SAFETY CLIMATE OF MIGRANT CONSTRUCTION WORKERS AND ITS RELATIONSHIP WITH THEIR SAFETY PERFORMANCE IN THE CONSTRUCTION INDUSTRY IN ABU DHABI, UAE

By

KAMRAN ZAFAR

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

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Chair : Professor Shamsul Bahri bin Hj. Mohd Tamrin, PhD
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Objective: Safety of migrant construction workers is now becoming a global concern and this requires the identification of the important safety climate factors and attention to them to enhance the workers' overall safety performance in this industry. **Methodology:** A cross-sectional study aimed to evaluate the relationship between the safety climate and its relationship with safety performance (in terms of safety participation, safety compliance, and self-reported near misses and injuries) of migrant construction workers in Abu Dhabi. 141 respondents from the major nationalities (Indians, Pakistanis, and Bangladeshi) participated in this study, from the 2 industrial zones (Abu Dhabi and Al Ain) of this emirate. Sociodemographic characteristics, information about safety climate, and safety performance were assessed by using a specifically designed questionnaire for the construction industry in English and respondents' native languages (Hindi, Urdu, and Bengali). Descriptive statistics determined the socio-demographic and work information whereas spearman's correlation coefficient test was carried out to determine the relationship between safety climate and safety performance of the migrant construction workers. The chi-square test was carried out to compare the safety performance among the Indian, Bangladeshi, and Pakistani migrant construction workers; and to identify the effects of demographic variables on the Safety performance of the Indian, Bangladeshi, and Pakistani migrant workers. The effects of demographic variables on the Safety climate of the Indian, Bangladeshi, and Pakistani migrant construction workers were explored by using the Independent Sample Kruskal-Wallis and Mann-Whitney U Tests. **Result:** The study showed that about half of the respondents (56%) belonged to the age group of 31 to 40 years, and nearly three-quarters (78%) of them were married. Their work information showed that 75% of them are skilled workers and one-third of them (75%) work with contractors and had construction industry experience of 6 years or more. Skilled migrant construction workers have a higher commitment toward safe work than laborers. Correspondingly married construction workers, aged 30 to 50 years

and having 6-15 years of experience in the same company majorly working directly with clients, supporting 1 -2 family members, with no smoking or drinking habit have achieved a relatively higher safety climate score than the other relevant categories. Construction workers with ages less than 30 years or below, with lower education and no dependents to support, and with smoking and drinking habits have achieved relatively low safety climate score. Safety climate showed a significant positive relationship ($r = 0.272$, $p = 0.001$) with the safety performance of the Indian, Bangladeshi, and Pakistani migrant construction workers. The factor of safety climate, organizational and management safety commitment developed the strongest relationship ($r = 0.339$, $p = 0.001$) with the perceived safety climate, on the other hand, the most ignored factor with the least relationship was Workers' Perception of Safety rules and procedures ($r = 0.203$, $p = 0.016$). Safety performance comparison among these nationalities revealed that there is an association between the country of origin and safety performance ($p<0.05$, $\chi2=6.828$) and Indians showed the highest injury rates (54.4%) as compared to Pakistanis (26.3%) and Bangladeshi workers (19.3%). **Conclusion:** The present study suggested that there was a significant positive relationship between safety climate and the safety performance of migrant construction workers. Therefore, construction workers with less experience and lower education, aged 30 years or below, with no dependents to support, with smoking and drinking habits needs to be focused on the augmentation of their safety performance by safety awareness, relevant safety education, and training.

Keywords: Construction safety and health; Migrant construction workers; Safety climate; Safety performance, Abu Dhabi, United Arab Emirate

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

IKLIM KESELAMATAN PEKERJA ASING DALAM PEMBINAAN DAN HUBUNGANNYA DENGAN PRESTASI KESELAMATAN MEREKA DALAM INDUSTRI PEMBINAAN DI ABU DHABI, UAE

