lighting, non-cash fringe benefits and work hours); Behavioral components of work environment (nature of workplace behavior, toxic behavior, mistreatment culture behavior, workers' relationship with management or colleagues, and distraction behavior) have an effect on the mediating variable (job satisfaction) and on the dependent variable (workers' productivity of the public petrochemical companies in Libya).

This study used multiple regression analysis (stepwise and standard regression) to test the hypotheses. The test would determine the impact of independent variables on mediating variable and dependent variable. This is because productivity is the sole dependent variable with interval as its measurement type, whereas there are several independent variables with the same measurement type. On the other hand, it is possible to include categorical predictors in a regression analysis using continuous variables (interval variables) (Garson, 2007; Hair, Anderson, Tatham, Black & Babin, 2006). The study attempts to investigate the impact of various independent variables on a dependent variable at the same time.

Furthermore, in this study, bivariate analysis (which involves two variables) and multivariate regression analysis (which involves the entire variables at the same time) were carried out. For the hypotheses testing, the multiple regression analysis was employed and correlation analysis was also applied. Correlation measures the association and relationship between two variables. (Carver & Nash, 2006).

5.2 SUMMARY

The study methodology development allowed the researcher to carry out the study systematically and in a robust manner. These inputs allowed the researcher to be aware of the suitable process to employ in this study. The primary data collection method used was the survey questionnaire, where all the items' reliability was confirmed after the pilot study. The fullest cooperation from the two public petrochemical companies allowed this study to be manageable. Furthermore, the determination of a suitable analysis that meets the study objectives assisted the understanding of further interpretation that is provided in the next chapter. In addition, reports of the results of the statistical testing as proposed in chapter 5 are presented in chapter 6.

CHAPTER SIX

ANALYSIS AND FINDINGS

6.0 INTRODUCTION

This chapter discusses the analysis of the data and presents the report of the results of the statistical testing. Data screening is discussed followed by validity and reliability tests. To address the study questions, statistical analyses are applied, including descriptive statistics, correlations, and multiple regression analysis.

6.1 SAMPLING RESULTS

6.1.1 Respondents' Profile

Before examining the results gained from this survey as they pertain to demographic characteristics, physical factors and behavioral factors, the demographic characteristics of the population is first described. By establishing the traits of the respondents, this study begins to assess the extent to which the results are generalizable. Table 6.1 shows information on population and return rates of the questionnaire sent to the workers of Abu Kammash Chemical Complex and Ras Lanuf Chemical Complex in Libya. Of the 600 questionnaires administered, 570 subjects were delivered but only 269 responses from workers were received resulting in a response rate of 47%. There were 33 cases with missing data, which were excluded as recommended by Babbie (2005).

Table 6.1
Summary of Response Rates

Questionnaires administrated	600
Undelivered	30
Subjects contacted	570
No. of Responses	269
Response rates	(269/570)

Tables 6.2, 6.3, 6.4, 6.5, and 6.6 below summarize the demographic profiles of the respondents. Despite the equal numbers of questionnaires distributed to both public petrochemical companies, the proportion of samples drawn was approximately 40.5:59.5, which amounted to 40.5 % from the Rasnalof Company and 59.5 % from Abo Kamash Company. However, the difference is quite marginal when considering the number of respondents, 109:160 (109 from Ras Lanuf Company and 160 from Abo Kamash Company) and considered appropriate to represent the population.

The demographic information was gathered from each subject and the data was collected to address a specific study question. It provides an insight into the subjects and assists in interpreting results of the analysis. Summaries of the demographic data collected from the Petrochemical companies' workers in Libya are as shown below.

Table 6.2
Profile of Respondents (Age)

	Frequency	Valid %
Below 31	6	2.5
31 to 40	69	29.2
41 to 50	86	36.4
51 to 60	72	30.5
61 and above	3	1.3
Total	**236**	**100.0**

Majority of the respondents were between 41 to 50 years of age (36.4%), followed by those between 51 to 60 years old (30.5%), and from 31 to 40 years (29.2). About 2.5 % of the workers were below 31 years old while older age of more than 60 is 1.3%.

Table 6.3
Profile of Respondents (Gender)

	Frequency	Valid %
Male	214	90.7
Female	22	9.3
Total	**236**	**100.0**

The sample indicates that male respondents represented a higher percentage of total samples (90.7%) when compared to female respondents (9.3%).

Table 6.4
Profile of Respondents (Educational Level)

	Frequent	Valid %
Secondary	16	6.8
Intermediate	146	61.9
Undergraduate	73	30.9
Postgraduate	1	0.4
Total	**236**	**100.0**

The majority of the respondents possessed intermediate education 61.9% (146). The data shows that about 6.8% (16) of the respondents hold secondary education while 30.9% (73) are undergraduates and 0.4 % (1) are postgraduate degree holders.

Table 6.5
Profile of Respondents (Position)

	Frequency	Valid %
Accounting and finance	31	13.1
Marketing	19	8.1
HRM	3	1.3
Management	57	24.2
International Business	5	2.1
Operational	89	37.7
Technology Management	32	13.6
Total	**236**	**100.0**

Table 6.6
Profile of Respondents (Experience)

	Frequency	Valid %
Less than 5 years	10	4.2
5 to 10 years	20	8.5
More than 10 to 15 years	27	11.4
More than 15 to 20 years	44	18.6
More than 20 to 25 years	29	12.3
More than 25 to 30 years	58	24.6
More than 30 years	48	20.3
Total	**236**	**100.0**

The analysis of the results also reveals that 4.2% (10) of the respondents have less than five years experience, 8.5% (20) have five to 10 years, 11.4% (27) have more than 10 to 15 years, 18.6% (44) have more than 15 to 20 years, 12.3% (29) have more than 20 to 25 years, 24.6% (58) have more than 25 to 30 years, and 20.3% (48) have more than 30 years. The pie chart in Appendix B explains the relative proportion of the respondents' profile in percentages with regards to age, gender, education level, position and experience.

6.2 VALIDITY AND RELIABILITY OF STUDY CONSTRUCTS

6.2.1 Validity Tests

Several validity tests were conducted to ensure that the measurement scale measures accurately (Davis & Consenza, 1998; Hair, Wolfinbarger, Ortinau & Bush, 2010).

Two widely accepted validity tests were conducted: content or face validity and construct validity. This study used validity as follows:

6.2.1.1 Content or Face Validity

Content validity refers to the level of the scale items' representation of the concept under study (Davis & Consenza, 1998), and it entails an assessment that is both systematic and subjective (Hair, Wolfinbarger, Ortinau & Bush, 2010). This was conducted in the pre-test stage with the help of the experts (academic staff from Libyan universities) as discussed in Chapter 3. Feedback was taken concerning any revision/modification to the scale, ensuring that the measures are sufficient and that the items actually tap the concept under study. This function determines the level to which the concept dimensions and elements are delineated. A measure is deemed to have content validity if there is a general consensus among judges that it covers the entire aspect of the measured variable (Sekaran, 2003; Hair, Anderson, Tatham, Black & Babin, 2006). Sekaran (2005) revealed that the evidence types that reinforce content validity entail the following steps:

a)   The judgment of individuals constructing the instrument or experts familiar with the area under discussion.

b)   Detailed definition/conceptualization/operationalization of the behavioral domain or universe under study.

c)   It presents way-high internal consistent reliability.

In this study, the study followed the procedures suggested above to test content validity of the questions as showed in chapter 4. In this way, the reliability of the scales were established.

6.2.1.2 Construct Validity

Construct validity deals with the degree to which the construct or "scale represents and acts like the concept being measured" (Davis & Consenza, 1998). Initially, construct validity was theoretically assessed. The instruments for the variables were adapted from prior studies that already had their construct validity confirmed. The statistical aspect for the confirmation of the variables, concept for construct validity, was assessed through convergent validity, which refers to the extent to which the construct is positively correlated to the same constructs' measures. The principal method run on all the study constructs to support convergent validity is the Varimax principal rotation analysis (PCA).

PCA is supported by Tabachnick, and Fidell (2001), for factor extraction over exploratory factor analysis (FA) particularly for data set empirical summary. FA can use metric variables it is easily measured by several types of correlation, but non-metric variables are riddled with more issues, as they cannot utilize the same kinds of correlation measure utilized by metric variables. Therefore, FA refers to a generic term of a class of multivariate statistical methods that primarily defines the underlying structure data matrix (Hair, Anderson, Tatham, Black & Babin, 2006). The entire factors of study variables are deemed as a one-by-one dimension in order to validate the scales and to identify the factor loading.

All the study variables regarding temperature, lighting, non-cash fringe benefits, work hours, nature of workplace behavior, mistreatment behavior, workers relationship with managers or colleagues, distraction behavior, job satisfaction and productivity were run through PCA to identify their factor loading. The rule of thumb recommended by Tabachnick and Fidell (2001) is that only variables with loadings of 0.32 and more should be considered viable. However, another interpretation by Byrne, Stewart and Lee (2004) suggests that any loading over 0.71 is considered excellent, 0.63 is considered very good, 0.55 is considered good, 0.45 is considered fair and finally, 0.32 is considered poor.

For FA, a total number of over 150 samples are ideal (Tabachnick & Fidell, 2001). In this study, the sample size is 236 and consistent with that, the study employed the Kaiser Meyer Olkin (KMO) measure of sampling adequacy (MSA). This is a measure that quantifies the level of inter-correlation among variables and the suitability of FA. The interpretation of this measure lies in the following guidelines: MSA values in the line of 0.90s are considered marvellous, 0.80s are considered meritorious, 0.70s are considered middling, 0.60s are mediocre, 0.50s are miserable and finally below 0.50s are rejected and should be deleted. Test of sphericity value should also be significant (0.05 or lower) (Hair, Anderson, Tatham, Black & Babin, 2006; Kaiser, 1970).

The correlation matrix should be at least $r=0.3$ or higher (Tabachnick & Fidell, 2001). Bartletts test of sphericity should be significant at $p<0.05$, and KMO statistic should be at 0.6 at a minimum (Kaiser, 1974). If the latter falls below the least value,

more data should be collected or other variables should be included (Field, 2009). The KMO values are interpreted by Hutcheson and Sofroniou (1999) as: between 0.5 and 0.7 is mediocre, between 0.7 and 0.8 is good, between 0.8 and 0.9 is great, and over 0.9 is superb.

Murphy and Davidshofer (1998) stated that FA provides a measure of the instrument's construct validity. Thus, the construct expounds on all the processes providing the description of the relationship between behaviors and abstract construct in detail, and is deemed as the key to identify the test's construct validity. The construct explication process is explained as:

1.   Determine the behaviors relating to the construct to be measured.

2.   Determine other constructs and know whether or not they are related to the constructs to be measured.

3.   Determine behaviors related to each additional construct.

6.2.1.2.1 Temperature

For the construct of temperature, the study conducted Varimax rotation PCA on a 4-item scale. Before the PCA was run, data was assessed for its suitability for FA. Based on the correlation matrix, most of the item coefficients were 0.42 and over. The study conducted two statistical measures to assess the data factorability through

KMO, in an attempt to identify the MSA value which was found to be 0.802, a value that exceeds the recommended value of 0.60 (Kaiser, 1974), indicating that it is in the range of 'great'. With regards to Bartlett's test, it shows significance at .000. Both values show that data is appropriate for FA. The factors abstracted represent a total variance of 68.055 % (appendix k). Only those factors having loading values of 0.40 and over were considered. The factor loading as shown in Table 6.7 below for this scale, recorded a loading value of between 0.694 and 0.881. Four items loaded on a single factor, were designated as the temperature. The Cronbach's coefficient alpha for the scale was found to be very good at 0.837.

Table 6.7
Factor Loading for Temperature

Items	Component 1
Control temperature	.881
Overall temperature in winters	.858
Normal level of productivity	.854
Overall temperature in summer	.694

6.2.1.2.2 Lighting

Initially, to assess the factorability of the data, KMO revealed a value of 0.866 which exceeded the recommended value of 0.6 (Kaiser, 1974) and also Barlett's test of sphericity was significant at 0.000. The correlation matrix of all the items indicated coefficients. Since the KMO value is above 0.8, which is interpreted as in the range

of "great" by Hutcheson and Sofroniou (1999), it therefore gives support to the samples for lighting items scale as being appropriate for FA.

Varimax rotated PCA was conducted on the four-item scale, and revealed a one factor structure that explained a total variance of 88.697 % (appendix k). The factor loading indicated a value of between 0.919 and 0.956. None of the items were deleted. All items were loaded on a single factor and labelled as lighting. The Cronbach's coefficient alpha for the scale was excellent at 0.957. Table 6.8 below indicates the factors extracted and loadings.

Table 6.8
Factor Loading for Lighting

Items	Component 1
Ample amount of natural lighting	.956
Windows complete my fresh air and lighting need	.952
Control lighting	.940
My workplace provided with efficient lighting	.919

6.2.1.2.3 Non-Cash Fringe Benefits

The varimax rotated PCA was conducted on fringe benefits on a six-items scale. The correlation matrix revealed that most of the items coefficients were at 0.6 and above. Assessment of the factorability of the data through KMO measures, revealed a value of 0.893 which exceeded the recommended value of 0.6 (Kaiser, 1970, 1974) and Barlett's test of sphericity was significant. Since the value of the above measures indicate an excess of 0.8, it can be classified as "great" (Hutcheson & Sofroniou,

1999). Therefore, the samples for the fringe benefits scale were appropriate for FA. The FA represented a total variance of 81.361 %. Only factors with a loading of 0.4 and above were taken into consideration. The factor loading for this scale was recorded at being between 0.864 and 0.941. Since all the items extracted were recorded above 0.4, none of the items were deleted. All the items loaded to a single factor were labelled as fringe benefits. The Cronbach's alpha for the scale was excellent at 0.954.

Table 6.9
Factor Loading for Non-Cash Fringe Benefits

I Items	Component 1
Transportation Services	.941
Staff Club	.932
Staff Common Room	.898
Catering Services	.897
Health Care	.878
Education and Training	.864

6.2.1.2.4 Nature of Workplace Behavior

Assessment of the factorability of the data revealed that there were correlations above 0.4 and based on the result, anti-image correlation values were more than 0.5 which means the data was suitable for FA. Moreover, KMO revealed a value of 0.646 which exceeded the recommended value of 0.6 (Kaiser, 1974) and also Barlett's test of sphericity, which was significant at 0.000. Since the KMO value is above 0.6, which is interpreted as in the range of "mediocre" by Hutcheson and Sofroniou, (1999), it therefore gives support to the samples for nature of workplace behavior items scale as being appropriate for FA.

Varimax rotation PCA was conducted on the three-item scale, and revealed a one factor structure that explained a total variance of 72.948 %. The factor loading indicated a value of between 0.739 and 0.907. None of the items were deleted. All items were loaded on a single factor and labelled as nature of workplace behavior. The Cronbach's coefficient alpha for the scale was very good at 0.810. Table 6.10 below indicates the factors extracted and loadings.

Table 6.10
Factor Loading for Nature Workplace Behavior

Items	Component 1
Nature Workplace	.907
Liveliness, Excitement and Motivation	.905
Stress, Tiredness and Pains	.739

6.2.1.2.5 Toxic Behavior

To determine how many components to extract, the study considered Kaiser's criterion. Also, this variable has interesting components that have an eigenvalue of 1 or more.. Only two components recorded eigenvalue above 1 in this factor which jointly explained 79.219 % of the variations in the items (appendix k). Thus, the final piece of output provided in this first step is the Component Matrix. This showed the loadings of each of the items on the two components. So it is important to look at factor loading. On this criterion, most of the items were strongly loading on the two components at a significant value of 0.4 or above and just one item (MHQ8 - mistreatment is on-going)

was deleted due to no value loading as suggested by Hair (2006). The Cronbach's

coefficient alpha for the scale was excellent at 0.857. Table 6.11 below indicates the

factors extracted and loadings as summarized below.

Table 6.11
Factor Loading for Toxic Behavior

Items	Component	
	1	2
Destabilization	.886	
Threat to Professional Status	.877	
Abuse of Authority	.870	
Interference with Work Performance	.866	
Isolation	.866	
Threat to Personal Standing	.856	
Verbal Abuse	.833	
It Has Not Stopped, It is on Going		-
Target was Terminated		.951
Target Voluntarily Left the Company		.950
Target Transferred		.950
Harasser Transferred or Terminated		.882
Harasser Stopped after Threats		.870

6.2.1.2.6 Workers' Relationships with Management and Colleagues or Peers

The varimax rotation PCA was conducted on workers' relationship with management

and colleagues on a seven-items scale. The correlation matrix revealed that most of the

items coefficients were at 0.6 and above. Assessment of the factorability of the data

through KMO measures, revealed a value of 0.865 which exceeded the recommended

value of 0.6 (Kaiser, 1974) and Barlett's test of sphericity was significant. Since the

value of the above measures indicate an excess of 0.8, it can be classified as "great"

(Hutcheson & Sofroniou, 1999). Therefore, the samples for the bad relations management scale were appropriate for FA. The FA represented a total variance of 82.353 % and the Cronbach's coefficient alpha was at 0.964. Table 6.12 indicates the extracted factor and their factor loadings, as summarized below.

