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THE IMPACT OF WORKFORCE DIVERSITY ON
INNOVATION PERFORMANCE AMONG
EMIRATES STEEL MANUFACTURERS
IN THE UNITED ARAB EMIRATES
WITH RISK ORIENTATION
AS A MODERATOR



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THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENT
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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“In the name of Allah, the Most Gracious and the Most Merciful”

I would like to express my special thanks of gratitude to my supervisor Dr. Norlaile binti Salleh Hudin as well as the president of the Sultan Idris Education University who gave me the golden opportunity to be part of this wonderful PhD Program on the topic “The Impact of Workforce Diversity on Innovation Performance in UAE”. Secondly, I would also like to thank my parents, friends and colleagues who helped me a lot in doing this project within the limited time frame.



ABSTRACT

This study examines the impact of workforce diversity on innovation performance among steel manufacturers in the United Arab Emirates (UAE), with a focus on risk orientation as a moderating factor. Utilizing a quantitative research design, 400 employees were randomly selected from a population of 10 steel companies, resulting in 351 valid responses after accounting for outliers. The analysis was conducted using SMART PLS 4.0 software. The instrument used in this study consists of 68 items, demonstrating high reliability and validity. The findings reveal significant impacts of age ($\beta=0.341$, $p=0.00$), education ($\beta=0.45$, $p=0.00$), language ($\beta=0.123$, $p=0.02$), religious beliefs ($\beta=-0.114$, $p=0.00$), and values ($\beta=0.083$, $p=0.00$) on innovation performance. In contrast, ethnicity ($\beta=0.09$, $p=0.06$), gender ($\beta=-0.129$, $p=0.06$), and norms ($\beta=-0.021$, $p=0.63$) showed no significant impact. Risk orientation significantly enhanced innovation performance ($\beta=0.264$, $p=0.00$), but its moderating effects on the relationship between diversity dimensions and innovation performance were mostly non-significant. Marginal moderating effects were observed on norms ($\beta=-0.046$, $p=0.26$) and education ($\beta=0.025$, $p=0.25$). The study concludes that specific aspects of workforce diversity, particularly age, education, language, religious beliefs, and values, are crucial for fostering innovation. While risk orientation directly contributes to innovation performance, its role as a moderator is limited. These insights highlight the importance of leveraging diversity and risk orientation to enhance innovation within the steel manufacturing sector in the UAE. Future research should explore how workforce diversity shapes an innovative culture using qualitative approaches to deepen understanding. Additionally, longitudinal studies could provide further insights into the long-term effects of diversity on innovation. Steel manufacturers are encouraged to embed workforce diversity in human resource policies to drive innovation. Thus, they can create a more inclusive and innovative work environment to adapt to the evolving market demands. Workforce diversity and risk orientation is pivotal for the sustained growth of steel manufacturers in the UAE.



KESAN KEPELBAGAIAN TENAGA KERJA TERHADAP PRESTASI INOVASI DALAM KALANGAN PENGELUAR KELULI EMIRATES DI EMIRIAH ARAB BERSATU DENGAN ORIENTASI RISIKO SEBAGAI PENYEDERHANA

ABSTRAK

Kajian ini meneliti kesan kepelbagaian tenaga kerja terhadap prestasi inovasi di kalangan pengeluar keluli di Emiriah Arab Bersatu (EAB), dengan fokus kepada orientasi risiko sebagai faktor pemoderasi. Menggunakan reka bentuk penyelidikan kuantitatif, 400 pekerja dipilih secara rawak daripada populasi 10 syarikat keluli, menghasilkan 351 respons sah selepas mengambil kira pencilan. Analisis dijalankan menggunakan perisian SMART PLS 4.0. Instrumen yang digunakan dalam kajian ini terdiri daripada 68 item yang menunjukkan kebolehppercayaan dan kesahan yang tinggi. Penemuan menunjukkan kesan ketara umur ($\beta=0.341$, $p=0.00$), pendidikan ($\beta=0.45$, $p=0.00$), bahasa ($\beta=0.123$, $p=0.02$), kepercayaan agama ($\beta=-0.114$, $p=0.00$), dan nilai ($\beta=0.083$, $p=0.00$) terhadap prestasi inovasi. Sebaliknya, etnik ($\beta=0.09$, $p=0.06$), jantina ($\beta=-0.129$, $p=0.06$), dan norma ($\beta=-0.021$, $p=0.63$) tidak menunjukkan kesan yang ketara. Orientasi risiko secara signifikan meningkatkan prestasi inovasi ($\beta=0.264$, $p=0.00$), tetapi kesan pemoderasi terhadap hubungan antara dimensi kepelbagaian dan prestasi inovasi kebanyakannya tidak ketara. Kesan pemoderasi marginal diperhatikan pada norma ($\beta=-0.046$, $p=0.26$) dan pendidikan ($\beta=0.025$, $p=0.25$). Kajian ini menyimpulkan bahawa aspek khusus kepelbagaian tenaga kerja, terutamanya umur, pendidikan, bahasa, kepercayaan agama, dan nilai, adalah penting untuk mendorong inovasi. Walaupun orientasi risiko secara langsung menyumbang kepada prestasi inovasi, peranannya sebagai pemoderasi adalah terhad. Penemuan ini menekankan kepentingan memanfaatkan kepelbagaian dan orientasi risiko untuk meningkatkan inovasi dalam sektor pembuatan keluli di UAE. Penyelidikan masa depan perlu meneroka bagaimana kepelbagaian tenaga kerja membentuk budaya inovatif menggunakan pendekatan kualitatif untuk memperdalam pemahaman. Selain itu, kajian longitudinal boleh memberikan pandangan lanjut tentang kesan jangka panjang kepelbagaian terhadap inovasi. Pengeluar keluli digalakkan untuk mengintegrasikan kepelbagaian tenaga kerja dalam dasar sumber manusia mereka untuk mendorong inovasi. Dengan berbuat demikian, mereka dapat mewujudkan persekitaran kerja yang lebih inklusif dan inovatif yang dapat menyesuaikan diri dengan permintaan pasaran yang sentiasa berubah. Kepelbagaian tenaga kerja dan orientasi risiko boleh menjadi penting untuk pertumbuhan mampan pengeluar keluli di UAE.