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Objektif: Keselamatan pekerja migran binaan kini menjadi kebimbangan diperingkat global dan tumpuan kepada faktor-faktor persekitaran keselamatan yang berkesan diperlukan agar dapat menambah baik prestasi keselamatan pekerja secara kesuluruhannya dalam industri ini. **Metodologi**: Suatu kajian tinjauan keratan rentas telah dilaksanakan bertujuan untuk menilai hubungan antara persekitaran keselamatan dan prestasi keselamatan (dari sudut penglibatan keselamatan, pematuhan keselamatan, serta laporan kendiri terhadap kejadian nyaris juga kecederaan) pekerja migran binaan di Abu Dhabi. Seramai 141 responden daripada warganegara utama (India, Pakistan, dan Bangladesh) telah mengambil bahagian dalam kajian ini, mereka terdiri dari 2 zon perindustrian (Abu Dhabi dan Al Ain) di emiriah ini. Penilaian terhadap ciri sosiodemografi, maklumat berkaitan persekitaran keselamatan dan prestasi keselamatan dinilai dengan menggunakan soal selidik yang direka khusus untuk industri pembinaan dalam Bahasa Inggeris dan Bahasa Ibunda responden (Hindi, Urdu dan Benggali). Seterusnya, sosio-demografi dan maklumat pekerja migran binaan ditentukan melalui statistik deskriptif manakala ujian 'spearman's correlation coefficient' telah dijalankan untuk menentukan hubungan antara persekitaran keselamatan dan prestasi keselamatan pekerja migran binaan. Selain dari itu, prestasi keselamatan di kalangan pekerja migran binaan dari India, Bangladesh dan Pakistan disbanding dengan menggunakan ujian Khi Kuasa Dua; selain untuk mengenal pasti kesan pembolehubah demografi ke atas prestasi keselamatan pekerja migran binaan dari India, Bangladesh dan Pakistan. Kesan pembolehubah demografi pada persekitaran keselamatan pekerja migran binaan India, Bangladesh dan Pakistan telah diteliti dengan menggunakan Ujian Sampel Bebas 'Kruskal-Wallis' dan 'Mann-Whitney U'. **Keputusan**: Kajian menunjukkan bahawa kira-kira separuh daripada responden (56%) tergolong dalam kumpulan umur 31 hingga 40 tahun, dan hampir tiga perempat (78%) daripada mereka telah berkahwin. Maklumat kerja mereka menunjukkan bahawa 75% daripada mereka adalah pekerja mahir dan satu

pertiga daripada mereka (75%) bekerja dengan kontraktor dan mempunyai pengalaman industri pembinaan selama 6 tahun atau lebih. Pekerja migran pembinaan yang berkepakaran mempunyai komitmen yang lebih tinggi terhadap keselamatan pekerjaan berbanding buruh tidak mahir. Pekerja binaan yang telah berkahwin, iaitu berumur 30 hingga 50 tahun dan mempunyai pengalaman 6-15 tahun dalam syarikat yang sama, kebanyakannya bekerja secara langsung dengan pelanggan, menyara 1 -2 ahli keluarga, tanpa tabiat merokok atau minum telah mencapai skor persekitaran keselamatan yang lebih tinggi daripada kategori lain yang berkaitan. Pekerja binaan yang berumur kurang daripada 30 tahun dan ke bawah, berpendidikan rendah dan tiada tanggungan untuk ditanggung, dengan tabiat merokok dan minum minuman keras telah mencapai skor persekitaran keselamatan yang agak rendah. Persekitaran keselamatan menunjukkan hubungan positif yang signifikan ($r = 0.272$, $p = 0.001$) dengan prestasi keselamatan pekerja migran binaan India, Bangladesh dan Pakistan. Faktor diantara persekitaran keselamatan dan komitmen keselamatan organisasi serta pengurusan menunjukkan hubungan yang paling kuat ($r = 0.339$, $p = 0.001$) dengan persepsi terhadap persekitaran keselamatan, sebaliknya, faktor yang paling diabaikan dengan hubungan paling sedikit ialah persepsi pekerja terhadap peraturan keselamatan dan prosedur ($r = 0.203$, $p = 0.016$). Perbandingan prestasi keselamatan dalam kalangan warganegara ini membuktikan bahawa terdapat hubung kait antara negara asal dan prestasi keselamatan ($p<0.05$, $\chi2=6.828$) dan India menunjukkan kadar kecederaan tertinggi (54.4%) berbanding Pakistan (26.3%) dan Bangladesh (19.3%). **Kesimpulan**: Kajian ini mencadangkan bahawa terdapat hubungan positif yang signifikan antara persekitaran keselamatan dan prestasi keselamatan pekerja migran binaan. Oleh itu, pekerja binaan yang kurang pengalaman dan berpendidikan rendah, berumur 30 tahun dan ke bawah, tanpa tanggungan untuk ditanggung, dengan tabiat merokok dan minum minuman keras perlu memberi tumpuan untuk meningkatkan prestasi keselamatan mereka melalui kesedaran keselamatan, pendidikan keselamatan yang berkaitan serta latihan keselamatan.

Kata kunci: Keselamatan dan kesihatan pembinaan; Pekerja migran binaan; Persekitaran keselamatan; Prestasi keselamatan, Abu Dhabi, Emiriah Arab Bersatu

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ADPHC	Abu Dhabi Public Health Centre
CI	Construction industry
COVID-19	Coronavirus Disease 2019
CST	Climate Survey Tool
DART	Days away, restricted work, or transfer
df	Degree of freedom
DOSH	Department of Occupational Safety and Health
EMR	Experience modification ratings
GCC	Gulf Cooperation Council
GDP	Gross domestic product
GOSI	General Organization for Social Insurance, Saudi Arabia
HSE	Health and Safety Executive, UK
ILO	International Labour Organization
NOSACQ-50	Nordic Occupational Safety Climate Questionnaire
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (USA)
OSHC	Occupational Safety and Health Council (Hong Kong)
PPE	Personal protective equipment
RIR	Recordable Injury Rate
SC	Safety climate
SCAD	Statistics Centre - Abu Dhabi
SCF	Safety climate factor
SCI	Safety climate index

Sig.	Significance
SP	Safety Performance
SPSS	Statistical Package for the Social Sciences
UAE	United Arab Emirates
UK	United Kingdom
UN	United Nation
UPM	Universiti Putra Malaysia
USA	United States of America

CHAPTER 1

INTRODUCTION

1.1 Introduction

In this chapter, study background and safety performance of migrant construction workers in the United Arab Emirates (UAE), and the Emirate of Abu Dhabi has been described. It describes the problem statement, aims, objectives and outlines the conceptual framework. Moreover, it illuminates the significance and justification of this study.