Table 6.12
Factor Loading for Workers Relationship with Management and Colleagues

Items	Component 1
Working with Uncooperative Colleagues	.946
Indifference to Work by Colleagues	.931
Suspicion Relationship	.904
Discriminating Attitude by Management	.901
Tribal / Religious Sentiments	.900
Non-Compliance with Official Channels for Conflict Resolution	.890
Communication Problems	.879

6.2.1.2.7 Distraction Behavior

The factors abstracted represent a total variance of 70.567 %. Only factors with a loading value of 0.4 and above were considered. Therefore, no items were deleted. The factor loading as shown in Table 6.13 below for this scale, recorded a loading value of between 0.801 and 0.871. All the four items loaded on a single factor. The Cronbach's coefficient alpha for the scale was found to be excellent at 0.860.

Table 6.13
FactorLloading for Distraction Behavior

Items	Component 1
Noise	.871
Crowding	.858
Interruption	.829
Mismatch	.801

6.2.1.2.8 Job Satisfaction

For the construct of job satisfaction, varimax rotation PCA was conducted on a six-items scale. Prior to performing the PCA, the suitability of the data for FA was assessed. Correlation matrix revealed that most of the items coefficients were 0.4 and above. Two statistical measures to assess the factorability of the data was also conducted through KMO to determine the MSA value which was at .847, exceeding the recommended value of 0.6 (Kaiser, 1974).

Table 6.14
Factor Loading for Job Satisfaction

Items	Component 1

Drop in Productivity	.840
Anxiety	.839
Excessive Absenteeism	.828
Lost Work Time	.823
Moral Decline	.804
Depression	.742

6.2.1.2.9 Productivity

Assessment of the factorability of the data, revealed that there were correlations above 0.4 and based on the result, anti-image correlation values were more than 0.5 which means the data was suitable for FA. Moreover, KMO revealed a value of 0.875 which exceeded the recommended value of 0.6 (Kaiser, 1974) and also Barlett's test of sphericity, which was significant at 0.000. Since the KMO value is above 0.8, it can be classified as "great" by Hutcheson and Sofroniou (1999), therefore giving support to the samples for productivity items scale as being appropriate for FA. Varimax rotation PCA was conducted on the six-item scale, and revealed a one factor structure that explained a total variance of 74.974 %. The factor loading indicated a value of between 0.653 and 0.917. None of the items were deleted. All items were loaded on a single factor and labelled as productivity. The Cronbach's coefficient alpha for the scale was very good at 0.931. Table 6.15 below indicates the factors extracted and loadings.

Table 6.15
Factor Loading for Productivity

Items	Component 1

Excessive Absenteeism	.917
Work Team Disruption	.907
Moral Decline	.902
Drop in Productivity	.898
Recruitment Problems	.888
Lost Work Time	.653

6.2.2 Reliability Test

To check the reliability of the scales, internal consistency confirmation of the scales was carried by checking the Cronbach's alpha coefficient. The scale item with a coefficient alpha of above 7.0 is the cut-off point for measuring the reliability for this study as recommended by Nunnally and Berstein (1994); and Nunnally (1978). The following Table 6.16 reports the Cronbach coefficient alpha of the variables for this study. The variables for this study have an excellent reliability with a coefficient of more than 0.7; only one factor (work hours) did not fulfil the minimum requirement level of reliability.

Table 6.16
Reliability Coefficient for Variables

Variables	Cronbach's Alpha	No of Items

Temperature	.837	4
Lighting	.957	4
Fringe Benefits	.954	6
Work Hours	.514	3
Nature Workplace	.810	3
Toxic Behavior	.944	7
Mistreatment Culture Behavior	.955	5
Workers Relationship	.964	7
Distraction Behavior	.860	4
Job Satisfaction	.897	6
Productivity	.931	6

As a result of FA, it revealed the new variable as mistreatment culture behavior as mentioned above. Moreover, the reliability test as shown in Table 6.16, points out the Cronbach's alpha for the scale was excellent at 0.955. This variable was added to the model as mistreatment culture behavior as shown in figure 6.11. page 208.

6.3 DESCRIPTIVE STATISTICS

In testing the descriptive statistics, Hair (2006) recommended that certain assumptions have to be met, such as the level of measurement, sampling techniques, independence of observations, detecting of missing data and outliers, normal distribution and homogeneity of variance. The measurement of the variables was in the interval scale (continuous variables) which has fulfilled the necessary measurement requirement. Sampling results were discussed in section 6.1. The sample scores were obtained by using the random sampling method. Observations were independent of each other and as such, no violation of assumption occurred (Stevens, 2001). Detections of outliers

and missing data were discussed in section 6.2 and necessary steps were also taken.

The following section 6.4.1 discusses the normality test or distribution, which assumption is that the samples taken from the population are normally distributed (Pallant, 2011). Assumption on homogeneity of variance would also depend on the tests conducted. To test for significant differences between the two groups of people or conditions, the t-test significant level of Levene's test for equality of variances was performed. For the one way analysis, F-test for significant level of Levene's test for equality of variances was carried out. To best describe the relative magnitude of differences between the "total variance of dependent variables that is predicted from knowledge of the levels of independent variables, the "effect size" or "strength of association" was calculated (Tabachnick & Fidell, 2001). This is presented in the Eta squared at the end of each testing which is discussed in section 6.6, that represents the "proportion of variance of the dependent variable that is explained by the independent variables" (Pallant, 2011). Based on Cohen's (1992) guidelines, the strength effect could be at 0.01= small effect, 0.06= moderate effect and 0.14= large effect.

6.3.1 Normality Test (Skewness and Kurtosis of the Study Variables)

Normality of distribution of data can be examined to a certain extent by each variable's skewness and kurtosis values. Skewness values present the distribution score symmetry where a skewed variable mean will not be at the centre of distribution. On the other hand, kurtosis provide information regarding the peakedness of distribution which can be extremely peaked (with short and thick tail) or extremely flat (with long and thin tail) (Tabachnick & Fidell, 2001). This test is

significant, particularly if the information is used in the parametric statistic method that is discussed in this chapter.

Distribution is considered to be normal when the skewness and kurtosis values are at zero. Positive skewness value is described as a cluster of cases to the left at a low value while negative skewness is described as the score cluster at the right with a long left tail (Tabachnick & Fidell, 2001). On the other hand, kurtosis values at zero indicate a relatively flat distribution called platykurtic and values above zero shows peaked distribution called leptokurtic. It is recommended by studies that samples be large enough (at least 200 and above) to prevent underestimation of variance. Perfect normality assumptions are seldom achieved. Hair (2006) provided the following normality rejection assumptions; normality at absolute values of +_ 3.29 at p<0.001 significant level, +_ 2.58 at 0.01 significant level, and +_ 1.96 at p<0.05 significant level, are rejected.

In order to assess the variables' normality, the above recommendations were followed and none of the variables fell outside of the probability range level of +_3.29 at p<0.001. As the sample size is 236, this was an expected result. The summary of the kurtosis and skewness of all the study variables are presented in Table 6.17. Data for these variables are normally distributed based on the test result, according to the test. Field (2009) suggested that if the sample size is more than 200, it would be sufficient just to inspect the value of the skewness and kurtosis, and virtually observe the shape of the distribution. Therefore, it can be concluded that all the study variables did not deviate from the normality test requirement.

Table 6.17
Skewness and Kurtosis for the Study Variables

Variables	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Temperature	-.332	.158	-1.007	.316
Lighting	-.645	.158	-1.061	.316
Fringe Benefits	-.809	.158	-.565	.316
Workplace Behavior	-.052	.158	-.918	.316
Toxic Behavior	.649	.158	.344	.316
Mistreatment Culture	-.045	.158	-1.338	.316
Distraction Behavior	.401	.158	-.166	.316
Workers Relationship	1.270	.158	.608	.316
Workers Productivity	.624	.158	-.907	.316
Job Satisfaction	.829	.158	-.269	.316

6.3.2 Mean and Standard Deviations of the Study Variables

The useable samples for this study consist of 236 respondents from Petrochemical companies in Libya. Table 6.18 below presents the mean and standard deviation of all the variables under study. All the variables were measured on a five interval scale. All the variable means were higher than two . It ranged from 2.0151 to 3.7069.

Table 6.18
Mean and Standard Deviation for Study Variables

Study Variables	Mean	Std. Deviation	N

Temperature	3.5456	1.06381	236
Lighting	3.4354	1.26273	236
Fringe Benefits	3.7069	1.13972	236
Nature Workplace	3.2062	1.12350	236
Toxic Behavior	2.4183	.93198	236
Mistreatment Culture Behavior	3.0737	1.36278	236
Distraction Behavior	2.4799	.91551	236
Workers Relationship	2.0151	1.11984	236
Productivity	2.3785	1.18674	236
Job Satisfaction	2.3552	1.10773	236

6.3.2.1   Temperature

The descriptive statistics of the temperature indicated by the respondents is shown in Table 6.19 below. As presented in the Table, more than 41 % agreed with bad effect of temperature; more than 20 % agreed with normal effect of temperature; more than 17% agreed with positive effect of temperature; more than 10% agreed with good effect of temperature; and more than 10% agreed with no effect of temperature. In addition, workplace temperature in winter; more than 35 % agreed with cool work place, more than 25 % agreed with cold workplace, more than 21 % agreed with slightly warm, more than 14 % agreed with pleasant, and less than 3 % agreed that temperature in winter was warm; temperature in summer, more than 28 % agreed that temperature in summer was slightly warm and cold, 22 % of the respondents agreed with cool workplace in summer, more than 14 % agreed with pleasant workplace, and less than 7 % agreed with warm workplace. It showed that, 30% agreed (agree and strongly agree) with control temperature at workplace; 61% of the

respondents disagreed that they could control temperature; and more than 8% were
neutral.

Table 6.19
Respondents' Percentage Control Temperature of Workplace

Response	Frequency	%
Strongly Agree	8	3.4
Agree	64	27.1
Neutral	20	8.5
Disagree	73	30.9
Strongly Disagree	71	30.1

160

Normal Level of Productivity			Temperature of Workplace in Winter Season			Temperature of Workplace in Summer Season	
Responses	Frequency	%	Responses	Frequency	%	Frequency	%
No Effect	24	10.2	Warm	6	2.5	16	6.8
Positive Effect	42	17.8	Slightly Warm	51	21.6	67	28.4
Good Effect	25	10.6	Pleasant	35	14.8	34	14.4
Normal Effect	48	20.3	Cool	84	35.6	52	22.0
Bad Effect	97	41.1	Cold	60	25.4	67	28.4

6.3.2.2   Lighting

The results of lighting as indicated by the respondents are as shown in Table 6.20 below. The respondents generally disagreed with that the workplace is provided with efficient lighting; more than 67% of the respondents appeared to disagree with lighting; more than 26% agreed with control lighting, while more than 54% disagreed, just 19% did not need lighting control; ample amount of natural lighting

more than 60% disagreed that the workplace did not provide ample amount of lighting to work, while more than 39% agreed that the workplace provided ample natural lighting. Regarding the number of windows, fresh air and light needed, more than 59% agreed that the workplace was not designed with efficient windows, while more than 26% of the respondents agreed that the workplace was designed with windows that complete their fresh air and lighting needs, and 14% of the respondents did not notice that.

Table 6.20
Respondents' Percentage

Ample Amount of		Windows Complete Fresh Air and Light Need	
%		Frequency	%
10.6		31	13.1
18.6		31	13.1
10.2		33	14.0
28.4		78	33.1
32.2		63	16.7

Efficient Lighting of Workplace			Control Lighting of the Workplace				
Responses	Frequency	%	Responses	Frequency	%	Responses	Frequency
Strongly agree	25	10.6	Completely	37	15.7	Always	25
Agree	51	21.6	Mostly	26	11.0	Mostly	44
Neutral	1	0.4	Don't Need	45	19.1	Often	24
Disagree	105	44.5	To Some Extent	93	39.4	To Some Extent	67
Strongly Disagree	54	22.9	Not at All	35	14.8	Not at All	76

6.3.2.3   Non-Cash Fringe Benefits

The descriptive of the fringe benefits indicated by the respondents is shown in Table 6.21 below, showed more than 65% disagreed (incorporated disagree and strongly disagree) with health care provided; more than 18% agreed (incorporated agree and strongly agree) with health care provided; and more than 15% were neutral with

163

health care provided. Also, for transportation services, more than 66% disagreed (incorporated disagree and strongly disagree) with transportation services; slightly more than 21% agreed with transportation services; and more than 11% were neutral with transportation services. In the same Table, for education and training provided, more than 66% disagreed with that; while 23% of the respondents agreed with education and training services provided by the company; more than 5% were neutral with that facility. With staff club provided, 64% disagreed (incorporated disagree and strongly disagree); more than 22% agreed (incorporated agree and strongly agree) with staff club provided; and slightly more than 13% were neutral with staff club provided. More than 64% disagreed (incorporated disagree and strongly disagree) with staff common room provided; more than 20% agreed (incorporated agree and strongly agree) with staff common room provided; and slightly more than 14% were neutral with staff common room provided. Moreover, it indicated that 72% disagreed (incorporated disagree and strongly disagree) with catering services provided; more than 15% agreed (incorporated agree and strongly agree) with catering services provided; and slightly more than 12% were neutral with catering services provided.

Table 6.21
Respondents' Percentage with (Non-

	Disagree		Strongly Disagree	
	Frequency	%	Frequency	%
	77	32.6	78	33.1
	73	30.9	85	36.0
	92	39.0	65	27.5
	80	33.9	71	30.1
	68	28.8	85	36.0
	88	37.3	82	34.7

Items	Strongly Agree		Agree		Neutral	
	Frequency	%	Frequency	%	Frequency	%
Health Care Services	20	8.5	24	10.2	37	15.7
Transportation Services	19	8.1	31	13.1	28	11.9
Education and Training	20	8.5	44	18.6	15	6.4
Staff Club Services	17	7.2	37	15.7	31	13.1
Staff Common Room Services	21	8.9	28	11.9	34	14.4
Catering Services	14	5.9	23	9.7	29	12.3

6.3.2.4   Nature of Workplace Behavior

The nature of workplace behavior indicated by the respondents is shown in Table below. Table 6.22 shows more than 58% agreed (incorporated poor and very poor) with nature of workplace is poor; more than 37% agreed (incorporated conducive and very conducive) with nature of workplace is conducive; and more than 3% fairly conducive with nature of workplace. The results shows that with liveliness,

excitement and motivation, more than 67% disagreed (incorporated disagree and strongly disagree) workplace behavior is liveliness, excitement and motivation; slightly more than 32% agreed that workplace behavior is liveliness, excitement and motivation; and 0.4% were neutral with that. Regarding workplace behavior on stress, tiredness and pains, more than 39% disagreed with that; while 54% of the respondents agreed workplace behavior is stress, tiredness and pains; more than 5% were neutral with that.

Table 6.22
Respondents' Percentage with(

Liveli	Stress, Tiredness and Pains	
%	Frequency	%
13.1	29	12.3
19.1	100	42.4
.4	14	5.9
42.4	49	20.8
25.0	44	18.6

Nature Workplace

Responses	Frequency	%	Responses	Frequency
Very Conducive	21	8.9	Strongly Agree	31
Conducive	67	28.4	Agree	45
Fairly Conducive	9	3.8	Neutral	1
Poor	80	33.9	Disagree	100
Very Poor	59	25.0	Strongly Disagree	59

6.3.2.5   Toxic Behavior

The results of toxic behavior as indicated by the respondents are as shown in Table below. Table 6.23 shows more than 78% agreed (incorporated mostly, always and often) with verbal abuse behavior; more than 17% agreed to some extent with verbal abuse; and just more than 3% disagreed with verbal abuse behavior. In addition, for interference in work performance, more than 85% agreed (incorporated mostly,

always and often) that there is interference in work performance behavior; slightly more than 11% agreed that toxic behavior through interference in work performance on a scale of 'to some extent'; more than 3% disagreed with interference in work performance. It also shows that more than 83% agreed with abuse of authority; more than 11% to some extent said there is abuse of authority; while 4% of the respondents disagreed with this. More than 86% agreed (incorporated mostly, always and often) with the behavior of holding necessary information and freezing out (isolation); slightly more than 9% agreed that there is some extent of isolation; while slightly more than 4% said there is no isolation behavior. Destabilization behavior shows more than 81% agreed (incorporated mostly, always and often) with that as toxic behavior; 14% to some extent encountered such behavior at work environment; and slightly more than 4% did not at all encounter such type of toxic behavior at the workplace. The results revealed more than 81% encountered threat of professional status at work environment; more than 14% to some extent faced persistent attempts to belittle and undermine work; and slightly more than 4% did not at all face that behavior. In addition to that, more than 72% encountered threat of personal standing at work environment; more than 20% to some extent faced undermining personal integrity at workplace; and slightly more than 6% did not at all face that behavior.

This survey aimed to gain an understanding of the lived experiences of targets who encounter such aggressive behavior; the description of the toxic behavior shown by participants' answers revealed that isolation (86%); interference with work performance (85%); abuse of authority (83%); destabilization (81%); threat to professional status (81%); verbal abuse (78%); and threat of personal standing (72%) were ranked highest, respectively.