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LIST OF ABBREVIATIONS

CMV	Common method variance
ESM	Emirates Steel Manufactory
NPD	New product development
PLS	Partial Least Square
UAE	United Arab Emirates
VIF	Variance inflated factor





LIST OF APPENDIXES

- A SURVEY QUESTIONNAIRE
- B SURVEY QUESTIONNAIRE
- C INSTRUMENT VALIDATION
- D INSTRUMENT VALIDATION





CHAPTER 1

INTRODUCTION



1.1 Introduction

Chapter one provides an overview of the study, outlining the background, purpose, and significance of the research on the impact of workforce diversity on innovation performance at Emirates Steel Manufacturers in the UAE, with risk orientation as a moderating factor. It includes the research problem, objectives, and questions guiding the investigation. The chapter also presents the theoretical framework underpinning the study, highlighting relevant concepts such as workforce diversity, innovation performance, and risk orientation. Additionally, it discusses the scope, limitations, and structure of the dissertation, setting the stage for the subsequent chapters that delve into the literature review, methodology, data analysis, and findings.





1.2 Background of the Study

UAE Vision 2030 is a comprehensive long-term strategic development framework designed to enhance the nation's infrastructure and urban development through the construction of smart cities, advanced transportation systems, ports, and integrated networks to accommodate rapid urbanization (Ministry of Cabinet Affairs, 2021; Al Zaabi & Khan, 2023). Within this context, the Emirates steel manufacturing industry plays a pivotal role by supplying high-quality steel products essential for infrastructure expansion and modernization (Emirates Steel Arkan, 2022). Furthermore, the industry significantly contributes to the UAE's industrial and economic growth by supporting key sectors, fostering economic diversification, and enhancing the country's self-sufficiency in steel production (Al Hamadi et al., 2024; UAE Industrial Strategy 2031, 2020).



Emirates steel manufacturing industry grew in a relatively short period of time from a re-roller of imported steel billets to a complex integrated manufacturing plant, using modern solutions to tackle traditional industrial problems and generate value for its various stakeholders, thus implying innovation and originality. The aim is to be efficient and competitive producers of finished steel products. To achieve this, this industry continually and significantly invests in expansions in the areas of processing, manufacturing and information technology. In addition, these investments help to improve product and service quality, reduce the company's environmental footprint and increase safety for its workers and customers.





Obviously, innovation is essential for increasing production output by enhancing efficiency, reducing waste, and optimizing processes to eventually move this industry forward. By integrating advanced technologies and modern production methods, industries can produce more in less time while maintaining high quality and cost-effectiveness. In the steel manufacturing industry, innovation plays a key role in improving production through automation, advanced materials, and energy-efficient processes. Technologies such as artificial intelligence (AI) and robotics help streamline operations, reduce human errors, and improve precision in steel cutting, welding, and shaping. Smart sensors and data analytics optimize furnace temperatures and raw material usage, leading to higher yields and lower energy consumption. Additionally, breakthroughs in sustainable steel production, such as hydrogen-based steelmaking and carbon capture technologies, enable manufacturers to reduce emissions while maintaining high production levels. By embracing innovation, steel manufacturers can enhance productivity, lower costs, and remain competitive in the global market.

In that sense, the UAE Leadership promotes innovation's relevance in all sectors (UAE Ministry of Cabinet Affairs, 2015). Responding to this call, companies in UAE are consistently looking for new methods to nurture the culture of innovation. Workforce diversity is one method to spur innovation (Kemeny, 2017). Evidence showed that UAE ranked at the 5th position as the world largest host of low-status expatriates worldwide in 2017 (ILO, 2019). The UAE's population also experienced significant growth over the past three decades, rising by nearly 471% from 2.4 million in 1995 to 11.3 million in 2025 (Worldometer, 2025). This sharp increase is primarily due to the influx of expatriates, whose proportion of the total population surged from 63.9% in 1975 to 93.9% in 2020 (Elsayed, 2024). Many expatriates migrated to UAE





because any who lived in the UAE for at least 20 years is eligible to apply for citizenship. As a result, the country's population growth is primarily driven by the increasing number of expatriates gaining citizenship and the high influx of immigrants, making the UAE the nation with the highest net migration rate in the world (O'Neill, 2024).

Malit and Youha (2013) noted that 99% of private workforce in UAE are migrant workers. Workforce diversity stimulates innovation by offering larger pool of knowledge and skills (Hall & Parker, 1993). Employees that possess creativity and knowledge often come up with new ideas or challenge the existing organizational system to create competitive advantage and improve cost effectiveness (Wendra et al., 2019). Therefore, diverse workforce is postulated to improve innovation performance of a company.



By increasing workforce diversity, the UAE achieved the 32nd rank in the Global Innovation Index (GII) in 2024 (World Intellectual Property Organization, 2024). However, the UAE has not surpassed other countries in the GII beyond the 31st rank it reached in 2022. This situation calls for thorough investigation because clearly, larger investment to increase innovation *per se* is inadequate. The next section discusses the problem related to innovation performance of UAE steel manufacturing industry in more detail.





1.2.1 Rationale for Context Selection

This study focuses on innovation performance within the Emirates steel manufacturing industry due to the sector's remarkable transformation and strategic importance to the UAE's industrialisation and economic diversification goals. Over the past two decades, the steel industry has evolved from a re-roller of imported billets into a fully integrated and technologically advanced manufacturing sector (Gulf Business, 2023). Emirates Steel Arkan, for example, is now one of the largest integrated steel producers in the region, with operations that rely heavily on innovation to remain globally competitive and environmentally sustainable.