1.1.1 Study Background

The rapidly growing economy in the United Arab Emirates (UAE) has fueled the construction industry. The construction industry contributed 8.5% to the UAE's GDP and 9.4% to the Emirate of Abu Dhabi in 2019. Researchers have agreed that the it is one of the dangerous industries because of its distinctive working environment. Because of the high number of accidents in construction projects, there are a lot of risks, unpredictability, and complication in these projects (Sousa et al., 2014). Hazards at the worksite keep on changing with the day-to-day operations and progress. This sector is additionally experiencing rapid changes in the form of globalization in developing countries. Only in the United States, 5,333 workers died on the job in 2019 and about 20% (1,061) of worker fatalities were in construction – accounting for one in five worker deaths for the year (OSHA, 2020a).

By the end of the 20th century, South Asians became the face of migrants in Gulf Cooperation Council (GCC: comprising Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) countries (Hamza, 2015). A "migrant worker" is defined in the International Labour Organization (ILO) instruments as a person who migrates from one country to another (or who has migrated from one country to another) with a view to being employed. UAE has the highest number of expats in the Gulf region and World Bank statistics show that this number is increasing every year (The World Bank, 2020). Exponential economic growth in Abu Dhabi which is the largest emirate in UAE has been met by a high inflow of migrants mostly originating from Southeast Asian countries for better opportunities. In the Emirate of Abu Dhabi, it is estimated by the Statistics Centre - Abu Dhabi, SCAD (2020) that 91% of the workforce population are expats, and about 16% of them are working in the construction sector as risky jobs are attractive to immigrants. These jobs also may pay more than other jobs that the migrant workforce would hold in the host country (Orrenius & Zavodny, 2012).

Developed nations have devised a variety of occupational health and safety management (OHSMS) systems to address the issues facing the construction sector, such as rising accident rates, dangerous situations, the complexity of the task, and unregulated working conditions. (Choudhry et al., 2008). The Abu Dhabi Public Health Center (ADPHC) in the Emirate of Abu Dhabi, the Labor Department in Hong Kong, the Department of Occupational Safety and Health (DOSH) in Malaysia, the Health and Safety Executive (HSE) in the United Kingdom (UK), the Occupational Safety and Health Administration (OSHA) in the United States, and various international organizations are constantly working in other part of the world to reduce the occupational accidents. Yet they continue to experience fatalities.

The accident rate is an important metric used to assess and monitor safety performance in various industries, including the construction industry. By analyzing the accident rate, organizations can identify trends, evaluate the effectiveness of safety measures, and implement strategies to prevent accidents and improve overall safety. According to the research by Hoła et al. (2017) there are various factors which affects and lead to the accidents in the construction industry such as work environment, work methods, management, work equipment's, organizational structure, legislations, people perceptions about safety, people's education, and technical progress.

In the UAE, according to Al-Kaabi and Hadipriono, (2003) about all the workforce in construction are immigrants and many of them are inexperienced, the threat escalates to them and to the industry. As per the ILO Statistics, in the year 2018 US faced 5.3 occupational fatalities per 100,000, in UK it was 0.8 in the year 2015, in Japan 2.0 in the year 2018, Qatar 1.7 in the year 2016, and as per the Abu Dhabi Health Statistics, Department of Health, the occupational fatalities per 100,000 workers for Abu Dhabi was 3.03 in the year 2018.

According to the latest available Abu Dhabi Health Statistics from the Department of Health, highest number of fatalities and injuries has been recorded in the year 2018 for the construction industry. There were 82 fatalities among the migrant workers in 2018 out of 88 reported fatalities in that year. This relatively poor safety performance and accident records within the construction industry continue to cause worldwide concern. Because of the relative poor performance in the safety records such as accidents, injuries, near-misses and fatalities, in this industry, it is becoming now global concerns.

Many academics and practitioners have investigated numerous ways, including some methods used in other sectors, to lower construction accidents and deaths. Despite their development, it is still challenging to use these techniques in the construction sector due to its specific characteristics, such as (a) ongoing workplace changes, (b) a migratory labor, and (c) complicated project and organizational measures (Molen et al., 2005). It clearly reflects that this sector requires more precise safety measures and research techniques.