168

Table 6.23
Respondents'   Percentage

To	Not at All		
%	Frequency	%	
17.4	9	3.8	
11.0	8	3.4	
11.4	11	4.7	
9.3	10	4.2	
14.0	10	4.2	
14.4	10	4.2	
20.8	15	6.4	

169

Items	Always		Mostly		Often		
	Frequency	%	Frequency	%	Frequency	%	Frequency
Verbal abuse	43	18.2	82	34.7	61	25.8	41
Interference Work Performance	56	23.7	106	44.9	40	16.9	26
Abuse of Authority	50	21.2	105	44.5	43	18.2	27
Isolation	56	23.7	114	48.3	34	14.4	22
Destabilization	50	21.2	108	45.8	35	14.8	33
Threat to Professional Status	38	16.1	93	39.4	61	25.8	34
Threat of Personal Standing	33	14.0	79	33.5	60	25.4	49

6.3.2.6　　　　　Mistreatment Culture Behavior

The results of mistreatment culture behavior as indicated by the respondents are as shown in Table 6.24 below stated that more than 52% disagreed (incorporated disagree and strongly disagree) with harasser transferred or terminated; 41% agreed

with harasser transferred or terminated; and just more than 5% were neutral with that. In addition, the percentage for harasser stopped after threats was more than 53% disagreed (incorporated disagree and strongly disagree); 39% agreed that mistreatment culture behavior as harasser stopped after threats; more than 5% were neutral with that behavior at workplace. The Table shows that slightly more than 46% disagreed with target transferred; more than 48% agreed with target transferred; while 5% of the respondents were neutral with this behavior. Moreover, the target voluntarily leaving the company; more than 47% agreed with that; while slightly more than 5% were neutral with that. it shows more than 46% disagreed (incorporated disagree and strongly disagree) with target was terminated; 47% agreed with target was terminated; while more than 6% were neutral with target was terminated.

Table 6.24
Respondents' Percentage

	Strongly Disagree		
%	%	Frequency	%
32.6		48	20.3
33.5		50	21.2
24.2		52	22.0
23.7		55	23.3
22.9		56	23.9

Items	Strongly Agree		Agree		Neutral		
	Frequency	%	Frequency	%	Frequency	%	Frequency
Harasser Transferred or Terminated / Terminated	44	18.6	54	22.9	13	5.5	77
Harasser Stopped after Threats	44	18.6	50	21.2	13	5.5	79
Target Transferred	49	20.8	65	27.5	13	5.5	57
Target Voluntarily Left the Company	46	19.5	66	28.0	13	5.5	56
Target was Terminated	46	19.5	65	27.5	15	6.4	54

6.3.2.7   Workers' Relationships with Management and Colleagues

The description of the workers relationship behavior shown by participants' answers revealed that as in Table 6.25 below shown slightly more than 81% agreed (incorporated agree and strongly agree) with discriminating attitude by management;

more than 17% disagreed with discriminating attitude by management; and just more than 0.8% were neutral with that. In addition, the respondents percentage for non-compliance with official channels for conflict resolution was slightly more than 79% agreed (incorporated agree and strongly agree); 19% disagreed that bad relationship behavior as non-compliance with official channels for conflict resolution; more than 1% were neutral with that behavior at workplace. More than 77% agreed with suspicion relationship; more than 19% disagreed with suspicion relationship; while more than 2% of the respondents were neutral with this behavior. It also shows more than 81% agreed (incorporated agree and strongly agree) with the communication problems; more than 16% disagreed with communication problems; while more than 1% were neutral with that. The Table shows more than 80% agreed (incorporated agree and strongly agree) with tribal/religious sentiments; more than 16% agreed with this behavior; while 3% were neutral with tribal/religious sentiments. Also, the Table revealed that slightly more than 76% agreed with the behavior of working with uncooperative colleagues; slightly more than 20% disagreed with that behavior; and more than 3% were neutral with uncooperative colleagues. More than 73% agreed with indifference to work by colleagues; 22% disagreed with this bad relationship; and slightly more 4% were neutral with indifference to work by colleagues.

Table 6.25
Respondents'

	Strongly Disagree	
	Frequency	%
	13	5.5
	14	5.9
	10	4.2
	14	5.9
	15	6.4
	17	7.2
	16	6.8

Items	Strongly Agree		Agree		Neutral		Disagree	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Discriminating Attitude by Management	106	44.9	86	36.4	2	.8	29	12.3
Non-Compliance with Official Channels for Conflict Resolution	99	41.9	88	37.3	4	1.7	31	13.1
Suspicion relationship	95	40.3	88	37.3	6	2.5	37	15.7
Communication problems	119	50.4	74	31.4	4	1.7	25	10.6
Tribal / Religious sentiments	130	55.1	60	25.4	7	3.0	24	10.2
uncooperative colleagues	106	44.9	74	31.4	8	3.4	31	13.1
Indifference to work by colleagues	84	35.6	90	38.1	10	4.2	36	15.3

6.3.2.8   **Distraction Behavior**

174

The descriptive statistics of the distraction behavior indicated by the respondents is shown that in Table 6.26 below. More than 84% agreed (incorporated mostly, always and often) with interruption behavior; more than 16% agreed to some extent with interruption behavior; and just more than 3% did not agree at all with interruption behavior; the percentage for crowding was more than 80% agreed (incorporated mostly, always and often); more than 16% agreed with crowding behavior to some extent; 3% disagreed with crowding behavior at work environment. The Table shows that more than 85% respondents agreed with noise in the workplace; more than 18% to some extent; while more than 5% of the respondents disagreed with this behavior. It also shows more than 81% agreed (incorporated mostly, always and often) with the behavior of mismatch at work environment; more than 14% agreed to some extent of mismatch behavior; while more than 3% did not at all agree with mismatch behavior.

Table 6.26	Not at %				
	3.4	3.0	5.5	3.8	

Items	Always		Mostly		Often		To Some Extent		Frequency
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	
Interruption Behavior	39	16.5	100	42.4	61	25.8	28	11.9	8
Crowding Behavior	56	23.7	77	32.6	57	24.2	39	16.5	7
Noise Behavior	40	16.9	62	26.3	77	32.6	44	18.6	13
Mismatch Behavior	57	24.2	88	37.3	47	19.9	35	14.8	9

6.3.2.9   Job Satisfaction

The descriptive statistics of the job satisfaction indicated by the respondents is shown in Table 6.27 below. The respondents were generally dissatisfied with their jobs as indicated in the Table presented that slightly more than 67% agreed (incorporated agree and strongly agree) with anxiety at work environment; slightly more than 29% disagreed with anxiety; and just more than 3% were neutral with that. Moreover, the percentage for depression was slightly more than 66% agreed (incorporated agree and strongly agree) with depression; 33% disagreed with depression; and 0.8% were neutral with that. In addition to that more than 71% agreed with excessive absenteeism as a result of bad work environment; more than 26% disagreed with bad workplace causing excessive absenteeism; while more than 1% of the respondents were neutral with this effect. Also the Table shows more than 75% agreed (incorporated agree and strongly agree) with the drop in productivity as a result of being dissatisfied with work environment; slightly more than 23% disagreed low productivity is caused by inappropriate work environment; while slightly more than 1% were neutral with that. The descriptive shows slightly more than 72% agreed (incorporated agree and strongly agree) with morale decline; more than 26% disagreed with morale decline caused by inappropriate work environment; while slightly more than 1% were neutral with morale decline. In addition to that, the Table reveals that slightly more than 70% agreed with lost work time resulting from dissatisfied work environment; slightly more than 28% disagreed with that; and more than 1% were neutral with lost work time as a result of satisfaction or dissatisfaction with work environment. From these results, it can be concluded that the respondents at Libyan Petrochemical Companies showed lower levels of job satisfaction.

Table 6.27

Strong %
13.1
11.9
9.7
7.6
9.7
11.9

178

Items	Strongly Agree		Agree		Neutral		Disagree		
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency
Anxiety	69	29.2	90	38.1	8	3.4	38	16.1	31
Depression	62	26.3	94	39.8	2	.8	50	21.2	28
Excessive Absenteeism	80	33.9	89	37.7	4	1.7	40	16.9	23
Drop in Productivity	80	33.9	98	41.5	3	1.3	37	15.7	18
Moral Decline	95	40.3	75	31.8	3	1.3	40	16.9	23
Lost Work Time	75	31.8	91	38.6	3	1.3	39	16.5	28

6.3.2.10 Productivity

The results of descriptive statistic of productivity as indicated by the respondents are as shown in Table 6.28 below. The Table presented that slightly more than 65% agreed (incorporated agree and strongly agree) with excessive absenteeism; more than 31% disagreed with excessive absenteeism; and just more than 3% were neutral with that. The percentage for work team disruption is slightly more than 65% agreed (incorporated agree and strongly agree); slightly more than 31% disagreed with work environment behavior causing work team disruption; more than 3% were neutral with that. More than 64% agreed with recruitment problems as a result of unsuitable work environment; more than 30% disagreed with recruitment problems; while more than 4% of the respondents were neutral with this effect. In addition, the Table shows that 67% agreed (incorporated agree and strongly agree) with the drop in productivity; more than 29% disagreed with the impact of work environment leading to drop in productivity; while more than 3% were neutral with that. More than 71% agreed (incorporated agree and strongly agree) with moral decline; more than 26% disagreed with this impact; while slightly more than 2% were neutral with moral decline. Moreover, slightly more than 62% agreed with the lost work time as an impact of work environment; slightly more than 31% disagreed with that; and more than 5% were neutral with lost work time. In addition, this survey aimed to gain an understanding of the impact of work environment on workers' productivity. The description of the effect of work environment shown by participants' answers revealed that 71% agreed with moral decline; 67% with drop in productivity; 65% with excessive absenteeism; 65% with disruption of work team; 64% agreed with recruitment problems; and 62% agreed with lost work time.

Table 6.28
Respondents' Percentage with (Productivity)

Items	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Excessive Absenteeism	84	35.6	70	29.7	8	3.4	49	20.8	25	10.6
Work Team Disruption	86	36.4	68	28.8	8	3.4	53	22.5	21	8.9
Recruitment Problems	84	35.6	69	29.2	11	4.7	53	22.5	19	8.1
Drop in Productivity	80	33.9	78	33.1	9	3.8	47	19.9	22	9.3
Moral Decline	86	36.4	83	35.2	5	2.1	41	17.4	21	8.9
Lost Work Time	74	31.4	75	31.8	13	5.5	56	23.7	18	7.6

181

6.4 CORRELATION ANALYSIS

In using correlation techniques to explore relationships among variables, Tabachnick and Fidell (2001) have recommended that certain conditions or assumptions have to be met. They are the level of measurement, independence from observations, detection of missing data and outliers, normal distribution and normality, linearity and homoscedasticity. Firstly, the level of measurements needed for testing the relationships between two variables should be at intervals or in ratio scale (continuous variables) (Pallant, 2011).

According to Pallant (2011), the exception to the rule is allowed if one of the independent variables is dichotomous and the other dependent variable is continuous. As indicated in the study questions in Section 1.4, this requirement was fulfilled. Observations were independent of each other as such there were no violations of the assumptions (Stevens, 2001). Detection of outliers and missing data were discussed in section 5.1.5.2.1 and the necessary steps have been taken. Normality of the distribution of data can be examined to a certain extent by the skewness and kurtosis values of each variable which were discussed in section 6.3.1. None of the variables fell outside the +_3.29 at $p<0.001$ at probability level range; therefore the data for this study's variables were normally distributed. The following section 6.4.1 discusses the normality, linearity and homoscedasticity before the procedure of regression is explained.

6.4.1 Normality, Linearity and Homoscedasticity

A critical element in simple linear regression analysis is testing whether or not the fundamental assumptions of linearity, normality, and homoscedasticity are met (Hair, Anderson, Tatham, Black & Babin, 2006). Linearity results through scatter plot diagrams for the study variables showed linearity with no evidence of non-linear pattern in the data. Similarly, homescedasticity test results through scatter plot diagrams of standardized residuals appeared to show that the dependent variable's variance is the same for all the independent variables' values as a different pattern in the data point was not discovered.

Before the assessment for correlation and regression can be carried out, all the three assumptions - normality, linearity and homoscedasticity - of the variables data were assessed simultaneously through the analysis of residuals (Tabachnick & Fidell, 2001). They presented the distribution of scores and the underlying correlation between the variables.

In this study, these assumptions were met through the checking of the residual scatterplots generated (see Appendix G), Normal probability plot (Normal P-P plot) (see Appendix H) and histogram (see Appendix I) of the regression standardized residual. The scatterplots presented did not indicate any discerning pattern of residuals. The scores were mostly concentrated in the centre (along the zero point) which suggests that there is no violation of the homoscedasticity assumptions. Inspection for any non-linear patterns on the residuals, such as curvilinear relationships, were not found; therefore the assumption on the linearity was also not.

Finally, inspection of the histogram and Normal P-P plots were undertaken to determine the normality of the independent variables. The histogram as in Appendix I, presents a normal distribution (bell –shaped curve). Further inspection of the Normal P-P plots as in Appendix H indicates that they all lie in a reasonable straight diagonal line from the bottom left to top right. Thus, the assumption that the independent variables of this study are normally distributed is not violated, this means that assumptions of linearity and homogeneity of data are met.

6.4.2 Correlation among the Study Variables

Pearson product-moment correlation extraction can be seen in Table 6.29, on all the ten variables (temperature, lighting, fringe benefits, nature of workplace, toxic behavior, mistreatment culture behavior, workers' relationship with managers or colleagues, distraction behavior, job satisfaction and productivity). Based on Dillon, Madden and Firtle (1993), Pearson correlation coefficient (r) ranges between the limits of value -1 to +1. Positive 1 indicates a perfect positive correlation and the negative correlation indicates otherwise. Correlation of zero (0) refers to the absence of correlation. Benny and Feldman (1985) suggested as a rule of thumb, that the correlation coefficients that exceed 0.8 (very strong correlation) will likely result in multicolinearity.

Cohen (1992), on the other hand, put forward a guideline on the effect size of the correlation coefficients in social science studies as: small effect size, r=0.1 − 0.29, medium, r=0.30- 0.49, and large, r=0.50. Results of the correlation analysis indicate positive correlations as the absolute value is between the ranges of 0.113 to 0.185 and negative correlations ranges between -.107 to -.232, which are lower than the

acceptable cut-off value of 0.8 (Benny & Feldman, 1985). Productivity was found to have a negative correlation with the six variables of temperature (r= -.197, p=0.01); lighting (r= -.176, p=0.01); fringe benefits (r= -.195, p=0.01); mistreatment culture behavior (r= -.158, p=0.05); distraction behavior (r= -.224, p=0.01) and job satisfaction (r= -.232, p=0.01), and have small positive correlations with the three variables of nature of workplace behavior (r= .162, p==0.05); toxic behavior (r= .185, p=0.01) and workers' relationship (r= .156, p=0.05).

Table 6.29
Correlations Coefficient (Pearson Correlation)

Variables (Pearson Correlation)	Temperature	Lighting	Fringe Benefits	Nature Workplace	Toxic Behavior	Mistreatment Culture	Distraction Behavior	Workers Relationship	Workers Productivity	Job Satisfaction
Temperature	1	-.029	.040	.000	.093	-.032	-.077	-.001	-.197**	.139*
Lighting		1	.171**	.113	-.064	-.017	.136*	.050	-.176**	.016
Fringe Benefits			1	-.019	-.129*	.099	.014	-.107	-.195**	.151*
Nature Workplace				1	-.023	-.033	.065	-.065	.162*	-.152*
Toxic Behavior					1	.000	-.040	-.117	.185**	-.161*
Mistreatment Culture						1	.114	-.217**	-.158*	.165*
Distraction Behavior							1	.027	-.224**	.136*
Workers Relationship								1	.156*	.096
Workers Productivity									1	-.232**
Job Satisfaction										1

6.5 MULTIPLE REGRESSION ANALYSIS

Multiple regression analysis can be conducted through three different methods (Tabchnick & Fidell, 2007); first, in the standard regression/simultaneous regression procedure, the entire independent variables are deemed to be of the same importance and are entered into regression equation as the study is interested in examining the relationship between the whole set of independent variables and dependent variable. Second, in the hierarchical regression procedure, independent variables are included in a pre-determined order by the study according to theoretical knowledge and third, in the stepwise regression procedure, the independent variables are introduced one by one based on some pre-determined statistical criteria. The regression procedure choice hinges on the analysis objective.

Consistent with the above and in order to satisfy the analysis objective, this study employed the stepwise regression and standard regression as the study is an attempt to determine the impact of every independent variable upon the dependent variable, and the impact of the entire independent variables included in the model. Owing to the close connection between the multiple regression and Pearson, the regressions are deemed as a powerful tool that summarizes the nature of the variables' relationships through the generation of a line that is consistent with the data. This line is referred to as the line that best fits the summarization of the two variables relationship.

Regression is also invaluable to predict the likely values of the independent variable. While correlation refers to the level of relationship between variables, regression

refers to the predictions of the dependent variable through independent variables (Tabachnick & Fidell, 2007; Hair, Anderson, Tatham, Black & Babin, 2006).

6.5.1 Assumptions of Multiple Regressions

In order to proceed with the hypothesis testing for this study, statistical techniques such as Multiple Linear Regression (MLR) was utilized based on certain conditions. However, to ascertain that the data meets the requirements for the MLR, certain assumptions have to be fulfilled, such as: sample size, multicollinearity and singularity, outliers, normality and homoscedasticity of residuals (Tabachnick & Fidell, 2001).

The first assumption that has to be fulfilled is the minimum sample size so as to generalize the population under study (Green, 1991). It has been suggested that the formula for calculating the number of cases or samples for testing multiple correlation is: N=50 + 8K (where K=number of predictors), especially if the test is the overall model. For this study, with eight predictors, the minimum case required is $50 + 8(8) = 114$ cases. The usable sample size for this study was approximately 236.