A defining feature of the UAE's industrial workforce, particularly in the steel sector, is its high level of diversity. According to the UAE Ministry of Human Resources and Emiratisation (MOHRE, 2022), approximately 80–85% of the total workforce in the UAE comprises foreign nationals. In the manufacturing sector specifically, foreign workers dominate operational and technical roles. Emirates Steel, like many large industrial firms in the UAE, employs a multicultural workforce consisting of more than 50 nationalities (Emirates Steel, 2023). This level of diversity presents both opportunities and challenges for innovation, especially when considering the need for effective cross-cultural communication, collaboration, and leadership in high-performance industrial environments (Alsharari & Alhmoud, 2022).

In terms of innovation performance, the UAE ranks high regionally and globally. The Global Innovation Index (GII) 2023, published by the World Intellectual Property Organization (WIPO), ranks the UAE 32nd globally and 1st among Arab





countries for innovation performance. Within the manufacturing sector, companies such as Emirates Steel have been recognised for implementing advanced technologies such as artificial intelligence, robotics, and digital twin systems to optimise production, improve quality control, and reduce energy consumption (World Steel Association, 2023). These developments demonstrate the sector's strong orientation toward innovation-driven growth.

By studying the relationship between workforce diversity and innovation performance in this context—along with risk orientation as a moderating variable, this research addresses a timely and strategically significant issue. It responds to both national priorities, such as the UAE Industrial Strategy “Operation 300bn,” and global imperatives for more sustainable and innovative manufacturing practices.



Over a relatively short period, this industry has evolved from a simple re-roller of imported steel billets into a complex, integrated manufacturing sector that adopts modern technologies to address traditional challenges (Al Kaabi & Al-Zaabi, 2021). Its rapid growth has been underpinned by continuous investment in manufacturing processes, information systems, and sustainability—demonstrating a clear commitment to innovation as a core driver of productivity, efficiency, and competitiveness (Gulf Business, 2023; Khan et al., 2022).

In this high-tech and capital-intensive environment, innovation is essential for sustaining progress, meeting environmental standards, and remaining competitive in the global market. Studying innovation performance in this context offers valuable insights into how internal organizational factors—particularly workforce diversity—





influence innovation outcomes. Research shows that diverse teams foster greater creativity and problem-solving, which are crucial for innovation-driven sectors (Nguyen et al., 2021; Alsharari & Alhmoud, 2022). Given that the UAE is actively pursuing economic diversification and industrial innovation through national strategies such as UAE Vision 2030, the steel manufacturing industry serves as a representative case for examining the interplay between human capital and technological advancement (UAE Ministry of Economy, 2024).

1.2.2 Risk Orientation

Incorporating risk orientation as a moderating variable enhances the explanatory power of this study, particularly within the high-stakes environment of steel manufacturing. Innovation performance often entails navigating uncertainty, managing investment risks, and embracing novel ideas or untested processes (Zhou et al., 2020). Risk orientation defined as the degree to which individuals and organisations are willing to take calculated risks thus plays a pivotal role in determining whether innovation initiatives are pursued, supported, and successfully implemented.

In the context of workforce diversity, risk orientation becomes even more crucial. A diverse workforce introduces a broad range of perspectives, experiences, and problem-solving approaches, which can generate more innovative ideas. However, harnessing this diversity effectively requires a risk-tolerant organisational culture. Without openness to new and potentially disruptive ideas, the innovative potential of a diverse team may remain unrealised. Risk orientation may therefore moderate the





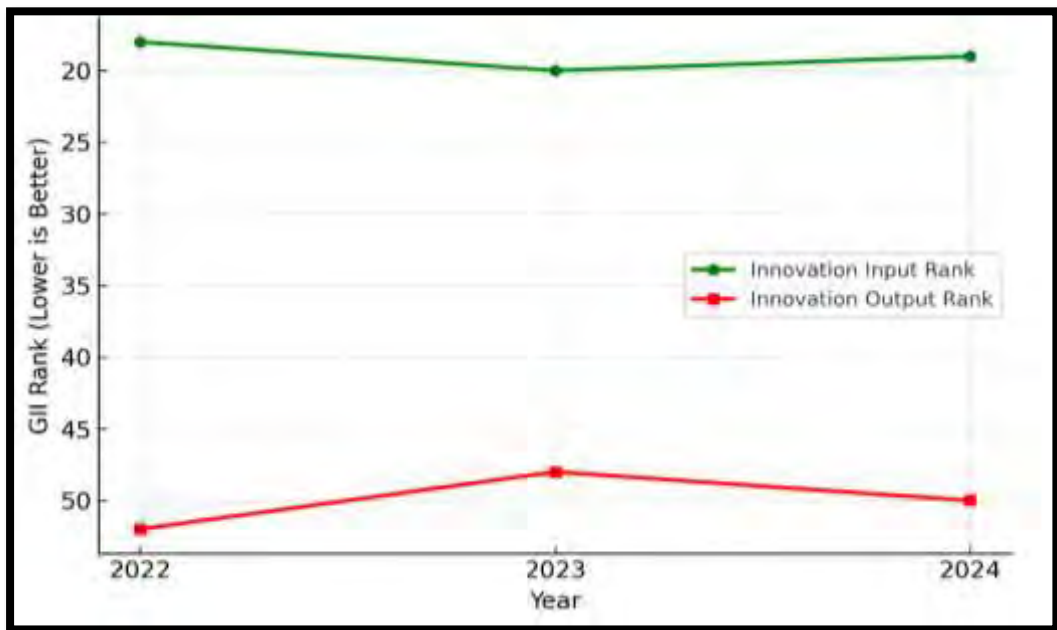
relationship between diversity and innovation by enabling organisations to leverage differences in thought and background as sources of innovation rather than viewing them as liabilities.