1.1.2 Safety Climate

According to Zekri, (2013) there are many studies have been conducted related to this industry and its hazardous nature, but few of them have been conducted or are related to GCC countries and negligible for the UAE's construction industry. HSE, UK defines "the term Safety Climate refers to the psychological characteristics of employees (i.e., how people feel) corresponding to the values, attitudes, and perceptions of employees with regard to safety within an organization". Zohar, (1980) introduced the concept of safety climate founded on the research study which incorporates the 20 Israeli manufacturing companies described this term as "a summary of molar perceptions that employees share about their work environments a frame of reference for guiding appropriate and adaptive task behavior".

There are several instruments developed by different researcher and organizations such as the Nordic Occupational Safety Climate Questionnaire (NOSACQ-50) for measuring the safety climate, however they are not specialized for the construction sector. According to Cooper and Phillips, (2004) safety climate factors are viewed industrial specific and several studies have been conducted on determining the SCF in the context of the construction industry have been reviewed (Dedobbeleer & Béland, 1991; Niskanen, 1994; Mohamed, 2002; Fang et al., 2006; Chan, Wong, et al., 2017; Chan, Javed, et al., 2017; Wu et al., 2018). It has been found that the safety climate comprised of different dimensions and numerous researchers have evaluated these dimensions from the industry perspective (Glendon & Stanton, 2000). As mentioned earlier, this dimensional safety climate endeavor was started by Zohar in 1980 and found eight dimensions with a study survey of 20 Israeli manufacturing companies.

A useful research tool, safety climate can help in the identification of the issues that may be perceived as being crucial to enhancing safety (Meliá et al., 2008). It has been reflected as an active instrument to highlight the weaknesses and areas of improvement in safety management, which is performed by measuring safety climate in different dimensions, such as management commitment, worker involvement, supervisory environment, and so on (Niu et al., 2017).

1.1.2.1 Safety Performance

Burke et al. (2002) has defined Safety performance as "actions or behaviours that individuals exhibit in almost all jobs to promote the health and safety of workers, clients, the public, and the environment". Safety performance is determined in two ways, either it is measured as lagging indicators (reactive measures) or as leading indicators (proactive measure) (Cooper & Philips, 2004). Both indicators have their own merits and demerits but the benefit of using leading performance indicators is that they can spot flaws in safety management procedures before they result in incidents (Mearns et al., 2003).

Conventionally, the safety performance of projects or companies is measured by reactive indicators or lagging indicators and are reported accordingly. However, few concerns and demerits associated with the reactive measures have been reported by many researchers (Glendon & Litherland, 2001; Chen & Jin, 2013) such as their lack of unauthenticity, unreliable reporting, unawareness of risk exposure. However, lagging indicators have been used to compare the safety performance across the industries (Hinze et al., 2013). Furthermore, because of the multi-layered and unique nature of this industry, it is challenging to determine and assess the 'real' safety performance of an active project based on these lagging indicators (Fang et al., 2006; Lingard et al., 2010).

Leading indicators monitor the management programs or individual behaviors linked to accident prevention, which helps to identify problem areas that will potentially lead to accidents and improve safety performance through managing positive safety behaviors. Consequently, there has been a transfer of research interest toward the application of leading indicators to predict safety performance.

In addition, various researchers have identified that occupational injuries in GCC countries are often under-reported and unreliable. In the context of UAE, very few studies have been carried out in the UAE's construction industry and they have mentioned categorically that unfortunately, the construction companies do not keep official records of occupational injuries and fatalities (Barss et al., 2009; Al-Kaabi & Hadipriono, 2003; Shibani et al., 2013; Zekri, 2013). Occupational accident statistics of UAE are available at the ILO record are also just till the year 2003 (ILO, 2011) and, data specifically on the migrant worker deaths in the Gulf region are only available in ILOSTAT for Qatar, despite various South Asian sending countries holding data on deaths of their workers abroad (Brian, 2021).

1.1.2.2 Construction Industry in UAE

Compared to many other industries, the construction sector has a reputation for being messy, challenging, and risky (Bust et al., 2008; Siegel, 2011). The practice of hiring migrant workers in community or from abroad has spread around the world (e.g., in Europe labor from Poland, Estonia, Latvia, and Lithuania; Indian, Pakistani, Bangladeshi and Nepalese workers not only in the Gulf region but also in Singapore, Malaysia and Hon Kong; Hispanics in the USA). Construction ranked among the top 10 UK industries for immigrant workforce in 2019, where 15% of the workforce was born abroad (Reinzo, 2021). In Spain, this percentage has increased to 30% (Meardi et al., 2012). In the construction industry of USA, Hispanic or Latino made up 30% and Asian made up 2% of the total number of workforce in the year 2020 (U.S. Bureau of Labor Statistics, 2021). Around 19% of construction workers in Malaysia are migrant employees and dependence on migrant labor started in the 1980s (The World Bank, 2019). Whereas the percentage of foreign construction workers in Singapore was 78% in the year 2021 (Ministry of Manpower, Singapore, 2022).