The second assumption refers to multicollinearity and singularity, which are related to the correlations between the predictor variables (Tabachnick & Fidell, 2001). Specific explanatory variables are correlated significantly with other independent variables, which could probably stem from multicollinearity. Therefore, before proceeding with the regression analysis, the study checked the predictor variables for multicollinearity.

Table 6.30
Testing For Multicollinearity

Variables	Collinearity Statistics	
	Tolerance	**VIF**
(Constant)		
TM	.953	1.050
LI	.934	1.071
FB	.914	1.094
NWPH	.950	1.052
TB	.932	1.073
MHCU	.902	1.108
DB	.939	1.065
WR	.903	1.107
JS	.858	1.166

The problem of multicollinearity is said to exist when there is high correlation between independent variables (Hair, Anderson, Tatham, Black & Babin, 2006). The detection of multicollinearity severity calls for the use of the variance inflation factors (VIFs) method. This guarantees the absence of any serious collinearity issue that may adversely impact the model parameter estimates' accuracy and stability. The VIFs measure the extent of inflation of the variance of the estimated regression coefficients in comparison to when the independent variables are linearity related. In regression analysis, the accepted collinearity values are considered from the tolerance value of over 0.10 or VIF value of less than 10 (Hair, Anderson, Tatham, Black & Babin, 2006). Maximum VIF value of over ten frequently indicates that multicollinearity may be excessively impacting the least square estimates (Benny & Feldman, 1985).

As a result, small tolerance value and large VIFs values indicate the redundancy of issues concerning correlation items. Accordingly, the VIFs of variables in this study

should not exceed 10. Table 6.30 contains the VIFs of variables with largest VIF (1.166) being well under the threshold of VIF = 10, as recommended by Hair (2006); this shows the absence of multicollinearity issue in the multiple regression models.

Multicollinearity poses a problem only for multiple regression and is said to be present when the independent variables are highly correlated (r=0.8 and above). It has been reported that when this happens, the regression coefficients would not be significant due to high standard error. Tolerance values approaching zero (0) specify the presence of high multicollinearity (Tabachnic & Fidell, 2001). However, no violation of the assumption is expected in this study as independent variables.

The third assumption is that when multiple regressions are applied, there should be no extreme cases of outliers. In this study, this was taken care during the data screening procedure (as in Section 5.1.5.2.1). Outliers are defined as cases that indicate a standardized residual of more than 3.3 or less than -3.3 (Tabachnick & Fidell, 2001). The z-scores results were reported within the range of 3.29 at p<0.001 significance level, which indicates that there are no serious multivariate outliers problems. In addition, the box plot was utilised (Appendix C) and it also indicated no serious outliers' problem. Assumptions with regards to normality, linearity, homodescedascity were assessed simultaneously through the analysis of residuals (Tabachnick & Fidell, 2001) as in section 6.4.1. All these assumptions were not violated.

6.6 EVALUATING THE MODELS USING TESTS OF SIGNIFICANCE

There are various tests used to examine significance, which are applied to the multiple regression analysis results. Among them, R^2 (R Square) coefficient is primarily utilized to evaluate the goodness of a regression equation. It is also called the coefficient of determination. In this study, R^2 is utilized to show the share of variance of the dependent variables (work environment-related factors). The criteria is such that if R^2 is equal to one, a perfect linear relationship is deemed to exist between the dependent and independent variables; if it is equal to 0, no linear relationship is considered to exist between the variables. As a result, the value given under R^2 indicates the level of variance in the dependent variable as explained by the model. In this model, the value is 0.254 and this shows that the model explains 25.4% of the variance in the workers' productivity.

Moreover, the SPSS provides an adjusted R^2 value in the output where, if the sample is small, R^2 in the sample is often an optimistic over-estimation of the actual value in the population (Tabachnick & Fidell, 2007). The adjusted R^2 statistic rectifies this value to offer a more accurate estimation of the actual value of the population as opposed to the normal R^2 value. This study also conducted an assessment of the statistical significance of the result with the help of ANOVA. The study model showed a statistical significance of sig. $= .000$, $p < .0005$.

6.7 EVALUATING EACH OF THE INDEPENDENT VARIABLES USING REGRESSION COEFFICIENTS

Beta analysis was employed to show the significance of the regression coefficient. Regression analysis is utilized for comparing the relative impact of independent variables that are measured by various measurement units, while regression coefficients are converted to a Beta coefficient. These Beta coefficients can then be compared to each other – a larger Beta coefficient translates to a stronger effect of the variable on the dependent variable.

The regression coefficient demonstrates which of the variables in the model predict the dependent variable and to what extent that relationship is. Standardized coefficients refer to values for each different variable that has been converted to the same scale in order to compare them and to determine the largest Beta value (overlooking the negative signs). Accordingly, the largest Beta coefficient was for total temperature at 0.235, indicating that this variable significantly contributed to explaining the dependent variable. Specifically, temperature was significant at less than .001 (sig. = .000) indicating its distinct contribution for predicting the dependent variable (workers' productivity). The Beta value for total distraction behavior was 0.220) (sig. = .000) indicating that distraction behavior made less of a contribution. Other variables were arranged according to stronger unique contributions as follows: nature of workplace behavior .205, Beta (sig. = .000); toxic behavior .201, Beta (sig. = .001); workers' relationship .177, Beta (sig. = .003); and lighting .157, Beta (sig. = .009). On the other hand, fringe benefits was .099, Beta (sig. = .099), and mistreatment culture behavior was .088, Beta (sig. = .140).

A summary of regression results is presented below in Table 6.31. The adjusted coefficient of determination (R^2) indicated that 0.228% of the variation in the dependent variable was explained by variations in the independent variables. This explains the variation in the workers' productivity was statistically explained or accounted for by the regression equation. R^2 was statistically significant, with F = 9.683 and p < 0.000. Thus, the general expression in the form of regression equation is stated as follows:

The workers' productivity = 3.446 – 0.263 Temperature - 0.147 Lighting - 0.103 Fringe benefits + 0.217 Nature of workplace + 0.256 Toxic Behavior + 0.188 Workers' relationship – 0.285 Distraction behavior -0.077 Mistreatment Culture behavior.

The eight predictor variables were observed to be positively correlated to the workers' productivity (the dependent variable), as indicated by the positive R-value of .504 in Table 6.31. A computed R-square value of .254 suggests that the variables were responsible for more than 25.4% of the variance in the workers' productivity with a standard error of estimate of 1.04261. The literature supports this finding in that the (R^2), the explained variance, is commonly much higher for operational and financial measures than for more attitude or opinion measures.

The low proportion of variance explained can be attributed to the following reasons. First, because this current study focuses on indirect factors, the values of R^2 are usually much lower compared to direct factors. The considerable unexplained variance in workers productivity might be explained by other factors not part of this

study, and organizational structure and operational focus. These values might be higher if the workers had more insightful thoughts about the work environment on their productivity because many workplaces in Libyan companies share similar work designs and environments.

Table 6.31
Regression Analysis Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.504	.254	.228	1.04261

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	84.203	8	10.525	9.683	.000[a]
	Residual	246.759	227	1.087		
	Total	330.962	235			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.446	.536		6.434	.000
	TM	-.263	.065	-.235	-4.069	.000
	LI	-.147	.056	-.157	-2.640	.009
	FB	-.103	.062	-.099	-1.658	.099
	NWPH	.217	.061	.205	3.536	.000
	TB	.256	.075	.201	3.422	.001
	MHCU	-.077	.052	-.088	-1.482	.140
	DB	-.285	.076	-.220	-3.751	.000
	WR	.188	.063	.177	2.958	.003

The ANOVA shows that the regression model of the influence of predictor variables on the workers' productivity is significant at 95 % confidence level with an F- value

of 9.683 (p<0.01). Three variables were found to be statistically significant (at p <0.001) to the workers' productivity. These variables are temperature, nature of workplace and distraction behavior; one variable was found to be significant at p=001 - toxic behavior and workers' relationship at p<0.05.

6.8 EVALUATING EACH OF THE INDEPENDENT VARIABLES AND MEDIATING VARIABLE USING REGRESSION ANALYSIS

The model sought to assess the effects of work environment on workers' productivity with job satisfaction acting as the mediator. Work environment was examined in two ways, namely; physical and behavioral. To test the mediating effects, three regression analyses were performed to assess if job satisfaction mediates the relationship between work environment and workers' productivity. According to Baron, and Kenny (1986), the following guidelines have to be fulfilled to determine whether or not job satisfaction mediates the relationship between independent variables and dependent variable. The guidelines that must be upheld are:

i. The independent (predictor) variables (work environment-factors) should make significant contribution to the dependent (criterion) variable (workers' productivity)

ii. The independent variables (work environment-factors) should make significant contribution to the mediating variable (job satisfaction).

iii. The mediator (job satisfaction) should make significant contributions to dependent variable (workers' productivity). Perfect mediation holds when the independent variables (work environment-factors)

no longer relate to the dependent variable (workers' productivity) after mediator (job satisfaction) is included and regression coefficient is reduced to non-significant (near zero) level. Partial mediation is when the Beta coefficient of the independent variables value is reduced but still statistically significant after the inclusion of mediator (Lok & Crawford, 2004).

6.9 HYPOTHESIS TESTING

The objectives of this study present the crucial points of the empirical inquiry from Chapter One are reported below. These objectives are:

1. Analyse the impact of factors in work environment on workers' productivity;

2. Examine the most important components of work environment, which affect workers' productivity; and

3. Investigate the impact of job satisfaction as mediating on the relationship between work environment and productivity.

As an attempt to achieve the study objectives, one testable hypothesis was developed and presented in Chapter Four (4). The following part provides the findings of relationship between the variables under study as hypothesized in Chapter 5.

Hypothesis one (1) sought to assess the effects of physical environments on workers' productivity as follows:

H1: There is a relationship between physical environments and workers' productivity.

Simple linear regression analysis was performed to examine the relationship between physical condition and workers' productivity. The regression analysis is the most appropriate statistical tool to run as the objective of this study is to establish a linear relationship between the two variables, to predict values of dependent variable from values of independent variables (Tabachnick & Fidell, 2001). Before the assessment was done, analysis for evaluation based on the assumptions of normality, linearity and homoscedascity was performed. Z scores of +_3.29 at p<0.001 probability level range and visual observation of the box plot indicated no serious outliers' problem. Therefore, it was found that there are no serious violations of the assumptions. Thus, simple linear regression analysis was appropriate to test this hypothesis.

The regression analysis results as shown in Table 6.32, indicate a negative and a significant relationship between physical environments and workers' productivity (t=-4.831, p=0.000). Based on the results, the Hypothesis (1) is supported. It can also be inferred that unsuitable physical condition leads to lower workers' productivity. However, the strength of the relationship between the two variables is - 0.301, as measured by r value at p value of 0.000. The coefficient of determination measured by r-square is .091. It demonstrates that the effect of physical conditions helps to explain 9.1 % of the variance in workers' productivity.

Table 6.32
Regression Analysis Summary: Relationship between Physical Environments and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
PHYE	.301	.091	-.301	-4.831	.000	23.342	.000	1.000

Hypothesis One (a)

H1a: **Job satisfaction mediates the relationship between physical environments and workers' productivity**.
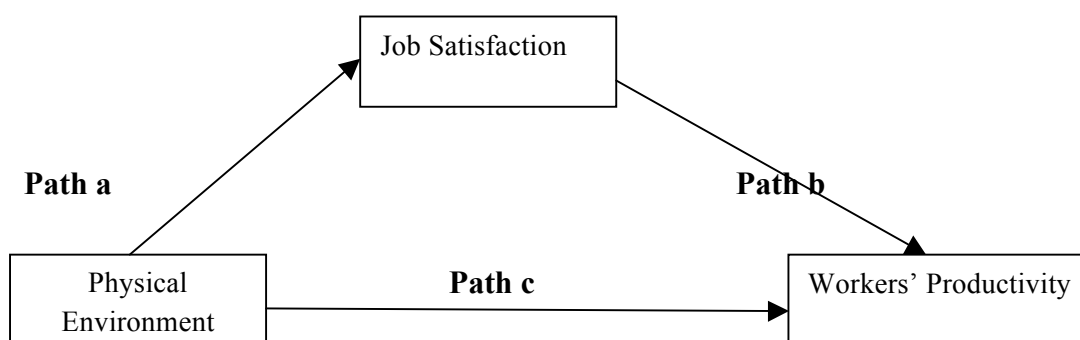
Figure 6.1
Model of Analysis-Job Satisfaction Mediates Physical Environments and Workers' Productivity

Before the hypothesis test was performed, MRL assumptions were conducted and were reported to have no serious violations. The tolerance statistics revealed that the entire variables under study were in an acceptable range cut-off .10 as suggested by Tabachnick and Fidell (2001). The hierarchical regression analysis was then employed to check whether job satisfaction mediates the physical components of work environment to workers' productivity.

Hypothesis H1a was tested following the three guidelines for the mediation analyses established by Baron, and Kenny (1986), as mentioned above. Job satisfaction was expected to mediate physical components to workers' productivity. Three regression analysis paths were carried out as shown in Figure 6.1 above. Table 6.32a below reports the results of the analysis that was carried out.

Table 6.32a
Physical Environment and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
PHYE	.028	.168	2.608	.010	6.794	.010	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
PHYE	.091	-.301	-4.831	.000	23.342	.000	1.000
Model 2							
PHYE	.125	-.270	-4.339	.000	16.589	.000	.972
JS		-.187	-3.006	.003			.972

WP: Workers' Productivity PHYE: Physical Environments JS: Job Satisfaction

To assess Path a, physical components of work environment were used to predict the mediator variable of job satisfaction, and were found to be significant at $p<0.05$, (R^2= .028), contributing 2.8 % of variance in job satisfaction. Therefore, condition one was supported. Physical work environment was positively and significantly correlated to workers' productivity (*B*= 0.168; t= 2.608; $p<0.05$).

When Path b was assessed, the mediating variable of job satisfaction was entered to predict the level of workers' productivity. The result revealed it to be significant at (*B*= -.232; t= -3.652; $p<0.001$), which in turn supports the second condition. About 5.4 % of the variance in workers' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator as previously revealed, as indicated in Model one, the R^2 was at 0.091 which was significant at 0.001 level. Previously, it was found to be significantly correlated at (B= -0.301; t= -4.831; p<0.001). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous significant relationship did not reveal any insignificant relationship to account for the third support for the perfect mediator. The strength of relationship indicated a decrease (B= -0.270; t= -4.339; p<0.001), the R^2 was 0.125 at 0.001 significance level. When the mediator was included, the equation for R^2 revealed a significant (F change = 0.000) increase from 0.091 to 0.125, indicating an improvement of 3.4 % in the variance of the physical work environment (R^2 change = 0.034).

As indicated in Table 6.32a above, the Beta coefficient of the independent variable value was reduced but still was statistically significant after the inclusion of the mediator. Therefore, it can be concluded that job satisfaction only partially mediates the physical work environment and workers' productivity relationship.

Hypothesis One (B)

H1b: There is a relationship between temperature and workers' productivity.

Referring to Table 6.32b, the regression analysis results as shown indicate a negative and a significant relationship between temperature and workers' productivity (t= -3.067, p=0.002). Based on the results, the Hypothesis (1b) is supported. However, the strength of the relationship between the two variables is 0.197 as measured by r

200

value at p value of 0.002. The coefficient of determination measured by R^2 is .039. It demonstrates that the effect of temperature helps to explain 3.9 % of the variance in the workers' productivity.

Table 6.32b
Regression Analysis Summary Relationship between Temperature and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
TM	.197	.039	-.197	-3.067	.002	9.405	.002	1.000

Hypothesis One (C)

H1c: Job satisfaction mediates the relationship between temperature and workers' productivity.
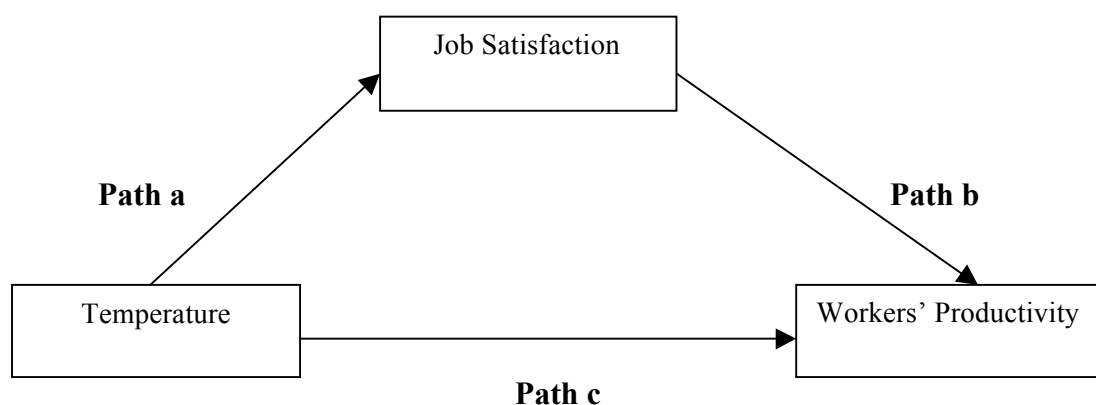
Figure 6.2
Job Satisfaction Mediates the Relationship between Temperature and Workers' Productivity

Hypothesis H1c was tested following the three guidelines for the mediation analyses established by Baron and Kenny (1986), as mentioned above. Job satisfaction was expected to mediate temperature to workers' productivity. Three regression analysis paths were carried out as shown in Figure 6.2 above. Table 6.32c below reports the results of the analysis that was carried out.