By examining how risk orientation interacts with workforce diversity to influence innovation performance, this study contributes to a more nuanced understanding of the dynamic capabilities required to thrive in complex industrial settings like the UAE steel manufacturing sector.

1.3 Problem Statement

Despite the UAE's substantial investment in its innovation ecosystem, recent evidence from the World Intellectual Property Organization's Global Innovation Index (GII) 2024 highlights a persistent innovation input–output gap. According to the GII, the UAE ranked 19th globally in the Innovation Input Sub-Index reflecting strong institutional frameworks, infrastructure, human capital, and market sophistication but only 50th in the Innovation Output Sub-Index, which measures tangible results such as new products, patents, and technological diffusion (WIPO, 2024).



Figure 1.1*UAE's Innovation Input–Output Gap (GII Rankings 2022–2024)*

Source: World Intellectual Property Organization (2022, 2024), Global Innovation Index.

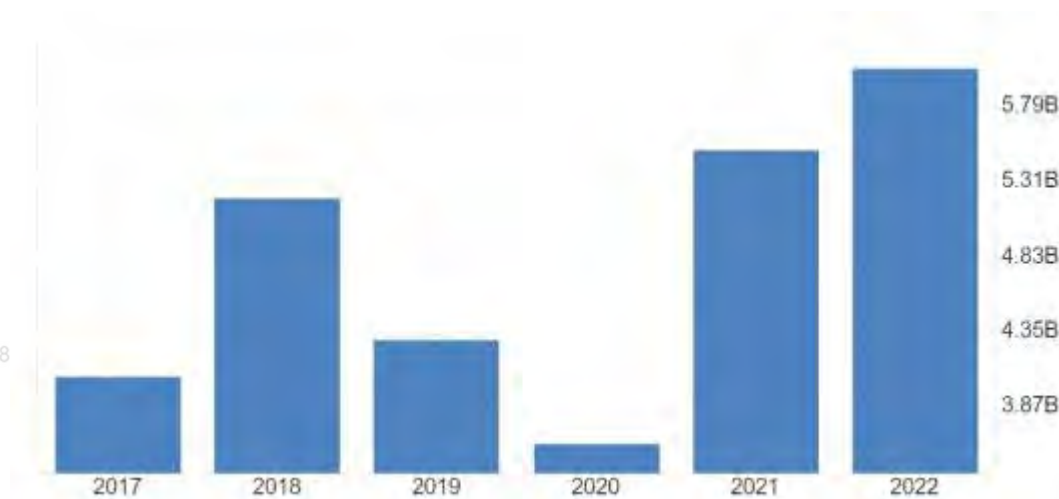
Figure 1.1 illustrates this disparity. While the UAE consistently performs well in innovation inputs, its output ranking remains significantly lower. This trend is not new; for example, in 2022, the UAE ranked 18th for inputs but 52nd for outputs (WIPO, 2022). The data suggest that although the UAE's innovation-supporting structures are strong, the country faces challenges in efficiently transforming resources and investments into measurable innovation outcomes.

Despite the importance of steel industry to UAE infrastructure and urban development and the significant investment made to improve innovation, UAE has only produced 3.0 Mt, 3.2 Mt and 3.2 Mt of steel in 2021, 2022 and 2023 respectively (World Steel Association, 2023). Due to this shortage, UAE had to increase steel imports from

other countries as shown in Figure 1.2. Without drastic measure, UAE will not be able to support UAE construction industries in the future and have to depend on imported steel. To curb this problem, UAE aims to increase steel production capacity by over 60% to about 15 million tons per year by 2030 to sustain increasing demand from construction and other industries in UAE.

Figure 1.2

UAE imports of steel (2017-2022)



Source: Trading Economics (2024)

Recent research confirmed that innovation is significant in improving steel production and increase quality of steel yielded (Tomasoni et al, 2024). However, while the UAE invests significantly in innovation, its innovation outputs are inefficient, i.e., relatively lower than expected (World Intellectual Property Organization, 2023; World Intellectual Property Organization, 2024). Innovation outputs refer to the tangible results and measurable outcomes of innovation efforts. These outputs indicate how effectively an industry transforms innovation inputs (such as research, investment, and



infrastructure) into real-world applications, products, or services to gain competitive advantage. Hence, the low innovation outputs in UAE suggest potential inefficiencies in translating research, development, and investment into tangible innovations, patents, or economic impacts.

To improve the innovation performance, UAE has been relying on its multinational's workforce. A diverse workforce brings varied perspectives, skills, and experiences, which can lead to knowledge-sharing, creative problem-solving and more innovation (Wendra et al., 2019; Haleem & Rahman, 2022). However, diversity alone does not guarantee innovation as it can also lead to conflicts, communication barriers, or resistance to change (Stahl & Maznevski, 2021; Paul et al., 2023; Liu et al., 2023) especially in UAE, which has high level of diversity in its workforce. This is proven by the work of Østergaard and Timmermans (2023) who reviewed 42 articles about workforce diversity and innovation performance published since 1989. They confirmed mixed evidence on the effect of workforce diversity on innovation performance, which calls for further investigation to understand the mechanism underlying this relationship.

Therefore, this study argues that risk orientation can enhance workforce diversity to achieve better innovation outcomes. Risk orientation refers to an organization's or team's willingness to take risks in decision-making and experimentation. In diverse teams, a high-risk orientation encourages members to explore unconventional ideas, challenge norms, and experiment with novel solutions (Brockman et al., 2012; Zahra et al., 2006); thus, leading to more efficient innovation output. Conversely, a low-risk orientation may suppress innovative potential, as





individuals may avoid uncertainty and favour safe, conventional choices (Sitkin & Pablo, 1992; March & Shapira, 1987).