In the emirate of Abu Dhabi, the construction industry accounted for the largest share of the total employees registered in the private sector at 33.9%, this migrant population is increasing every year and can be seen in the Figure 1.2 added below that this population was 76% of the total population in 2001 and has reached to 81% in 2016 (Statistics Centre - Abu Dhabi, 2020).

UAE's estimated population is 9.89 million and is mostly comprised of a migrant workforce mainly originating from the Indian Sub-continent, Philippine, African, and other Middle Eastern countries. According to the UN source for 2019, there are 27.5% of Indians, 12.7% Pakistanis, 11.5% Emiratis, 7.4% Bangladeshis, 5.6% Filipinos, and the remaining 35.4% of the population belongs to other countries.

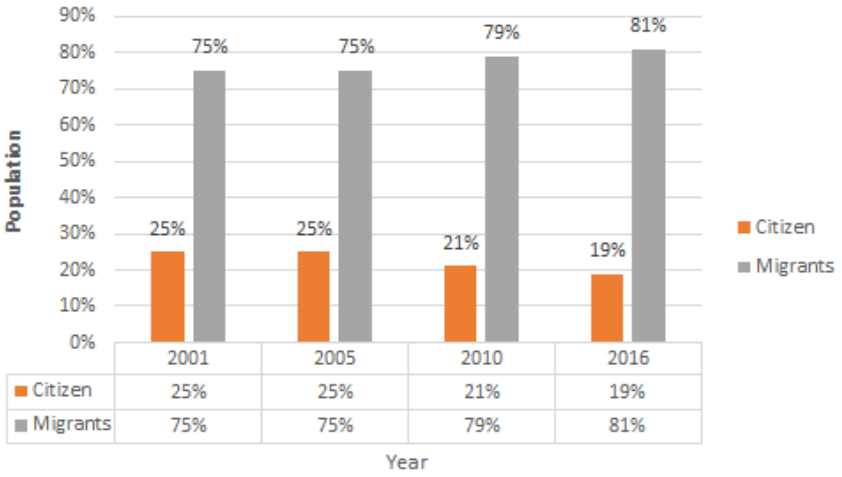

Figure 1.1: Percentage of migrant population of the Emirate of Abu Dhabi, UAE

However, there is a need to reveal the reasons for poor safety performance among this migrant workforce and to enhance their behaviour toward safety compliance. It has been found that the safety climate can be augmented by enhancing the employee's behaviour (Zhou et al., 2008), whereas according to many researchers the safety performance can be reliably predicted by the safety climate (Pousette et al., 2008; Zohar, 2010; Hon, Chan, et al., 2014). Therefore, application of leading indicators to improve the safety performance specifically for the migrant construction workers in the emirate of Abu Dhabi, UAE in this research will be the best practice, as the same carried out by different researchers in other countries (Neal & Griffin, 2006; Hinze et al., 2013; Hon, Hinze, et al., 2014; Lyu et al., 2018).

1.2 Problem Statement

The construction industry is essential to the UAE's economy, and it has significant impact on other sectors. This is because all physical assets, from factories to airports to tourist landmarks, must be 'constructed'. For a developing nation such as the UAE, the construction industry has been a backbone. In the first nine months of 2020, Abu Dhabi was awarded $5.7bn compared to $2.8bn of construction contracts in Dubai (MEED Middle East Business, 2020). Because of the rapid development, distinctive and risky characteristics, safety and health are continually recurring problems in the construction industry.

The number of immigrants is increasing every year in Abu Dhabi and the construction industry is a major employer of migrant workers from India, Bangladesh, and Pakistan. These workers come from different cultures and backgrounds, and they may have different levels of education and experience. Statistical data has shown the highest number of fatalities and injuries in this dangerous sector, where these migrant workers are working in the highest percentage (Statistics Centre – Abu Dhabi, 2020). The safety of migrant workers in construction has become a global concern and the earlier studies have shown that health and safety of these workers is an evolving issue in this sector (Hargreaves et al., 2019; Moyce & Schenker, 2018; Tutt et al., 2011; Toh & Quinlan 2009; Bust et al., 2008; Trajkovski & Loosemore, 2006).

The number of migrant workers is in this industry is projected to continue to upsurge because of new upcoming projects the emirate of Abu Dhabi such as Saadiyat Reserve, Al Qana, Mina Zayed Redevelopment, Jubail Marina. Therefore, these migrant workers are more vulnerable to accidents which may result in more fatalities, and it is important to understand the socio-demographic and work information of these workers to develop effective safety programs. Moreover, migrant workers have an incomplete understanding of occupational health and safety, and the safety performance of these migrant construction workers may vary depending on their nationality (Fass et al., 2017). Migrant workers on construction sites are more likely to experience accidents and various factors can increase its probability such as Cultural factors, Language and communication, training and education, experience, familiarity of safety hazards, religious beliefs including fasting during the month of Ramadan (Kim et al., 2020). It is important to compare the safety performance of Indian, Bangladeshi, and Pakistani migrant construction workers in order to identify any potential differences.