Table 6.32c
Temperature and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
TM	.019	.139	2.146	.033	4.605	.033	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
TM	.039	-.197	-3.067	.002	9.405	.002	1.000
Model 2							
TM	.081	-.168	-2.643	.009	10.330	.000	.981
JS		-.209	-3.295	.001			.981

WP: Workers' Productivity; TM: Temperature; and JS: Job Satisfaction

To assess Path a, temperature was used to predict the mediator variable of job satisfaction and was found to be significant at $p<0.05$, ($R^2= .019$), contributing 1.9 % of variance in job satisfaction. Therefore, condition one was supported. Temperature was positively and significantly correlated to job satisfaction (B= 0.139; t= 2.146; $p<0.05$).

When Path b was assessed, the mediating variable of job satisfaction was entered to predict the level of workers' productivity. The result revealed it to be significant at (B= -.232; t= -3.652; $p<0.001$), which in turn supports the second condition. About 5.4 % of the variance in workers' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator as previously revealed, as indicated in Model one, the R^2 was at 0.039 which was significant at 0.002 level. Previously, it was found to be significantly correlated at

(B= -0.197; t= -3.067; p<0.05). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous significant relationship did not reveal any insignificant relationship to account for the third support for the perfect mediator. The strength of relationship indicated a decrease (B= -0.168; t= -2.643; p<0.05). The R^2 was 0.081 at 0.009 significance level, when the mediator was included, the equation for R^2 revealed a significant (F change = 0.000) increase from 0.039 to 0.081, indicating an improvement of 4.2 % in the variance of the temperature (r-square change = 0.042).

As indicated in Table 6.32c above, the Beta coefficient of the independent variable value was reduced but still was statistically significant after the inclusion of the mediator. Therefore, it can be concluded that job satisfaction only partially mediates the temperature and workers' productivity relationship.

Hypothesis one (D)

H1d: **There is a relationship between lighting and workers' productivity.**

The objective of the above hypothesis is to examine the relationship between the lighting and workers' productivity. Simple linear regression analysis was conducted. Before the analysis was conducted, an analysis for the evaluation of assumptions for normality, linearity and homoscedascity was carried out. Z scores obtained were within a range of +_ 3.29 at p<0.001 probability level and visual observation of the box plot indicated no serious outliers' problem. Results of the assessments indicated no violation of the assumptions (Hair, Anderson, Tatham, Black & Babin, 2006).

The simple linear regression analysis is reported in Table 6.32d below with the t value -2.735 at p<0.007, indicating a negative and a significant relationship between lighting and productivity. Therefore, based on these results, Hypothesis (1d) is supported. This indicates that, unsuitable lighting leads to lower productivity. However, the strength of the relationship is measured by the r value of 0.176 at p-value of 0.007. The coefficient of determination measured by the R^2 is at 0.031. This indicates that lighting helps to explain 3.1 % of the variance in workers' productivity.

Table 6.32d
Regression Analysis Summary: Relationship between Lighting and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
LI	.176	.031	-.176	-2.735	.007	7.480	.007	1.000

Hypothesis One (E)

H1e: Job satisfaction mediates the relationship between lighting and workers' productivity.
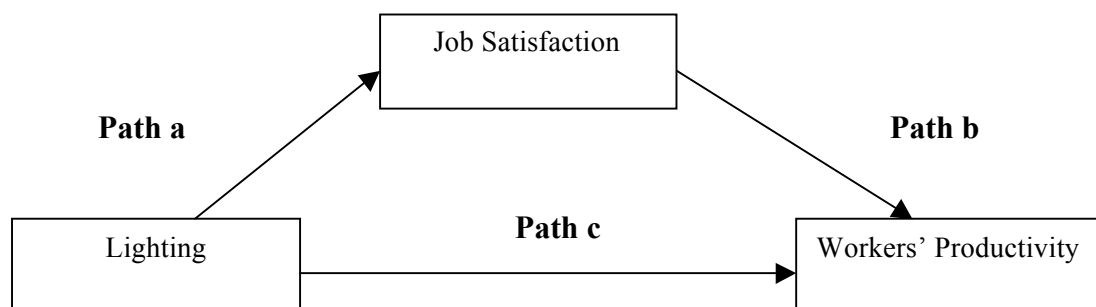
Figure 6.3
Job Satisfaction Mediates the Relationship between Lighting and Workers' Productivity

Hypothesis H1e was tested following the three guidelines for the mediation analyses established by Baron and Kenny (1986), as mentioned above. Job satisfaction was expected to mediate lighting to workers' productivity. Three regression analysis paths were carried out as shown in Figure 6.3 above. Table 6.32e below reports the results of the analysis that was carried out.

Table 6.32e
Lighting and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
LI	.000	.016	.252	.801	.064	.801	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
LI	.031	-.176	-2.735	.007	7.480	.007	1.000
Model 2							
LI	.084	-.172	-2.746	.007	10.623	.000	1.000
JS		-.229	-3.657	.000			1.000

WP: Workers' Productivity; LI: Lighting, and JS: Job Satisfaction

To assess Path a, lighting was used to predict the mediator variable of job satisfaction and was found insignificant at p=801, (r-square= .000). Therefore, condition one was unsupported.

When Path b was assessed, the mediating variable of job satisfaction was entered to predict the level of workers' productivity. The result revealed it to be significant at (B= -.232; t= -3.652; p<0.001), which in turn supports the second condition. About 5.4 % of the variance in workers' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled) before the inclusion of the mediator as previously revealed, as indicated in Model one, the R^2 was at 0.031 which was significant at 0.007 level. Previously, it was found to be significantly correlated at (B= -0.176; t= -2.735; p<0.05). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous significant relationship did not reveal any insignificant relationship to account for the third support for the perfect mediator. The strength of relationship indicated a slight decrease (B= -0.172; t= -2.746; p<0.05). The R^2 was 0.084 at 0.007 significance level, when the mediator was included, the equation for R^2 revealed a significant (F change = 0.000) increase from 0.031 to 0.084, indicating an improvement of 5.3 % in the variance of the lighting (R^2 change = 0.053).

As indicated in Table 6.32e above, the Beta coefficient of the independent variable value was slightly reduced. Moreover, lighting was not significant to the job satisfaction as mentioned above in path a; hence, the finding failed to accept the hypothesis one (e). Therefore, job satisfaction does not mediate the lighting and workers' productivity relationship.

Hypothesis One (F)

H1f: There is a relationship between non-cash fringe benefits and workers' productivity.

Table 6.32f displays the coefficient of non-cash fringe benefits = -0.195, significant at 0.003 level. For each unit change of the independent variable; fringe benefits, there is an expected change of -0.195 in the dependent variable; the workers'

productivity. The sign is negative. In other words, for each increment of one unit in

non-cash fringe benefits, one predicts a -0.195 increment in the workers and his

evaluation of the company's productivity. An examination of the t-values (t = -3.044,

p<0.05) indicates that non-cash fringe benefits contribute to the impact of the

workers and his evaluation of the company's productivity. This suggests that non-

cash fringe benefits is significant to the workers and his evaluation of the company's

productivity, and thus allows us to except the hypothesis.

Table 6.32f
Regression Analysis Summary: Relationship between Non-cash Fringe Benefits
and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
FB	.195	.038	-.195	-3.044	.003	9.268	.003	1.000

Hypothesis One (G)

H1 (g): Job satisfaction mediates the relationship between non-cash fringe benefits and workers' productivity.
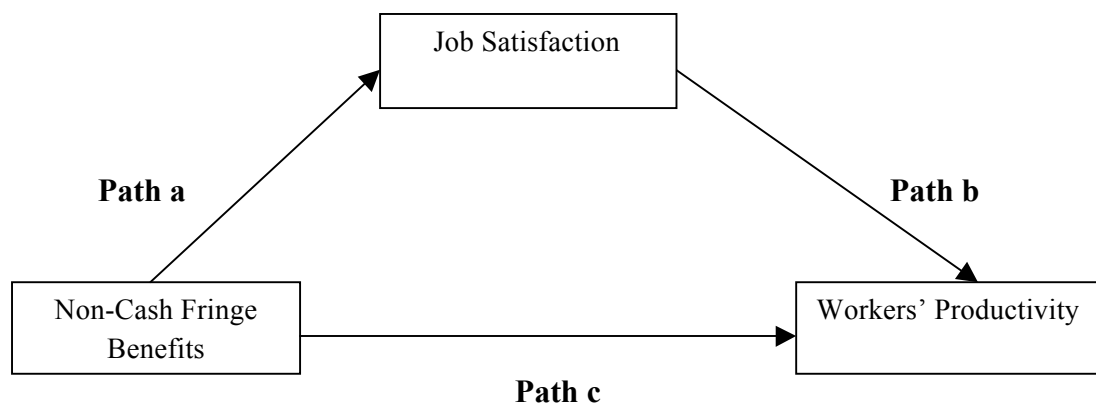

Figure 6.4
Job Satisfaction Mediates the Relationship between Non-Cash Fringe Benefits and Workers' Productivity

Hypothesis H1g was tested following the three guidelines for the mediation analyses established by Baron and Kenny (1986), as mentioned above. Job satisfaction was expected to mediate non-cash fringe benefits to workers' productivity. Three regression analysis paths were carried out as shown in Figure 6.4 above. Table 6.32g below reports the results of the analysis that was carried out.

Table 6.32g
Non-Cash Fringe Benefits and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
FB	.023	.151	2.336	.020	5.458	.020	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
FB	.038	-.195	-3.044	.003	9.268	.003	1.000
Model 2							
FB	.080	-.164	-2.578	.011	10.152	.000	.977
JS		-.207	-3.264	.001			.977

WP: Workers' Productivity; FB: Fringe Benefits, and JS: Job Satisfaction

To assess Path a, fringe benefits was used to predict the mediator variable of job satisfaction and was found to be significant at $p < 0.05$, (r-square= .023) contributing 2.3 % of variance in job satisfaction. Therefore, condition one was supported. Non-cash fringe benefits was positively and significantly correlated to job satisfaction (B= 0.151; t= 2.336; $p < 0.05$).

When Path b was assessed, the mediating variable of job satisfaction was entered to predict the level of workers' productivity. The result revealed it to be significant at (B= -.232; t= -3.652; $p < 0.001$), which in turn supports the second condition. About 5.4 % of the variance in company' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator as previously revealed, as indicated in Model one, the R^2 was at 0.038 which was significant at 0.003 level. Previously, it was found to be significantly correlated at (B= -0.195; t= -3.044; p<0.05). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous significant relationship did not reveal any insignificant relationship to account for the third support for the perfect mediator. The strength of relationship indicated a decrease (B= -0.164; t= -2.578; p<0.05). The R^2 was 0.080 at 0.011 significance level, when the mediator was included, the equation for R^2 revealed a significant (F change = 0.000) increase from 0.038 to 0.080, indicating an improvement of 4.2 % in the variance of the non-cash fringe benefits (R^2 change = 0.042).

As indicated in Table 6.32g above, the Beta coefficient of the independent variable value was reduced but still was statistically significant after the inclusion of the mediator. Therefore, it can be concluded that job satisfaction only partially mediates the fringe benefits and workers' productivity relationship.

Hypothesis One (H)

H1h: Not tested since the variable (work hours) has been discarded.

Table 6.32h
Test of Reliability of Work Hours

Variable	Cronbach's Alpha	N of Items
Work Hours	.514	3

Hypothesis Two

H2: There is a relationship between behavior environments and workers' productivity.

Simple linear regression analysis was peformed to examine the relationship between behavior components of work environment and workers' productivity. The regression analysis is the most appropriate statistical tool to run as the objective of this study. It is to establish a linear relationship between the two variables, i.e., to predict values of dependent variable from values of independent variables (Tabachnick & Fidell, 2001).

The regression analysis results as shown in Table 6.33, indicate non-significant relationship between behavior components and workers' productivity (t=1.400, p=.163). Based on the results, the Hypothesis (2) is rejected.

Table 6.33
Regression Analysis Summary: Relationship between Behaviur Environments and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
BHE	.091	.008	.091	1.400	.163	1.960	.163	1.000

Hypothesis Two (A)

H2a: Job satisfaction mediates the relationship between behavior environments and workers' productivity.
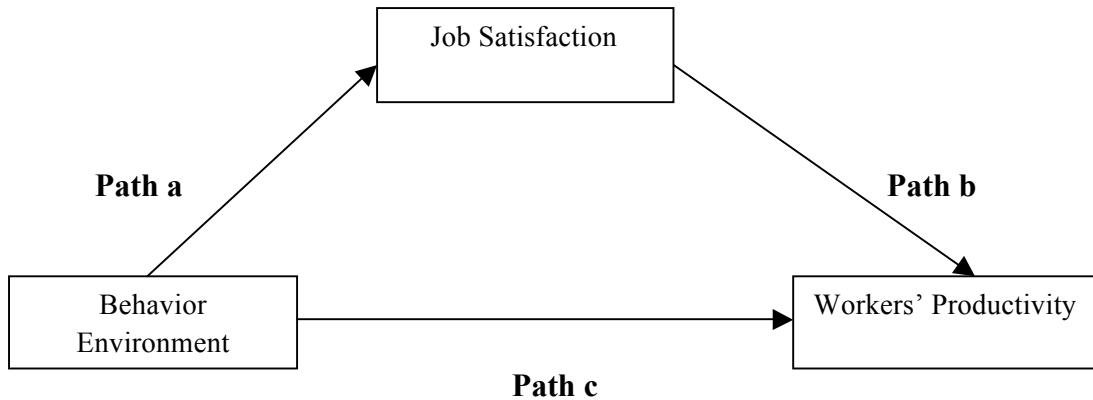
Figure 6.5
Job Satisfaction Mediates the Relationship between Behavior Environments and Workers' Productivity

Hypothesis H2a was tested following the three guidelines for the mediation analyses established by Baron and Kenny (1986), as mentioned above. Job satisfaction was expected to mediate behavior components to workers' productivity. Three regression analysis paths were carried out as shown in Figure 6.5 above. Table 6.33a below reports the results of the analysis that was carried out.

Table 6.33a
Behavior Environments and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
BHE	.004	.062	.956	.340	.914	.340	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
BHE	.008	.091	1.400	.163	1.960	.163	1.000
Model 2							
BHE	.065	.106	1.671	.096	8.115	.000	.996
JS		-.256	-3.763	.000			.996

WP: Workers' Productivity; BHE: Behavior Environments, and JS: Job Satisfaction

To assess Path a, behavior component was used to predict the mediator variable of job satisfaction and was found to be insignificant at p>0.05, (r-square= .004), contributing 0.4 % of variance in job satisfaction. Therefore, condition one was unsupported. Behavior component was positive in sign and insignificantly correlated to job satisfaction (B= 0.062; t= .956; p>0.05).

When Path b was assessed, the mediating variable of job satisfaction was entered to predict the level of workers' productivity. The result revealed it to be significant at (B= -.232; t= -3.652; p<0.001), which in turn supports the second condition. About 5.4 % of the variance in company' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator as previously revealed, as indicated in Model one, the R^2 was at 0.008 which was insignificant at 0.163 level. Previously, it was found to be insignificantly correlated at (B= 0.091; t= 1.400; p>0.05). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous insignificant relationship did not reveal any significant relationship. Therefore, it can be concluded that job satisfaction did not partially or perfectly mediate the behavior component and workers' productivity relationship. As a result of that, this hypothesis is rejected.

Hypothesis Two (B)

H2b: There is a relationship between nature of workplace behavior and workers' productivity.

Referring to Table 6.33b, the coefficient of nature of workplace behavior = .162, is significant at the 0.05 level. For each unit change of the independent variable, nature of workplace, there is change of 0.162 in the dependent variable, the workers' productivity. The sign is positive. In other words, each increment in nature of workplace, predicts a 0.162 increment in the workers' productivity. An examination of the t-values (t = 2.511, p<0.05) indicates that nature of workplace contributes to the improvement of the workers' productivity. This suggests that nature of workplace behavior is significant to the workers' productivity.

Table 6.33b
Regression Analysis Summary: Relationship between Nature of Workplace Behavior and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
NWPH	.162	.026	.162	2.511	.013	6.303	.013	1.000

Hypothesis Two (C)

H2c: **Job satisfaction mediates the relationship between nature of workplace behavior and workers' productivity.**
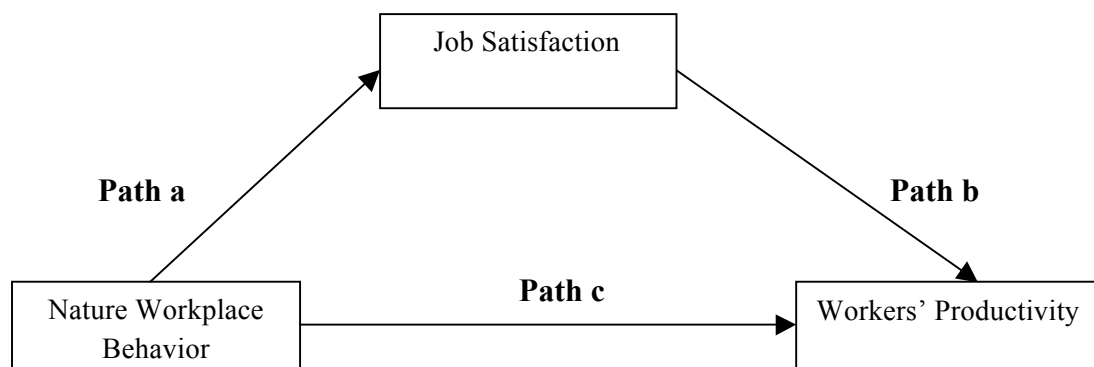

Figure 6.6
Job Satisfaction Mediates the Relationship between Nature of Workplace Behavior and Workers' Productivity

Hypothesis H2c was tested following the three guidelines for the mediation analyses established by Baron and Kenny (1986), as mentioned above. Job satisfaction was expected to mediate nature of workplace behavior to workers' productivity. Three regression analysis paths were carried out as shown in Figure 6.6 above. Table 6.33c below reports the results of the analysis that was carried out.