Analysing the mechanism caused by risk orientation in the relationship between workforce diversity and innovation performance is essential for moving beyond merely identifying an empirical link between diversity and innovation, as explored in numerous past studies (Solheim & Fitjar, 2018). Instead, it focuses on dissecting the specific mechanisms that contribute to a potential causal relationship, providing deeper insights into how this connection operates.

Furthermore, this study also reconceptualises workforce diversity to create a more comprehensive measurement. This study strongly believed that the dimensions for workforce diversity are more than just two dimensions (Taylor, 2011; Kerga & Asefa, 2018; Tjimuku & Atiku; Krithi & Pai, 2021; Tjimuku & Atiku, 2024). Also, there is no universal acceptable dimensions for measuring work diversity. For example, Tjimuku and Atiku (2024) used five dimensions to measure work diversity; Taylor (2011) used six dimensions; Kerga and Asefa (2018) used six dimensions and Krithi and Pai (2021) used more than six dimensions. Meanwhile, Østergaard and Timmermans (2023) identified age, gender, tenure, education, functional background, ethnicity, industry experience, origin, culture, nationality and occupation as the dimensions of workforce diversity used by scholars based on 10 years publications.

It was based on this rationale that the researcher proposes reconceptualization of workforce diversity to include broader dimensions because the enhancement of innovation performance in an organization cannot be determined by only age and





gender. By limiting workforce diversity only to age and gender, this study is likely to deliver the same results reported in previous studies without any extension to the current knowledge. In fact, Yadav and Lenka (2020) emphasized that there were overwhelming number of studies that applied surface-level diversity, such as race, age and gender, while deep-level diversity, such as values, beliefs, and norms that shaped attitudes, are frequently ignored. In support, Morfaki and Morfaki (2022) and Roberson (2019) underscored that diversity is complex and multidimensional, and therefore, more detailed analysis of the concept is needed. Yadav and Lenka (2020) also literally stated that religions and languages are rarely investigated. Based on these mentioned reasons, the researcher integrates multiple dimensions such as gender, age, education, religion, ethnicity, language, values and norms so that social categorization diversity, informational diversity (Yadav & Lenka; 2020) and psychological diversity (Roberson, 2019) could be studied concurrently to address limitations of prior research.



The steel industry has long grappled with challenges related to workforce diversity, which in some cases have negatively impacted innovation performance (Ismail et al., 2021). Issues such as discrimination and employee attitudes concerning gender, age, ethnicity, educational background, values, norms, and culture can dampen morale and hinder the infusion of innovation within organizations (Awardco, 2023). When diversity is not effectively managed, it can lead to decreased employee morale, increased turnover, and communication problems (Ali et al., 2021). For instance, communication barriers stemming from language differences and cultural misunderstandings are common in diverse teams, potentially leading to conflicts and reduced collaboration (Ahmed & Wahab, 2021).





These challenges underscore the importance of investigating the impact of workforce diversity on innovation performance. Understanding and addressing the complexities of diversity can help organizations harness its potential benefits, such as enhanced creativity and problem-solving capabilities, while mitigating its drawbacks (Ismail et al., 2021). Steel plays a critical role in the UAE's economic development, particularly in the oil and gas sector, construction, and infrastructure projects (World Steel Association, 2023). The country's demand for steel has grown significantly, fuelled by large-scale development initiatives under the UAE Vision 2030 and major energy sector investments. According to the UAE Ministry of Energy and Infrastructure, annual steel demand has exceeded 10 million metric tonnes, while domestic production capacity stands at approximately 3.5 million tonnes per annum (Emirates Steel, 2024). This supply-demand gap underscores the strategic importance of enhancing local steel manufacturing capabilities, not only in terms of production but also innovation performance driven by a diverse and capable workforce.

Although innovation could be interpreted broadly, either in terms of new product development or managerial transformation, workforce diversity is one of the UAE resources which could be exploited to increase innovation performance of steel industry. However, many previous studies which investigated the effect of workforce diversity on innovation performance used narrow definition of workforce diversity. For example, Chaarani et al. (2022), Hair et al. (2019), Moreno et al. (2018), Chaarani and Raimi (2022), Xie et al. (2020), and Sung and Choi (2019) measured workforce diversity based on gender and age of the employees only. Apart from this, innovation performance has been affected by the work diversity categorization such as age, gender, education, religious, ethnicity, language, values as well as norms. These categorizations





have contributed negatively to innovation performance which in turn steel production in UAE. This is why Merin (2022) expressed that work diversity is the success and core determinant of organizational performance like steel manufacturers. Tomasoni et al. (2024) submitted that injection of innovation into organization must be given top priority by the players in the sector.

The interpretation of workforce diversity has been limited to only age and gender by previous studies because of the theories underlying those studies. According to the Contingency Theory used by Sung and Choi (2019), there is no single best management method that can guarantee high organizational performance; thus, managers have to find the best fit between organizational and contextual factors to make it work. Based on that postulation, Sung and Choi (2019) verified the insignificant effect of age and gender diversity on innovation performance which otherwise could have possibly arrived at a different conclusion if workforce diversity has been defined in much broader sense. Similarly, streaming from the Social Cognitive Theory, Moreno et al. (2018) argued that specific dynamic in a diverse workforce could rise conflicts, and therefore Moreno et al. (2018) used this theory to validate the negative effect of gender diversity as a source of conflict that affected innovation performance. In contrast, this study adopted the cognitive diversity theory. Based on this theory, workforce diversity that incorporated the broader concept of gender, age, education, religion, ethnicity, language, values and norms diversity, is considered as a source of advantage that could positively results in better innovation performance because team members contribute unique cognitive attributes based on their experiences stemming from their diverse backgrounds.