Organizational climate refers to the safety climate which is defined "as a perception of policies, procedures, and practices relating to the safety in the workplace" (Choudhry et al., 2009). Kines et al. (2011) described it as "workgroup members' shared perceptions of management and workgroup safety related policies, procedures and practices". First, Zohar (1980) identified 8 factors of safety climate for manufacturing industries, whereas Kines et al. (2011) refined them in 7 factors by using the Nordic Safety Climate Questionnaire

(NOSAQCQ-50) though, these were not specifically designed for the construction industry. However, the 7 factors refined by the Occupational Safety and Health Council Hong Kong (OSHC, 2008) have been solely devised of the construction industry which are (1) Organizational and Management Safety Commitment and Concern for Occupational Health and Safety; (2) Resources for safety and its effectiveness; (3) Risk-taking behavior and perception of work risk; (4) Perception of safety rules and procedure (5) Personal involvement in safety and health; (6) Safe working attitude and workmates influence; (7) Safety promotion and communication. It has been found in various research that safety climate is related to safety performance and safety climate factors have been investigated to predict the safety performance to improve the overall safety at work to reduce the incidents and injuries and to make people safe (Dursun & Şengül, 2023; Chen et al., 2021; Wu et al., 2018; Lyu et al., 2018; Chan, Wong, et al., 2017). So prime investigation is required to explore the relationship between the safety climate and safety performance of these migrants workers and to identify the significant factors which can lead to a better working environment.

Previous studies revealed a history of very poor safety and health performance in the UAE's construction sector (Shibani et al., 2013; Zekri, 2013; Chua & Goh, 2004; Al-Kaabi & Hadipriono, 2003). Generally, poor safety performance is because of the poor safety climate depending upon various factors in addition to workers low level of education, but the management is also accountable for the inhibition of unwanted events such as accidents (Petersen, 1978). Therefore, management shortcomings sight the actual cause of the accidents as required by law as well (Fang et al., 2004). In various industrial sectors, there has been a recent shift towards measuring safety performance using indicators represented by latent constructs such as safety compliance, safety participation, unsafe acts, unsafe conditions, and number of reported near misses and accidents (Nadhim et al., 2018; Zekri, 2013; Farooqui et al., 2007). These migrant workers are also more exposed not only because of the changing working environment but also susceptible to severe weather conditions during the summer (Zekri, 2013). Moreover, peer pressure to complete the job, loosing job even could increase the probability of taking unnecessary risks which in turn lead to injuries (Lyu et al., 2018). Consequently, increment in the incidents are consistently because of workers falling from elevated work platforms, struck by objects, slips & trips, and misuse of equipment (Choudhry et al., 2014). Therefore, it is necessary to investigate the risky work practices, their participation in safe activities, compliance to the safe system of work on these projects in order to improve their Safety Performance.

Hence, research is lacking that investigates the association between the safety climate and safety performance of this migrant workforce especially in the emirate of Abu Dhabi to diminish the hazards and to ensure safe acts which support to lessen the number of incidents. The underlying causes of accidents (leading indicators) are researched as there are no credible accident data (a lagging indicator) is available. The study also identifies the personal attributes and significant safety climate factors that can influence the safety performance of construction projects in the emirate of Abu Dhabi, UAE.

1.3 Study Justification

In the United Arab Emirates, almost 70% of construction organizations have a serious lack of understanding of the importance of safety and health, and Safety policy (Umar, 2019). Statistics related to occupational safety and health performance of construction organizations working in Dubai show that in 2013, 71% of the construction companies (out of 130) have no occupational safety and health training for their workers (Zekri, 2013).

The first published study was conducted in 2002 by Noura Al-Kaabi under the title “Construction safety performance in the United Arab Emirates”. The second published study was conducted in 2013 by Shibani Abdussalam under the title “Health and safety influence on the construction project performance in United Arab Emirates (UAE)”. Human Right Watch has mentioned that workers are struggling in the construction industry in UAE despite some improvements in working conditions. In addition to that, independent research by a construction trade publication found that approximately 88 migrant workers died in a construction site accident but only 34 cases were reported officially for all nationalities (Zekri, 2013).

Abu Dhabi is the largest Emirate and federal capital of the UAE with 85% of the total area (excluding Islands) which has accomplished an exceptional economic growth in the past fifty years (Ruler's Representative Court, 2023), and accounts for approx. two-third of the UAE economy, where this emirate was awarded $5.7bn compared to $2.8bn of construction contracts in Dubai, where it is expected to expand at an annual average of 3.8% between 2022 and 2025 (MEED Middle East Business, 2020). Moreover, all emirates have their own governments, regulatory frameworks, with defined borders where residents were not allowed to move freely to move under the COVID-19 protocols. This emirate was selected with the motivation to improve the health & safety of these migrant workers, who left their countries and have joined these 3D jobs (dirty, dangerous, difficult) to earn money for their loved ones back at home (Orrenius & Zavodny, 2012; Buckley et al., 2016). It will also support the goal of the Abu Dhabi Public Health Centre (ADPHC) for the promotion of public health and preventive health concepts which is the first of its kind in the region (ADPHC, 2022).