Table 6.33c
Nature of Workplace Behavior and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
NWPB	.023	-.152	-2.349	.020	5.520	.020	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
NWPB	.026	.162	2.511	.013	6.303	.013	1.000
Model 2							
NWPB	.070	.130	2.029	.044	8.816	.000	.977
JS		-.213	-3.325	.001			.977

WP: Workers' Productivity; NWPB: Nature Workplace Behavior, and JS: Job Satisfaction

To assess Path a, nature of workplace behavior was used to predict the mediator variable of job satisfaction and was found to be significant at $p<0.05$, ($R^2 = .023$) contributing 2.3 % of variance in job satisfaction. Therefore, condition one was supported. Nature of workplace behavior was negatively and significantly correlated to job satisfaction (B= -0.152; t= - 2.349; p<0.05).

When Path b was assessed, the mediating variable of job satisfaction was entered to predict the level of workers' productivity. The result revealed it to be significant at

(B= -.232; t= -3.652; p<0.001), which in turn supports the second condition. About 5.4 % of the variance in workers' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator as previously revealed, as indicated in Model one, the R^2 was at 0.026 which was significant at 0.013 level. Previously, it was found to be significantly correlated at (B= 0.162; t= 2.511; p<0.05). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous significant relationship did not reveal any insignificant relationship to account for the third support for the perfect mediator. The strength of relationship indicated a decrease (B= 0.130; t= 2.029; p<0.05). The R^2 was 0.070 at 0.044 significance level, when the mediator was included, the equation for R^2 revealed a significant (F change = 0.000) increase from 0.026 to 0.070, indicating an improvement of 4.4 % in the variance of the workers' productivity (R^2 change = 0.044).

As indicated in Table 6.33c above, the Beta coefficient of the independent variable value was reduced but still was statistically significant after the inclusion of the mediator. Therefore, it can be concluded that job satisfaction only partially mediates the nature of workplace behavior and workers' productivity relationship.

Hypothesis Two (D)

H2d: There is a relationship between toxic behavior and workers' productivity.

Table 6.33d displays the coefficient of toxic behavior = 0.185, significant at 0.004 level. For each unit change of the independent variable, toxic behavior, there is an

expected change of 0.185 in the dependent variable, the workers' productivity. The sign is positive. An examination of the t-values (t = 2.881, p<0.05) indicates that toxic behavior contributes to the improvement of the workers' productivity. This suggests that toxic behavior is significant to the workers' productivity, and thus allows us to accept this hypothesis.

Table 6.33d
Regression Analysis Summary: Relationship between Toxic Behavior and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
TB	.185	.034	.185	2.881	.004	8.302	.004	1.000

Hypothesis Two (E)

H2e: Job satisfaction mediates the relationship between toxic behavior and workers' productivity.

Figure 6.7
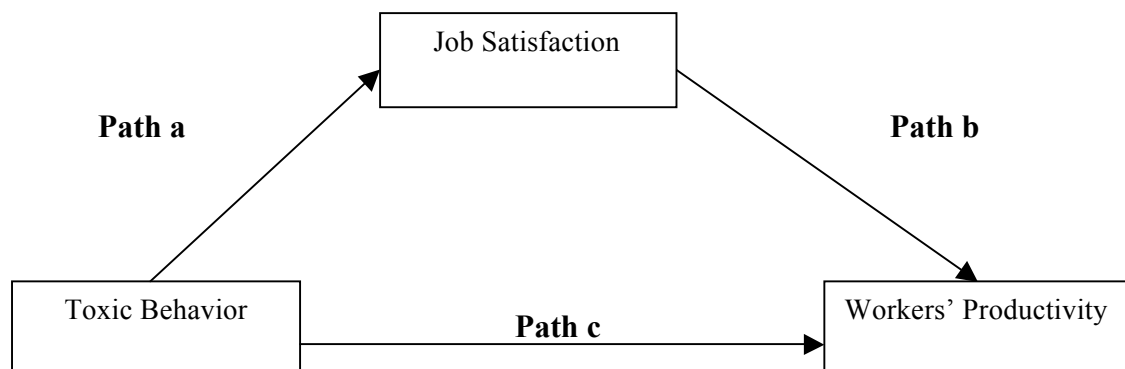***Job Satisfaction Mediates the Relationship between Toxic Behavior and Workers' Productivity***

Hypothesis H2e was tested following the three guidelines for the mediation analyses established by Baron and Kenny (1986), as mentioned above. Job satisfaction was expected to mediate toxic behavior to workers' productivity. Three regression

analysis paths were carried out as shown in Figure 6.7 above. Table 6.33e below

reports the results of the analysis that was carried out.

Table 6.33e
Toxic Behavior and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
TB	.026	-.161	-2.497	.013	6.237	.013	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
TB	.034	.185	2.881	.004	8.302	.004	1.000
Model 2							
TB	.076	.152	2.377	.018	9.625	.000	.974
JS		-.208	-3.257	.001			.977

WP: Workers' Productivity; TB: Toxic Behavior, and JS: Job Satisfaction

To assess Path a, toxic behavior was used to predict the mediator variable of job

satisfaction and was found to be significant at $p<0.05$, ($R^2= .026$), contributing 2.6 %

of variance in job satisfaction. Therefore, condition one was supported. Toxic

behavior was negatively and significantly correlated to job satisfaction (B= -0.161;

t= - 2.497; $p<0.05$).

When Path b was assessed, the mediating variable of job satisfaction was entered to

predict the level of workers' productivity. The result revealed it to be significant at

(B= -.232; t= -3.652; $p<0.001$), which in turn supports the second condition. About

5.4 % of the variance in workers' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator

as previously revealed, as indicated in Model one, the R^2 was at 0.034 which was

significant at 0.004 level. Previously, it was found to be significantly correlated at (B= 0.185; t= 2.881; p= 0.004). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous significant relationship did not reveal any insignificant relationship to account for the third support for the perfect mediator. The strength of relationship indicated a decrease (B= 0.152; t= 2.377; p<0.05). The R^2 was 0.076 at 0.018 significance level, when the mediator was included, the equation for R^2 revealed a significant (F change = 0.000) increase from 0.034 to 0.076, indicating an improvement of 3.6 % in the variance of the workers' productivity (R^2 change = 0.036).

As indicated in Table 6.33e above, the Beta coefficient of the independent variable value was reduced but still was statistically significant after the inclusion of the mediator. Therefore, it can be concluded that job satisfaction only partially mediates the toxic behavior and workers' productivity relationship.

Hypothesis Two (F)

H2f: There is a relationship between mistreatment culture behavior and workers' productivity.

Table 6.33f displays the coefficient of mistreatment culture behavior = -0.158, significant at .015 level. An examination of the t-values is (t= -2.451, p<0.05). This suggests that culture behavior was significant to the workers' productivity; therefore the result allows us to accept the hypothesis.

Table 6.33f
Regression Analysis Summary: Relationship between Mistreatment Culture Behavior and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
MCUB	.158	.025	-.158	-2.451	.015	6.006	.015	1.000

Hypothesis Two (G)

H2g: Job Satisfaction Mediates the Relationship between Mistreatment Culture Behavior and Workers' Productivity.
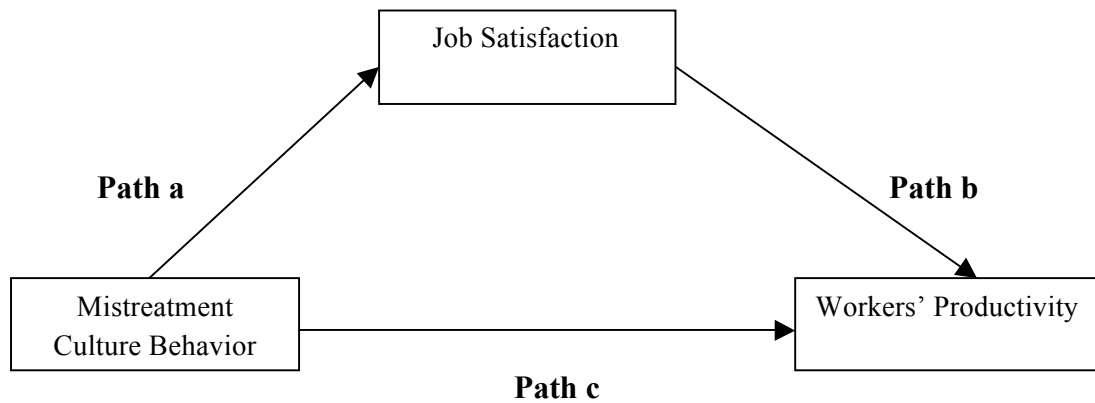

Figure 6.8
Job Satisfaction Mediates the Relationship between Mistreatment Culture Behavior and Workers' Productivity

Job satisfaction was expected to mediate culture behavior to workers' productivity. Three regression analysis paths were carried out as shown in Figure 6.8 above. Table 6.33g below reports the results of the analysis that was carried out.

Table 6.33g
Mistreatment Culture Behavior and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
MCUB	.027	.165	2.557	.011	6.538	.011	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
MCUB	.025	-.158	-2.451	.015	6.006	.015	1.000
Model 2							
MCUB	.069	-.123	-1.923	.056	8.593	.000	.973
JS		-.227	-3.306	.001			.973

WP: Workers' Productivity; MCUB: Mistreatment Culture Behavior, and JS: Job Satisfaction

To assess Path a, mistreatment culture behavior was used to predict the mediator variable of job satisfaction and was found to be significant at $p<0.05$, ($R^2= .027$), contributing 2.7 % of variance in job satisfaction. Therefore, condition one was supported. Culture behavior was positively and significantly correlated to job satisfaction (B= 0.165; t= 2.557; $p<0.05$).

When Path b was assessed, the mediating variable of job satisfaction was entered to predict the level of workers' productivity. The result revealed it to be significant at (B= -.232; t= -3.652; $p<0.001$), which in turn supports the second condition. About 5.4 % of the variance in workers' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator as previously revealed, as indicated in Model one, the R^2 was at 0.025 which was significant at 0.015 level. Previously, it was found to be significantly correlated at (B= -0.158; t= -2.451; p= 0.015). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous relationship

revealed insignificant relationship at p>0.05 to account for the third support for the perfect mediator. The strength of relationship indicated a decrease (B= -0.123; t= -1.923; p=0.056). The R^2 was 0.069 at insignificance 0.056 level, when the mediator was included, the equation for R^2 revealed a significant (F change = 0.001) increase from 0.025 to 0.069, indicating an improvement of 4.4 % in the variance of the workers' productivity (R^2 change = 0.044).

As indicated in Table 6.33g above, culture behavior was significant to the workers' productivity as mentioned above in path c, hence, the findings allows us to accept the hypothesis two (g). Therefore, job satisfaction perfectly mediates the mistreatment culture behavior and workers' productivity relationship.

Hypothesis Two (H)

H2h: There is a relationship between workers' relationship with management and colleagues and workers' productivity.

The objective of the above hypothesis is to examine the relationship between the workers' relationship and workers' productivity. Simple linear regression analysis was conducted. The simple linear regression analysis is reported in Table 6.33h below with the t value 2.423 at p<0.05, indicating a positive and a significant relationship between workers' relationship and productivity.

Therefore, based on these results, Hypothesis (2h) is supported. This indicates that workers' relationship contributes to the improvement of the workers' productivity. However, the strength of the relationship is measured by the r value of 0.156 at p-

value of 0.016. The coefficient of determination measured by the R^2 is at 0.024. This indicates that workers' relationship helps to explain 2.4 % of the variance in workers' productivity.

Table 6.33h
Regression Analysis Summary: Relationship between Workers' Relationship **with Management and Colleagues** *and Workers' Productivity*

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
WR	.156	.024	.156	2.423	.016	5.872	.016	1.000

Hypothesis Two (J)

H2j: Job satisfaction mediates the relationship between workers' relationship with management and colleagues and workers' productivity.

Figure 6.9
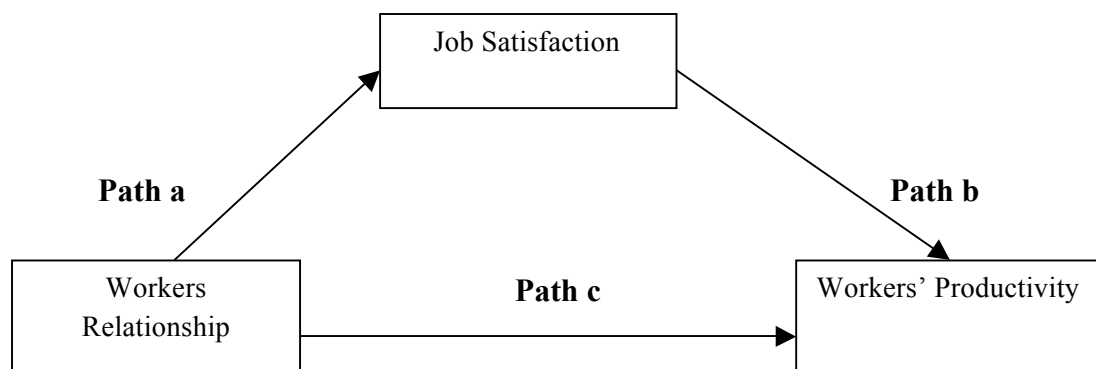*Job Satisfaction Mediates the Relationship between Workers' Relationship* **with Management and Colleagues** *and Workers' Productivity*

Hypothesis H2j was tested following the three guidelines for the mediation analyses established by Baron and Kenny (1986), as mentioned earlier. Job satisfaction was expected to mediate workers' relationship to workers' productivity. Three regression

analysis paths were carried out as shown in Figure 6.9 above. Table 6.33j below

reports the results of the analysis that was carried out.

Table 6.33j
Workers Relationship with Management and Colleagues *and Workers'*
Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
WR	.009	.096	1.482	.140	2.197	.140	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
WR	.024	.156	2.423	.016	5.872	.016	1.000
Model 2							
WR	.086	.181	2.869	.004	10.990	.000	.991
JS		-.250	-3.967	.000			.991

WP: Workers' Productivity; WR: Workers Relationship, and JS: Job Satisfaction

To assess Path a, bad workers' relationship was used to predict the mediator variable

of job satisfaction and was found to be insignificant at p>0.05, (R^2= .009). Therefore,

condition one was unsupported. An examination indicated that (B= 0.096; t= 1.482;

p>0.05).

When Path b was assessed, the mediating variable of job satisfaction was entered to

predict the level of workers' productivity. The result revealed it to be significant at

(B= -.232; t= -3.652; p<0.001), which in turn supports the second condition. About

5.4 % of the variance in workers' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator

as previously revealed, as indicated in Model one, the R^2 was at 0.024 which was

significant at p<0.05 level. Previously, it was found to be significantly correlated at (B= 0.156; t= 2.423; p= 0.016). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous significant relationship did not reveal any insignificant relationship to account for the third support for the perfect mediator. The strength of relationship indicated an increase (B= 0.181; t= 2.869; p=0.004). Therefore, condition three was unsupported due to increased Beta. As mentioned above and according to Baron and Kenny (1986), the three regression analyses were not met that indicated job satisfaction did not mediate the relationship between the bad workers' relationship and workers' productivity. As a result of that, the findings failed to accept the hypothesis two (j).

Hypothesis Two (K)

H2k: There is a relationship between distraction behavior and workers' productivity.

Table 6.33k displays the coefficient of distraction behavior = -0.224, significant at p= 0.001 level. For each unit increase of the independent variable, distraction behavior, there is an expected decrease of -0.224 in the dependent variable, workers' productivity. The direction of the relationship is negative.

An examination of the t-values (t= -3.519, p=0.001). This suggests that distraction behavior was significant to the workers' productivity; and thus allows us to accept this hypothesis.