Furthermore, many prior studies (e.g., Malhotra et al., 2023; Zouagi et al., 2020; Xie et al., 2020; Nigatu & Tensay, 2021; Chaarani et al., 2022; Han et al., 2022; Horbach & Jacob, 2018; Moreno et al., 2018; Ostergaard et al., 2012) focused exclusively on the effect of workforce diversity on innovation performance, without considering other factors that could have a moderating effect on this relationship. Accordingly, this study expanded the current knowledge by introducing the moderating effect of risk orientation in the relationship between workforce diversity and innovation performance. This is because, despite the opportunity to combine different perspectives and approaches for greater creativity and adaptability through workforce diversity (Chow, 2018), innovation itself is a risky endeavour (Nawrocki & Jonek-Kowalska, 2022).



Moreover, there are just a few empirical studies measuring the impact of workforce diversity on innovation performance in the UAE and no attempt on the Emirate steel manufacturers (e.g., AL jebri, 2017; Busaibe, Singh, Ahmad, & Gaur, 2017; Iren & Tee, 2017, 2018; Issa, 2015; Lutfi, 2011; Ahmad et al., (2017). Previous studies have been conducted mostly in Europe (Zouaghi et al., 2020; Horbach & Jacob, 2018; Ozgen et al., 2014; Ostergaard et al., 2011), Korea (Han et al., 2021; Sung & Choi, 2021; Bae & Han, 2019), China (Xie et al., 2020; Dai et al., 2019), Taiwan (Li & Huang, 2019), Singapore (Subramaniam et al., 2016), and Canada, Germany and USA (Elia et al., 2019). Accordingly, the current understanding of workforce diversity in a highly diverse workforce in UAE is still limited.

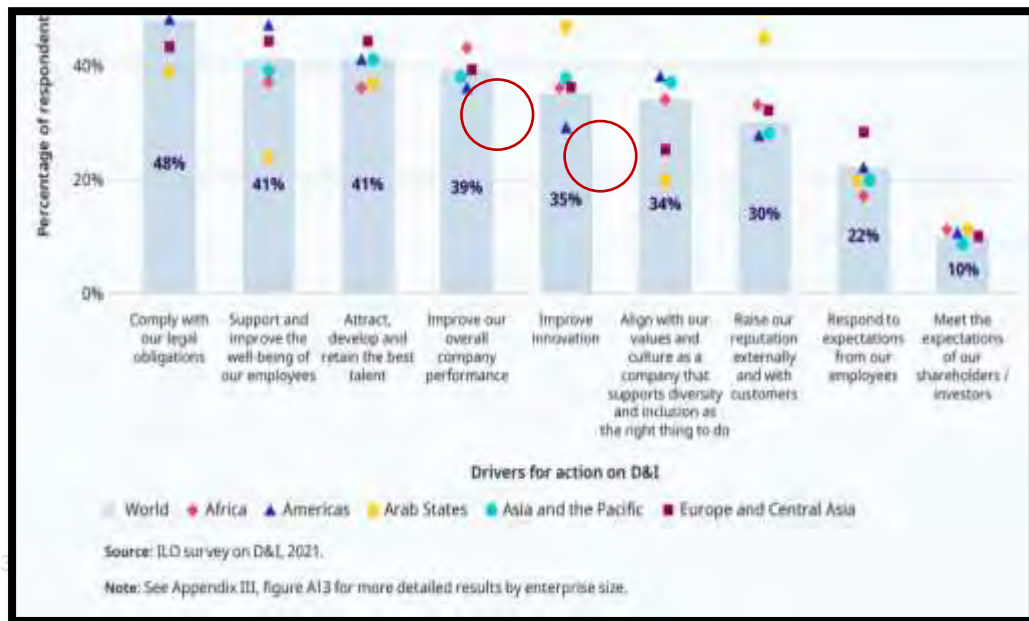
Based on Figure 1.3, although employees from other regions have different view about the benefits they gained from workforce diversity, employees in from Arab States



including UAE believed that workforce diversity is the main driver to achieve overall company performance and improve innovation.

Figure 1.3

Drivers for action on diversity and innovation



Source: ILO survey on D &I,2021

In terms of the economic sector, UAE policy encourages companies to have 50% women employees by 2025 and recruiting from all cultures and backgrounds (UAE, 2021). Thus, most companies have achieved the 20% higher representation of women on board and met equality standards in selection of workers, but records of workforce diversity for steel manufacturers in UAE cannot be traced. Most prior research involved multi sectors without focusing on steel industry, such as Horbach and Jacob (2018), Zouaghi et al. (2020), Xie et al. (2020) and Bae and Han (2019). Therefore, existing literature has been limited to general conclusion about the effect of workforce diversity on innovation performance derived from multi sectors, although



special attention should be given to improve innovative performance of steel industry in UAE. As explained previously, steel industry in UAE plays a significant role to support overall UAE development through oil extraction activities and construction projects.

Based on arguments presented above, a systematic investigation should be conducted to determine the impact of workforce diversity on innovation performance. Apparently, the definition of workforce diversity should be revisited especially in this era of globalization which stimulated the diaspora of talents from other parts of the world to UAE. As a result to the rising workforce diversity in UAE, innovation performance is now an intricate matter that demands better understanding in order to be enhanced. This diverse workforce comes together with certain risk orientation rooting from unique backgrounds of each employee that is yet to be explored and understood. Therefore, this study aims to examine the impact of workforce diversity on innovative performance, and the moderating effect of risk orientation in this relationship especially in among the Emirate steel manufacturers.

1.4 Research Objectives

RO1: To examine the relationship between workforce diversity (gender diversity, age diversity, education diversity, religion diversity, ethnicity, language, values and norms) and innovation performance among Emirates Steel Manufacturers in the UAE.