In order to improve the safety performance of migrant workers, the safety climate factors associated with it should prior be identified to determine the relationship between both safety performance and the safety climate. This can help to enlighten the employers and management to put efforts in the identified areas of improvements of the safety climate, among the migrant construction workers which could assist the company in improving the safety performance of these workers.

In addition, this study will be the first of its kind in the UAE to investigate the relationship between the safety climate of construction companies and the safety

performance of these construction migrants. Where the safety climate studied by using the specifically designed Safety Climate instrument developed by the Occupational Safety and Health Council (OSHC) Hong Kong, in the form of a questionnaire for the construction industry with the migrant workforce. It has been validated by various researchers (Zahoor et al., 2015; Chan, Javed, et al., 2017; Lyu et al., 2018). For this study, the researcher has communicated with the OSHC Hong Kong and special approval has been taken by the respective council to use their instrument (Questionnaire) in the emirate of Abu Dhabi where the migrant workforce is working in the construction industry. Hopefully, the data gained from this study will assist the ADPHC in improving the guidelines, standards, and code of practices on the occupational health and safety of migrant workers in the Construction industry.

This study will not only help to investigate this relationship specifically for Abu Dhabi's construction industry but also the results may be a reference for the global comparison as the safety of migrant workers is now becoming a global concern.

1.4 Research Question

The fundamental research question of this study is whether there is any significant association between the safety climate (SC) of the construction companies and the safety performance (SP) (as leading indicators) of the migrant workers especially Indian, Pakistani and Bangladeshi, in the Emirate of Abu Dhabi?

1.5 Research Objectives

1.5.1 General Objectives

The general objective of this research is to assess the safety climate of construction companies and its relationship with safety performance in terms of safety participation, safety compliance, and self-reported near misses and injuries.

1.5.2 Specific Objectives

There are six specific objectives relevant to this research, which are:

i. To determine the socio-demographic and work information of the Indian, Bangladeshi, and Pakistani migrant construction workers.

ii. To compare the safety performance among Indian, Bangladeshi, and Pakistani migrant construction workers.

iii. To determine the relationship between safety climate and safety performance of the Indian, Bangladeshi and Pakistani migrant construction workers.

iv. To determine the relationship between safety climate factors and safety performance of Indian, Bangladeshi, and Pakistani migrant construction workers.

v. To identify the association of demographic variables with the safety performance of migrant construction workers.

vi. To identify the association of demographic variables with the safety climate of migrant construction workers.

1.6 Research Hypothesis

The research hypothesis of the study are as follows:

H_1: There is a significant association between the safety climate and safety performance of Indian, Bangladeshi, and Pakistani migrant construction workers of the Emirate of Abu Dhabi.

H_2: There is a significant association between safety performance and the country of origin of the migrant construction workers of the Emirate of Abu Dhabi.

1.7 Conceptual Definition

This section discussed the conceptual and operational definitions of several study variables applied in this study. As for the conceptual definitions, it is obtained from experts from this research field while the operational definitions are applied according to relevant concepts being utilized in the view of this research study.

1.7.1 Safety Climate

Conceptual: As stated by Zohar (2003), “safety climate reflects the true perceived priority of safety in an organization”. According to Griffin and Neal (2000), the safety climate is made up in what way employees perceive the organization's guidelines, procedures, and practices.

Operational: Zohar (1980) defines safety climate as “a summary of molar perceptions that employees share about their work environments… a frame of reference for guiding appropriate and adaptive task behaviors”. A pre-validated questionnaire survey may be used to quickly and regularly assess the safety climate.

1.7.2 Safety Performance

Conceptual: according to DeArmond et al. (2011) “Safety Performance is conceptualized as multi-dimensional in occupational safety research” and according to Burke et al. (2002) it’s described as “the actions or behaviors that individuals exhibit in almost all jobs to promote the health and safety of workers, clients, the public, and the environment”.

Operational: Instead of measuring Safety Performance as occurrences of failures or number of accidents such as “OSHA recordable injury rates (RIR)”, “DART injury rates”, and “EMR that are gathered after losses have been incurred” i.e. lagging indicators of Safety Performance (Hinze et al., 2013; Grabowski et al., 2007), several leading indicators such as “safety compliance, safety participation” and number of accidents/injuries and near-misses” (Huang et al., 2013; Zahoor et al., 2017; Hon, Javed, et al., 2014) measures Safety Performance.

1.8 Conceptual Framework

Figure 1.2 shows the research conceptual framework of this study. Based on Figure 1.2, the independent variable is the safety climate of the construction companies while the dependent variable is the Safety Performance of the migrant construction workers in terms of safety participation, safety compliance, and self-reported near misses and injuries (Zahoor et al., 2017; Lyu et al., 2018).