Table 6.33k
Regression Analysis Summary: Relationship between Distraction Behavior and Workers' Productivity

Variable	R	R Square	B	T	Sig	F-value	f-Sig change	Tolerance
DB	.224	.050	-.224	-3.519	.001	12.385	.001	1.000

Hypothesis Two (L)

H2l: Job satisfaction mediates the relationship between distraction behavior and workers' productivity.
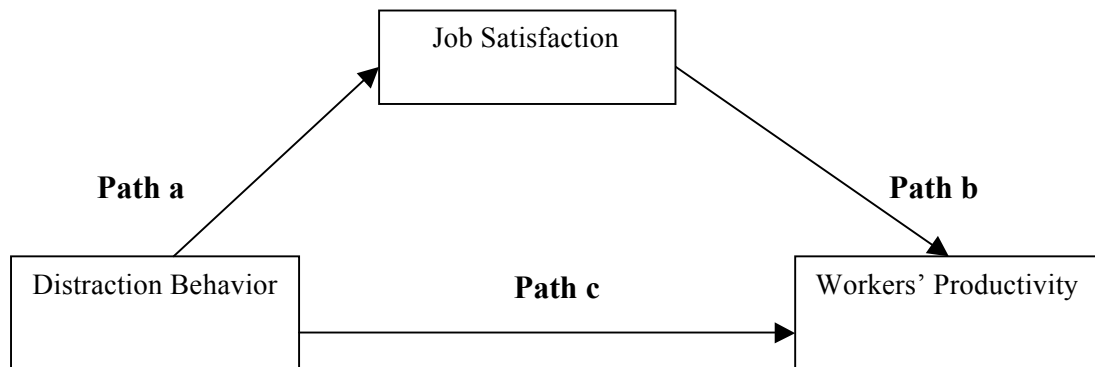
Figure 6.10
Job Satisfaction Mediates the Relationship between Distraction Behavior and Workers' Productivity

Hypothesis H2L was tested following the three guidelines for the mediation analyses established by Baron and Kenny (1986), as mentioned earlier. Job satisfaction was expected to mediate distraction behavior to workers' productivity. Three regression analyses paths were carried out as shown in Figure 6.10 above. Table 6.33L below reports the results of the analysis that was carried out.

Table 6.33L
Distraction Behavior and Workers' Productivity by Job Satisfaction

Variables	R Square	B	T	Sig	F-Value	Sig Change	Tolerance
DB	.019	.136	2.102	.037	4.417	.037	1.000
JS	.054	-.232	-3.652	.000	13.336	.000	1.000
Model 1							
DB	.050	-.224	-3.519	.001	12.385	.001	1.000
Model 2							
DB	.092	-.196	-3.114	.002	11.673	.000	.981
JS		-.205	-3.261	.001			.981

WP: Workers' Productivity; DB: Distraction Behavior, and JS: Job Satisfaction

To assess Path a, distraction behavior was used to predict the mediator variable of job satisfaction and was found to be significant at $p<0.05$, (r-square= .019), contributing 1.9 % of variance in job satisfaction. Therefore, condition one was supported. Distraction behavior was positively and significantly correlated to job satisfaction (B= 0.136; t= 2.102; $p<0.05$).

When Path b was assessed, the mediating variable of job satisfaction was entered to predict the level of workers' productivity. The result revealed it to be significant at (B= -.232; t= -3.652; $p<0.001$), which in turn supports the second condition. About 5.4 % of the variance in workers' productivity is affected by job satisfaction.

In Path c, (when Path a and b were controlled), before the inclusion of the mediator as previously revealed, as indicated in Model one, the R^2 was at 0.050 which was significant at 0.001 level. Previously, it was found to be significantly correlated at (B= -0.224; t= -3.519; p= 0.001). However, after the inclusion of the mediator variable of job satisfaction, as shown in Model Two, the previous significant

relationship did not reveal any insignificant relationship to account for the third support for the perfect mediator. The strength of relationship indicated a decrease (B= -0.196; t= -3.114; p<0.05). The R^2 was 0.092 at 0.002 significance level, when the mediator was included, the equation for R^2 revealed a significant (F change = 0.000) increase from 0.050 to 0.092, indicating an improvement of 4.2 % in the variance of the workers' productivity (R^2 change = 0.042).

As indicated in Table 6.33L above, the Beta coefficient of the independent variable value was reduced but still was statistically significant after the inclusion of the mediator. Therefore, it can be concluded that job satisfaction only partially mediates the distraction behavior and workers' productivity relationship.

As a result of hypotheses tested, it therefore can be pointed out the significance of physical and behavioral environments on workers' productivity with the mediated effected of job satisfaction. Accordingly, the model below reflects the significant variables that impact workers' productivity as presented in Figure 6.11.
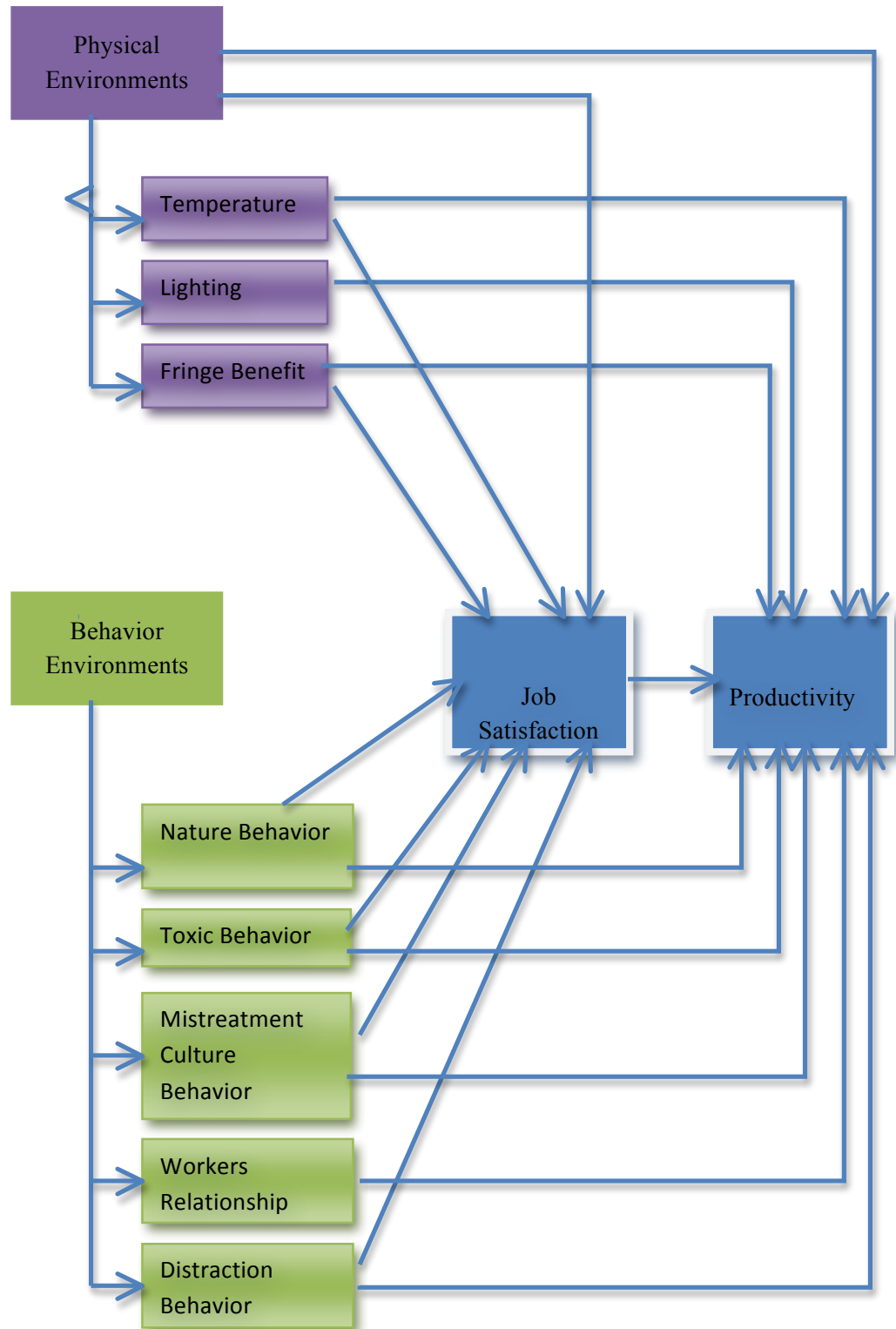
6.10 PROPOSED FRAMEWORK

Figure 6.11
The Effect of Eight Basic Factors on Productivity

6.11 SUMMARY

In this Chapter Five, the data was analyzed and presented; the report of the results obtained through statistical testing as proposed in the previous chapters are discussed. Data screenings were followed by validity and reliability tests which are also discussed. Descriptive statistics as well as hypothesis testing results are presented. In the next Chapter Seven (7), the findings of this chapter are discussed and its implication on theories, policy making and future study are highlighted and presented in a proper sequence. Table 6.34 below is the summary of the results of the hypotheses tests.

Table 6.34
Summary of Hypothesis Tests

No	Hypothesis	Statistical Test	Result
1	**H1:** There is a relationship between physical environments and workers' productivity.	Regression	Accept H1
2	**H1A:** job satisfaction mediates the relation between physical environments and workers' productivity.	Multiple Regression	Partly Supported H1A
3	**H1B:** There is a relationship between temperature and workers' productivity.	Regression	Accept H1B
4	**H1C:** job satisfaction mediates the relation between temperature and workers' productivity.	Multiple Regression	Partly Supported H1C
5	**H1D:** There is a relationship between lighting and workers' productivity.	Regression	Accept H1D
6	**H1E:** job satisfaction mediates the relationship between lighting and workers' productivity.	Multiple Regression	H1E is not accepted
7	**H1F:** There is a relationship between non-cash fringe benefits and workers' productivity.	Regression	Accept H1F

Table 6.34 (Continued)

No	Hypothesis	Statistical Test	Result
8	**H1G:** job satisfaction mediates the relationship between non-cash fringe benefits and workers' productivity.	Multiple Regression	Partly Supported H1G
9	**H2:** There is a relationship between behavior components and workers' productivity.	Regression	H2 is not accepted
10	**H2A:** Job satisfaction mediates the relationship between behavior environments and workers' productivity.	Multiple Regression	H2A is not accepted
11	**H2B:** There is a relationship between nature of workplace behavior and workers' productivity.	Regression	Accept H2B
12	**H2C:** Job satisfaction mediates the relationship between nature of workplace behavior and workers' productivity.	Multiple Regression	Partly Supported H1C
13	**H2D:** There is a relationship between toxic behavior and workers' productivity.	Regression	Accept H2D
14	**H2E:** Job satisfaction mediates the relationship between toxic behavior and workers' productivity.	Multiple Regression	Partly Supported H1E
15	**H2F:** There is a relationship between mistreatment culture behavior and workers' productivity.	Regression	Accept H2F
16	**H2G:** Job satisfaction mediates the relationship between mistreatment culture behavior and workers' productivity.	Multiple Regression	Perfect Supported H2G
17	**H2H:** There is a relationship between workers' relationship and workers' productivity.	Regression	Accept H2H
18	**H2J:** Job satisfaction mediates the relationship between workers' relationship and workers' productivity.	Multiple Regression	H2J is not accepted
19	**H2K:** There is a relationship between distraction behavior and workers' productivity.	Regression	Accept H2K
20	**H2L:** Job satisfaction mediates the relationship between distraction behavior and workers' productivity.	Multiple Regression	Partly Supported H1L

CHAPTER SEVEN

DISCUSSION AND CONCLUSION

7.0 CONCLUSION

The purpose of this quantitative study was to examine the influence of work environment on workers' productivity. The primary problem identified was the relationship between workplace environment and productivity, while the secondary problem is concerned with how job satisfaction mediated and affected the relationship between work environment and productivity. Chapter 1 discussed the purpose of the study and its significance. Chapter 2 discussed the history of productivity in Libya and the literature review was presented in Chapter 3, wherein the history of work environment, productivity and past studies were explained. Chapter 4 discussed the theorotical framework and hypothesis developed. Chapter 5 discussed the chosen methodology and Chapter 6 contained data analysis and presentation.

This chapter discusses the results of the study presented earlier in Chapter 6. In this Chapter 7, the key findings and results of the hypothesis are discussed in some detail. Theoretical implications, limitations of the study, contributions of the study and finally suggestions for future study are also presented.

7.1 RECAPITULATION OF THE STUDY

This study aimed to examine the effect of work environment on the productivity of workers in Libya and to determine the association between the physical and behavioral environments and productivity mediated by job satisfaction.

The theoretical framework for this study depended on the Maslow's Need Hierarchy; Herzberg's Motivator-Hygiene Theory and Social Exchange Theory. These theories also try to identify factors contributing to a higher level of job satisfaction and its connection to productivity (Dunnette, 1976). Need theories postulate that the physical environment is only important when it fails to meet the basic needs. Another contention of the theory is one where in the meaning of surrounding is deemed significant, and this results in deduction indicating that the surrounding factors, known as facilitating conditions, positively satisfy the overall individual needs. In addition, the social exchange theory establishes the conditions in which people conceive it is their duty to return the favor after they benefit from the company services.

The study's population comprises Public Petrochemical Companies in Libya, i.e., the Abo Kammash Chemical Complex situated in the western area of Libya (Tripoli as the capital city) and Ras Lanuf Chemical Complex situated in the eastern area. Hand-to-hand questionnaire distribution was employed and the total response rate was reported at 47%.

The result of the Cronbach Coefficient Alpha of the variables received a significant reliability report with coefficients ranging from 0.810-0.964, higher than 0.7. One

item (Mistreatment is on-going) was deleted owing to no loading of total items. Values are reported to go over 0.40 and in addition, the variable of work hours was not tested as it failed to fulfill the least requirement of reliability level. Simple linear and multiple regression analysis were utilized for the assessment of the association of variables and mediating impacts of job satisfaction. Tests of linearity, normality, and homoscedasticity were conducted to make sure that the assumptions were not violated prior to employing both statistical assessments.

The linear regression analysis results showed that all variables under the physical environment negatively affected the productivity of workers and both positive and negative effects were noted from the variables under behavioral environment upon the productivity of workers. However, the mediating effect of job satisfaction on physical as well as behavioral worker's productivity appeared to indicate partial mediation, with only a single variable indicating perfect mediation. On the basis of survey results, it is clear that workplace environment impacted worker's productivity with the physical workplace environment significantly impacting the productivity of workers.

7.2 DISCUSSION OF FINDINGS

The main findings of this study concern: the significance of workplace environment; the different types of physical environment, namely, temperature, lighting and fringe benefits; the different types of behavioral environment, namely, workplace nature, toxic behavior, mistreatment behavior, workers' relationships with management and colleagues, and distraction behavior, which were all experienced by the workers; the

relationship between work environment and productivity of workers mediated by job satisfaction; and finally, work environment's impact upon the productivity of workers. This study has laid down the basis for future examinations of the reasons behind low productivity.

The study investigated the most common negative acts experienced in the workplace environment. According to the study data, respondents from petrochemical companies experienced various negative acts in terms of the physical workplace environment. The analysis indicated a negative and a significant relationship between physical environments and workers' productivity (t=-4.831, p=0.000). The coefficient of determination measured by R^2 was .091 at a p value of 0.000. These results demonstrated that the effect of physical conditions helped explain 9.1% of the variance in workers' productivity. These results align with Brill's (1992) estimate that improvements in the physical design of the workplace may result in a 5 to 10% increase in employee productivity. Similarly, ASID (1999), said that physical workplace design is one of the top three factors, which affect performance and job satisfaction. This is consistent with Gensler's (2006) study, in which he reported that 89% of the respondents stressed the significance of workplace design, and 90% of senior officials related workplace designs to the productivity of workers. Also, around 22% of the respondents in Gensler's (2006) study were convinced that if offices were effectively designed, increased performance would be noted. Thus, businesses are likely to improve their productivity if they enhance their workplace designs.

Job satisfaction was expected to mediate physical environments to workers' productivity, but the data in this study demonstrated that job satisfaction only partially mediated the physical work environment and workers' productivity relationship. Srivastava's (2008) finding that workers who perceived their physical work environment to be adequate were more satisfied with their jobs supported this finding.

Social-Exchange Theory considers that job satisfaction functions as a mediator. The Theory of Social Exchange suggests that employees engage in either positive or negative behaviors toward the organization only in response to either positive or negative actions that are seen to originate from the organization (e.g., favourable or unfavourable working conditions for fair or unfair treatment). This would, in turn, suggest that job satisfaction mediates the relationship between actual working conditions and workplace behaviors (Thibaut & Kelley, 1959).

The coefficient of determination impact of temperature on productivity measured by R^2 was .039. This demonstrated that the effect of temperature helped to explain 3.9% of the variance in the workers' productivity. A bad temperature can lead to lower productivity. However, the strength of the relationship between the two variables was 0.197 as measured by r value at a p value of 0.002. This result aligned with those of Rasha (2013), who revealed that temperature could have a significant effect on employee performance. In hot environments, employees commonly become irritable and less efficient. In addition, Yusof, Deros, and Rasdan's (2013),study empirically demonstrated that environmental factors such as: relative humidity and lighting significant impacted workers' productivity. In this study, the mediation analysis of

job satisfaction found that job satisfaction only partially mediated the temperature and workers' productivity relationship.

Furthermore, this current study indicated that the relationship between lighting and productivity was negative and significant. However, the strength of the relationship is measured by the r value of 0.176 at a p-value of 0.007. The coefficient of determination measured by the R^2 was at 0.031. This indicates that lighting helps to explain 3.1 % of the variance in workers' productivity. Otherwise, lighting was not significant with respect to job satisfaction; hence job satisfaction did not mediate the lighting and workers' productivity relationship. These results were aligned with those of Henri, Marius, and Tenner (2007), who stated that the effect of increased or decreased illumination affects the productivity, psychology and biological aspects of workers. Chandraseker (2011) confirmed that an unsafe or unhealthy workplace environment in terms of poor ventilation and unsuitable lighting could affect the health and productivity of workers. Conversely, Akbari, Dehghan, Azmoon, and Forouharmajd (2013) found no significant relationship between lighting and human productivity ($p > 0.05$).