RO2: To examine the moderating effect of risk orientation on the relationship between workforce diversity and innovation performance among Emirates Steel Manufacturers in the UAE.

1.5 Research Questions

Accordingly, the following research questions were proposed:

RQ1: Does workforce diversity (gender diversity, age diversity, education diversity, religion diversity, ethnicity, language, values and norms) have a significant relationship with innovation performance among Emirates Steel manufacturers in the UAE?

RQ2: Does risk orientation significantly moderate the relationship between workforce diversity and innovation performance among Emirates steel manufacturers in the UAE?

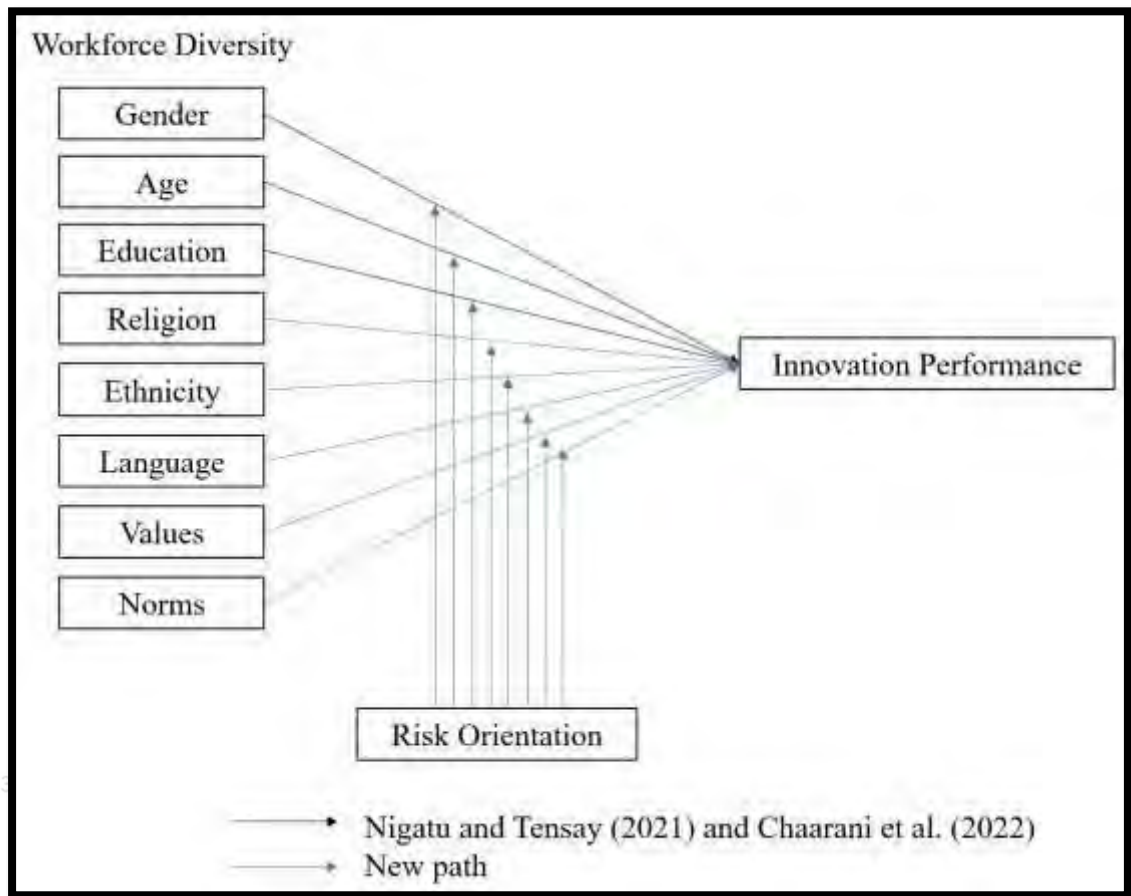
1.6 Conceptual Framework

The conceptual framework in Figure 1.3 explains that innovation performance depends heavily on the ability of managing workforce diversity.



Figure 1.4

Conceptual framework



The conceptual framework for this study builds upon the works of Nigatu and Tensay (2021) and Chaarani et al. (2022). Nigatu and Tensay (2021) examined the innovation performance of telecommunication companies and identified age, education, and gender as significant predictors. In contrast, Chaarani et al. (2022) investigated multiple sectors in Lebanon and confirmed a significant relationship between gender and innovation performance.

While previous studies have operationalized workforce diversity primarily in terms of age, gender, and education (Nigatu & Tensay, 2021; Chaarani et al., 2022), this study adopts a broader definition. It argues that workforce diversity should also encompass religion, ethnicity, language, values, and norms. Accordingly, this research extends the earlier frameworks by reconceptualising workforce diversity to include gender diversity, age diversity, education diversity, religious diversity, ethnic diversity, linguistic diversity, and diversity in values and norms, as illustrated in Figure 1.3.

The Resource-Based View (RBV) posits that organisations achieve sustainable competitive advantage by leveraging valuable, rare, inimitable, and non-substitutable resources (Barney, 1991). Workforce diversity, encompassing differences in gender, age, education, religion, ethnicity, language, values, and norms, constitutes such a strategic resource because it provides a broad spectrum of perspectives, knowledge bases, and problem-solving approaches. When effectively managed, this diversity fosters creativity, facilitates knowledge recombination, and enhances an organisation's capacity to generate innovative solutions, ultimately improving innovation performance (Cox & Blake, 1991; Richard et al., 2004).