The first safety climate model was developed by Zohar (1980), and various researchers designed many instruments in both the Western and Eastern parts of the world. Coyle et al. (1995) discovered that additional performance indicators of occupational safety and health and safety climate analyses were related. However, it has not been agreed upon that how many safety climate factors and which one will be the more significant in that relative studies. According to Lin, Tang, et al. (2008), it depends upon multiple motives of the studies, such as the versatility of the workforce, social backgrounds, choice of the investigator and because of the different types of sectors and industries as SCF are chosen with relevancy of the industrial requirements as well.

In this study, pre-determined industry-specific SCFs established for the Hong Kong construction industry by the Occupational Safety and Health Council

(OSHC) of Hong Kong, have been chosen. These specifically designed Seven Safety Climate Factors for the construction industry (Chan, Javed, et al., 2017) are mentioned below;

SCF 01. Organizational and management safety commitment and concern for occupational health and safety

SCF 02. Resources for safety and its effectiveness

SCF 03. Risk-taking behavior and perception of work risk

SCF 04. Perception of safety rules and procedure

SCF 05. Personal involvement in safety and health

SCF 06. Safe working attitude and workmates influence

SCF 07. Safety promotion and communication

As for the indicator in the figure 1.2, yellow-filled box indicates the independent variable, Safety Climate factors are filled with green color. Whereas the blue-filled box indicates the dependent variable Safety Performance and the safety performance indicators under study are filled with light blue color and the confounders are in light red color.

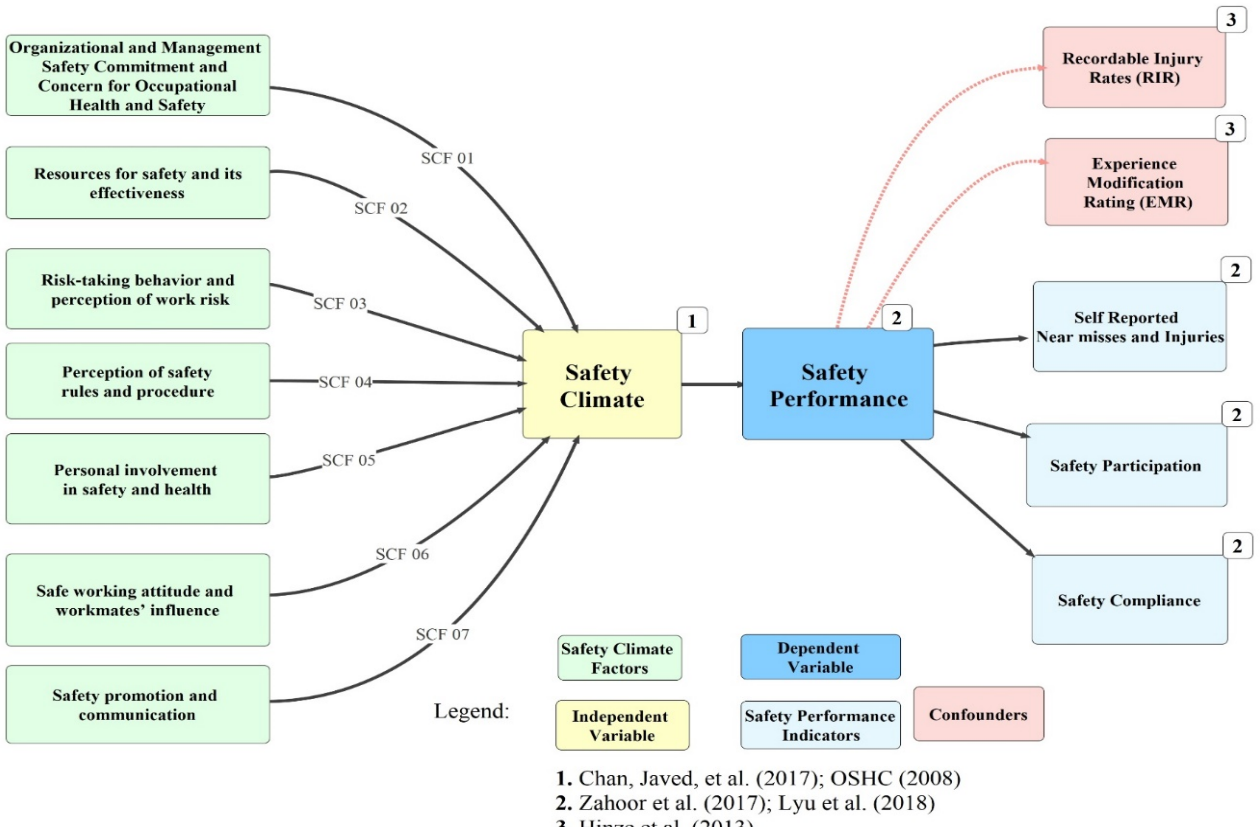

Figure 1.2: Conceptual Framework

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