An examination of the t-values (t = -3.044, $p < 0.05$) indicated that non-cash fringe benefits contribute to the impact of a worker and his or her evaluation of the company's productivity. This suggests that non-cash fringe benefits are significant to the workers and their evaluation of the company's productivity. Job satisfaction only partially mediated the fringe benefits and workers' productivity relationship. Social-Exchange Theory, which considered that job satisfaction functions as a mediator, supported the results of the study (Thibaut & Kelley, 1959).

236

The regression analysis results of behavior environments indicated a non-significant relationship with workers' productivity, and job satisfaction did not either partially or perfectly mediate the behavior component and workers' productivity relationship. The net result is that a mediating relationship was not indicated, which means that the expected mediation was not supported. Surprisingly, this study contradicts that of Leblebici (2012), who said that workplace environment affects employee performance but behavioral environment has a greater effect on employee performance.

Additionally, the respondents opined that the work environment was poor and negatively impacted their productivity. This study affirmed the study of Sheikh, Ali, and Adan (2013), who found that working conditions could have both positive and negative impact on productivity. Bornstein (2007) stated that, in organizations in which employees are exposed to stressful working conditions, productivity is negatively influenced. On the other hand if working conditions are good, productivity increases and produces a positive impact on the delivery of service. The mediation analysis supported that the notion that job satisfaction partially mediates the nature of workplace behavior and workers' productivity relationship. This result aligns with that of Kaplan, Ogut, Kaplan, and Aksay (2012) who stated that organizational factors such as working conditions were negatively related with job satisfaction.

The participants also reported toxic behavior in the workplace. A survey was employed to obtain an understanding of the actual experiences of the participants

who faced aggressive behavior issues. The results indicated that toxic behavior had a significant relationship with workers' productivity and that job satisfaction only partially mediated the toxic behavior and workers' productivity relationship. Porath and Erez (2009) had similar results, showing that the negative impact of aggressive behavior in an organization lowered productivity and profit. Similarity, counterproductive work behavior has been shown to have a significant negative association with job satisfaction (Dalal, 2005). Anjum's (2013), results concluded that job satisfaction has a diminishing effect on counterproductive behaviors.

In addition, a culture of mistreatment behavior was negatively and significantly related to worker productivity. The mediating effect of job satisfaction on the relationship between mistreatment behavior and workers productivity was perfectly mediation. The effect sizes for Path A and B were small to medium, but the effect size at Path C was large. Newsham, Brand, Donnelly, Veitch, Aries and Charles's (2009) study indicated that increased environmental satisfaction was associated with increased satisfaction with compensation and with management, which were associated with increased job satisfaction, The model came close to full mediation. In addition, they tested a model with job satisfaction mediating the relationship between job stress and employee wellbeing. The results did not support a mediating relationship.

Along with the negative behavior at the petrochemical companies, the respondents reported bad relationships with managers in the workplace. The study results indicated a positive and a significant relationship between workers' relationship and productivity. This result aligned with a study of Robbins and Judge (2011) who

238

stated that employee job satisfaction would more likely increase when the supervisors were understanding and friendly, praised satisfactory performance, encouraged feedback from subordinates and displayed personal and genuine interest in employees.

Otherwise, the net result of job satisfaction is that a mediating relationship between workers relationship with managers or colleagues and productivity is not indicated. Baron and Kenny (1986) found that job satisfaction did not mediate the relationship between worker relationship and worker productivity. Furthermore, an examination of the t-values (t= -3.519, p=0.001) suggested that distraction behavior was negatively significant with worker productivity. The mediation analysis found that that job satisfaction only partially mediated the distraction behavior and worker productivity relationship. Bruce (2008) found that workplace distractions negatively impacted productivity by as much as 40% and heightened workplace errors by 27%.

Based on the above results, the work environment in the context of Libyan petrochemical companies should be redesigned to make that environment more suitable and conducive to enhancing worker productivity. The work environment should be redesigned so that workers achieve satisfaction and practice a free-flow of ideas to increase both motivation and productivity (Brenner, Fairris, & Ruser 2004; Anbuoli, 2012).

In sum, the results of this current study highlighted the negative effect of a work environment perceived as bad on workers' productivity in Libyan petrochemical companies. This study suggests that policy makers consider the redesigning of such

environments to reduce the possibility of losing workers or lowering their productivity. A suitable work environment calls for that environment to be characterized as attractive, creative, comfortable, satisfactory, and motivating so that workers may have a sense of pride and purpose in their work.

Therefore, the conclusion can be made that the respondents from the Libyan petrochemical companies had low a degrees of job satisfaction. Importantly, these companies should consider the correlation of job satisfaction with job productivity. According to Judge, Thoresen, Bono, and Patton (2001), a significant average correlation exists between job satisfaction and productivity. This study indicated a significant correlation between work environment and job satisfaction, and a significant correlation between job satisfaction and productivity of workers.

Thus, this current study shows that work environment factors impact job satisfaction, which may in turn negatively impact the productivity of workers working in an adverse working environment. Negative workplace behavior, including aggressive behavior and a negative employee-management/peer relationship results in anxiety, negative feelings, and job burnout. Bad feelings can be counterproductive and cause employees to become less effective and to be absent from work. Companies that have a toxic behavioral environment often fail in comparison to their non-toxic counterparts because of their workers' low morale, workers' inability to come up with novel ideas, or worker absenteeism and turnover. According to Appelbaum and Roy (2007), these types of companies also exhibit higher costs related to lower productivity and less workers' cooperation.

7.3 SIGNIFICANCE TO MANAGERS AND POLICY MAKERS

Extant literature highlights the work environment as a significant topic for study. The present study's findings contribute to the literature through identifying of the significance of work's physical and behavioral environments, and the impact of work environment on the productivity of workers. This study employed job satisfaction as a mediator in the relationship between work environment and worker productivity. Researchers have also begun to be aware of the missing mediating links between work environment and organizational outcomes. For example, Politis (2006), Yousef (2002), and Crede, Chernyshenko, Stark, Dalal, and Bashshur (2010) have reported the existence of a possible mediator, such as job satisfaction, may account for the significant linked between counterproductive workplace behavior, organizational behavior, commitment and performance.

Although empirical findings have advanced the understanding of these links, little is known about the mediating role of job satisfaction in the relationship between the physical and behavioral environments on the workers productivity. Given the salience of this issue, more evidence is required to examine the effects of job satisfaction as a mediator in the relationship between physical and behavioral environments and workers' productivity.

Most participants in this study complained about insufficient lighting at their workplace that made their work more difficult and a too hot temperature, which both negatively impacted their productivity. Such environmental problems are easy to fix.

However, work environment does not only comprise temperature, lighting, or fringe benefits, but also includes too aggressive behavior. An underlying nature of negative behavior at the workplace can be detrimental to worker satisfaction, work ability, emotional well being, self-worth, and financial conditions. This current study is one of the pioneering studies dedicated to examining the workplace environment in the context of Libya. A work environment, characterized as unpleasant, can have a significant negative impact upon a company. When a negative environment begins to spread, morale begins to decline, negatively influencing productivity. Distorted personality types often exist in the workplace. Often these distorted types have a single purpose, which is to attack, belittle, criticize, and eventually destroy someone (Isaac, 2013).

Negative behavior, whether coming from female or male workers, should be further investigated owing to the long-term costs incurred by the company in which they work. This current study reflects upon the methods of aggression used in toxic behavior, the factors of bad relationships, and distraction behavior that leaders must acknowledge and put a stop to.

This study's findings shed light on workplace environment with data gathered from two petrochemical companies in Libya. Analysis of the findings show that negative workplace environment is not conducive for workers, particularly when companies continue to allow some workers to continue behaving badly. This study is proof that a negative physical environment and negative behavior lead to an unpleasant working environment for all workers and bring about job dissatisfaction, lost productivity, and, eventually, losses for the company.

This study's findings also have significant contributions to managers and policy makers. They provide first-hand knowledge of the impact of unsuitable physical and behavioral factors in the workplace. This study recommends the creation of better work environments and acknowledges that workers are unable to work effectively in a negative workplace environment. The study recommends that management ensures that workers work in a safe environment, rewards good behavior, leverages strengths, modifies negative aspects, and acknowledges the necessity of eliminating workplace mistreatment before the workers experience low morale. Until and unless bad behavior in the workplace is recognized and addressed, such behavior will continue to be detrimental to the morale of a company and its bottom line. Hence, managers should learn to acknowledge aggressive behavior and make bullies accountable for their actions.

Most companies do not have anti-harassment policies or, if they do, these policies may not be enforced. According to data gathered in this study, 50% disagreed with the transformation/termination of harassers. Thus, managers should identify and eliminate abusive behavior at the onset before this behavior adversely affects workers' innovation and productivity, turns away quality workers or transforms the workplace into a place characterized by violence.

The relationship between the workplace environment and productivity and its impact on job satisfaction was found to be significant. The findings also show that job satisfaction mediates the relationship between the two. The dynamic relationship between physical and behavioral environments and job satisfaction can impact

worker morale, anxiety, work time losses, excessive absenteeism, and eventually, company operations. These findings call for qualitative studies in workplace environment, which would contribute to the extant body of knowledge.

The recognition and understanding of the impact of workplace environment may also improve the ability of managers or policy makers to determine the needs of workers and to determine negative behavior through the development of physical conditions and the implementation of anti-negative policies.

From the onset of this current study that began 2010, not much study has been dedicated to the workplace environment, although some literature related to it has been published. For instance, Taiwo (2010) said that factors in both external and internal work environment and employment policies were unfavourable to the improvement of labour productivity in Nigeria. Hence, governments should examine methods to improve and update infrastructural facilities in order to transform work environment into places more conducive to improving labour productivity. Similarly, job and organizational related factors and employment policies should be examined by employers for possible reviews to make them more conducive to workers' productivity.

Chandrasekar (2011) contended that the linkage between work and the tools of work in the workplace becomes an integral part of the work itself, and that management that wanted to maximize employee productivity should concentrate on two main areas, namely personal motivation and the work environment infrastructure (Chandrasekar, 2011). Chandrasekar also noted that a supervisor's support was

critical for helping employees to carry out their tasks. The interpersonal role of the supervisor was significant for encouraging positive relationships and maximizing employees' self-confidence. Skilled and respected individuals were needed to assist employees in performing their jobs better and in developing their future role.

Along the same line of study, Leblebici (2012) found that the quality of environment in workplace might pinpoint the degree of employee's motivation and his eventual performance and productivity. The manner in which an employee gets along with an organization impacts his error rate, innovation level, collaboration with peers, absenteeism, and eventually the length of time he remains at his job.

7.4 STUDY LIMITATIONS AND THEIR IMPLICATIONS

Not unlike other studies, this study has its own limitations, which are listed as follows;

First, data for this study was gathered at a single point in time. It is important to stress that questionnaire surveys designed to include close-ended questions do not permit qualitative interaction. While qualitative study is exploratory, this study is only confined to quantitative method.

Second, respondents experiencing bad relationships with their management or peers and mistreatment behavior are often reluctant to complain about their experiences, some of the respondents have different ideas in the same question. Most workers are fearful of their work environment and they suffer in silence often blame themselves.

Targets are often ashamed and afraid of revealing their experiences to a stranger, which may result in exacerbating their situation. Therefore, some of the participants in this study might not have been completely transparent when answering their survey.

Third, future study dedicated to work environment should consider the employment of a qualitative or mixed method. In this study, job satisfaction was examined for its mediating role; hence, future studies should make use of more negative aspects causing unpleasant work environment, such as the physical and mental symptoms that workers may experience from unsuitable temperature, lighting and non-cash fringe benefits or from being targets of bullies or from experiencing bad relationship, poor nature of workplace and distraction behavior. These adverse aspects include feelings of shame, guilt, embarrassment, decreased self-esteem, headache, and high-blood pressure. These options would allow the studies to accept or reject the following hypotheses:

H1: There is a negative relationship between work environment and physical stress.

H2: Physical stress mediates the relationship between work environment and workers' productivity.

H3: There is a negative relationship between work environment and mental stress.

H4: Mental stress mediates the relationship between work environment and workers' productivity.

On the other hand, an appropriate work environment within which workers function is important to output. Future studies can look at factors related to the workplace that assist in improving productivity that would confirm or negate the following hypothesis;

H5: There is a positive relationship between appropriate work environment and workers' productivity.

The scope covers various physical and behavioral environments and reactions that probably make participants wary in some places to fill in the survey owing to the subject matter. On the basis of the literature and personal experiences with the adverse workplace behaviors and bad relationships, individual's behaviors may impact other individuals in the organization. However, the notion stating that adverse behaviors are widespread in Libya has not yet been empirically proven.

7.5 RECOMMENDATIONS

On the basis of the above limitations, this study has several recommendations for future studies. From the onset of this study, no further scientific study has been dedicated to physical and behavioral environments and their impact on workers' productivity, while examining job satisfaction's mediating role between work environment and productivity.

Future studies may concentrate on various industries and compare the results with this study' findings, which would help validate this study's findings through a general sample of participants. The negative effects of unsuitable temperature, lighting, and non-cash fringe benefits on workers' productivity were explained in Chapter 6. The findings showed that the nature of workplace is riddled with stress, frequency of toxic behavior, mistreatment culture behavior, and negative relationship. Although the findings provide an overview of the work environment, each of them can be further examined for further clarification.

In addition, companies should attempt to eliminate the distraction behavior, mistreatment behavior, and workers' negative relationship at the workplace environment to assist them in working satisfactorily and boosting productivity. Moreover, companies should facilitate good working conditions, suitable lighting and temperature and enough fringe benefits for workers to maximize their morale and efficiency.

In this study, some respondents have more to add outside of the survey questions. Some of them wanted their stories concerning bad physical environment and errant behavior to be heard so they can be resolved. Therefore, a qualitative analysis or mixed method study may help extend the evaluations of the attitudes and feelings of those respondents who experienced unsuitable physical environment and who have been a target of mistreatment or those who have witnessed others being mistreat or are unhappy with their bad relationship with their managers at work.

Future studies could also explore the impact of unsuitable physical and negative behavior upon the profitability of the company. Research studies should employ a larger representative sample to provide an extensive understanding of the impact of unpleasant temperature, insufficient amount of lighting and the provision of non-cash fringe benefits to the workers as well as the frequency of negative behavior.

Future studies may also investigate whether or not harassers in authority are likely to be policy makers or managers. Misuse of power may result in damaging behaviors, like harassment, mobbing, and mistreatment – behaviors examined in this study. Owing to their authoritative position and easy access to resources and influence, managers may have a great opportunity to mistreat by misusing their power. Therefore, future studies should investigate how policy makers could gather additional information for the detection of toxic behavior and the recognition of types of mistreatment in the workplace as directed towards the target, to ensure that their employees are working in a safe and healthy working environment.

More importantly, companies in developing countries could make use of this study's survey to determine the overall physical and behavioral environment in their culture and workplace environment and compare it with this study in the context of Libya.

Companies attempting to survive and thrive in a competitive business environment must make sure that suitable environment is created to increase work performances. There are significant indications pointing to the fact that more has to be done by managers and leaders in Libya in the public sector to provide an environment that

would satisfy workers' expectations maximize job satisfaction and enhance workforce productivity.

On the whole, this study highlights the destructive and complex work environment, particularly in the context of Libyan petrochemical companies. An important avenue for future studies is to investigate the work environment aspects which demand the acknowledgement of managers and policy makers in order for them to facilitate a conducive physical environment and to stop negative workplace behavior, to encourage innovation among workers and to acknowledge the measures companies have obtained to handle toxic situations and their successes. Finally, additional study in this area may highlight the relationship of toxic behavior and work performance enabling managers to facilitate a working environment that is healthy and productive.

7.6 SUMMARY

Work environment is challenging to define and is considered as a difficult area to examine. In addition, there has been increasing interest in literature regarding the issue of workplace environment. Factors in the organization that contribute to the facilitation of errant environment at work exist, and management should know how to develop a challenging but positive work environment to encourage employees to achieve the aims of the organization.

In my firsthand experience of the Libyan work environment, while I was working at the university, I experienced lack of several motivating factors in the workplace: these include, but are not limited to, lack of air-conditioning, insufficient illumination, interference at work, distinction among employees and misuse of authority. All these impact the morale of employees directly and indirectly, resulting in psychological impact leading to decreased performance. This study revealed the way negative behavior and inappropriate temperature and lighting, and provision of fringe benefits can impact the morale and satisfaction and workers' productivity.

According to this study, suitable attention has to be provided to create a positive environment in order to maintain the satisfaction and good welfare of employees as well as the company's productivity. The study's findings are significant and therefore support and contribute to the literature. The results may also contribute to policy makers and managers' information on how they could manage workplace environment, particularly in the petrochemical companies in the context of Libya, in the hopes of developing a working culture of respect, satisfaction, and eventually productivity.

Ongoing study dedicated to workplace environment is called for in order to create a work design and facilitate the passing of legislation that eliminates errant behavior in the workplace. Companies should focus on providing the employees better physical environment in terms of suitable temperature and lighting, as these benefits are of high concern to the workforce. Moreover, management should exert effort to provide a suitable benefits package to their employees to stimulate their work motivation and eliminate negative behavior in both small and large companies if they are desirous of remaining competitive in a dynamic global workplace.

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