However, the translation of diversity into innovation outcomes is not automatic; it is influenced by managerial orientations and decision-making styles. The Upper Echelons Theory (UET) (Hambrick & Mason, 1984) asserts that organisational outcomes reflect the characteristics, values, and cognitive bases of top executives. Risk orientation, a leader's propensity to take strategic risks under uncertainty serves as a critical behavioural lens through which diversity-related inputs are interpreted and acted upon. Leaders with high risk orientation are more inclined to encourage



experimentation, support unconventional ideas, and allocate resources toward untested initiatives, enabling diverse perspectives to be transformed into novel products, processes, or services. Conversely, leaders with low risk orientation may favour incremental improvements and risk-averse strategies, thereby constraining the innovation potential embedded within a diverse workforce.

In this study, RBV provides the foundation for understanding the direct link between workforce diversity and innovation performance, while UET offers the explanatory basis for the moderating role of risk orientation. Together, these perspectives highlight that diversity is a strategic asset, but its impact on innovation performance depends significantly on the risk-taking disposition of decision-makers.

In addition, this study also introduces risk orientation as a moderating variable in the relationship between workforce diversity and innovation performance. Innovation is associated with the need to face new challenges; therefore, it is reasonable to understand that innovation is a risky activity because the new challenge that needs to be solved is associated with uncertainty (Nawrocki & Jonek-Kowalska, 2022). In support, Azizah et al. (2023) also confirmed that risk orientation has a positive effect in building an innovative culture. This shows that managers who are more prepared to accept higher risks, will be more innovative than managers who are not prepared. Therefore, this study aims to verify this relationship.

In a diversified workplace, managers come from different backgrounds presented by different values, norms, (Hofstede, 1980), ethnicity (Beyers, 2017) and religion (Platovnjak, 2017). Such differences result in either high uncertainty avoidance



culture or low uncertainty avoidance culture (Hofstede, 1980). Therefore, although workforce diversity helps stimulate more idea generation as proposed by the Cognitive Diversity Theory (Chow et al, 2018), it could also moderate innovation performance due to differences in one's risk orientation, either high or low uncertainty avoidance culture.

Overall, the proposed conceptual framework shows the relationship between workforce diversity (gender, age, education, religion, ethnicity, language, values, norms) and innovation performance. Based on the Cognitive Diversity Theory, this study postulates that higher workforce diversity will increase innovation performance. Additionally, this study also predicts that risk orientation (risk avoidance or risk acceptance) will moderate the effect of workforce diversity on innovation performance.

In other words, although more creative ideas could be obtained from diverse employees' backgrounds, innovation performance is still subject to how much risk could be accepted by the diverse group of employees.

1.7 Research Hypothesis

Based on the above-mentioned research objectives, the following are the research hypothesis.

H1: Workforce diversity positively impacts innovation performance among Emirates steel manufacturers in UAE.

H1a: Religious diversity has a positive significant relationship with innovation performance among Emirates Steel manufacturers.



H1b: Ethnicity diversity has a positive significant relationship with innovation performance among Emirates Steel manufacturers.

H1c: Language diversity has a positive significant relationship with innovation performance among Emirates Steel manufacturers.

H1d: Age diversity has a positive significant relationship with innovation performance among Emirates Steel manufacturers.

H1e: Educational diversity has a positive significant relationship with innovation performance among Emirates Steel manufacturers.



H1f: Values diversity has a positive significant relationship with innovation performance among Emirates Steel manufacturers.

H1g: Norms diversity has a positive significant relationship with innovation performance among Emirates Steel manufacturers.

H1h: Gender diversity has a positive significant relationship with innovation performance among Emirates Steel manufacturers.

H2: Risk orientation positively moderates the relationship between workforce diversity constructs and innovation performance among Emirates Steel manufacturers.





1.8 Significance of the Study

This study offers a timely and significant contribution to the understanding of how workforce diversity influences innovation performance, particularly within the context of the Emirates steel manufacturing sector. Despite the UAE's heavy investment in innovation, steel production remains relatively stagnant—recording only 3.0 Mt in 2021, 3.2 Mt in 2022, and 3.2 Mt in 2023 (World Steel Association, 2023). The shortfall has necessitated increased steel imports, signalling inefficiencies in the UAE's innovation outputs (World Intellectual Property Organization, 2023; 2024). This study addresses this challenge by exploring how a diverse workforce when effectively managed can drive innovation and boost domestic steel production to meet national infrastructure demands.



From a theoretical standpoint, this research contributes to the literature by advancing the Cognitive Diversity Theory and applying the Network Model. Unlike prior studies that often treated diversity as a source of conflict (Nigatu & Tensay, 2021; Sung & Choi, 2019; Moreno et al., 2018), this study frames workforce diversity as a strategic asset that can enhance innovative capacity. The Network Model further supports this by illustrating how diversity facilitates information flow, idea exchange, and collaborative problem-solving across teams—especially relevant in large-scale manufacturing settings. The application of multivariate statistical techniques, such as Independent Component Analysis, helps reveal both distributed and localized cognitive mechanisms underpinning innovative performance.





Furthermore, while diversity has been widely studied, there is limited research on its direct impact on innovation, especially in the UAE (Ostergaard et al., 2012). Most existing studies focus on its relationship with leadership, motivation, or general performance (Al-Jenaibi, 2017; Greenberg, 2004; Gottardello, 2019). By specifically targeting the steel manufacturing sector in the UAE, this study fills a critical research gap and provides localized insights into the diversity–innovation nexus.

In addition, while many prior studies explored diversity using only surface-level dimensions such as age and gender (Chaarani et al., 2022; Han et al., 2021; Xie et al., 2020; Sung & Choi, 2019), this research adopts a more holistic approach. It reconceptualizes workforce diversity to include age, gender, education, religion, ethnicity, language, values, and norms. This broader framework allows for a more comprehensive understanding of how diverse perspectives contribute to innovation. Excluding such dimensions risks overlooking significant factors that influence organizational creativity and adaptability (Yadav & Lenka, 2020; Roberson, 2019; Morfaki & Morfaki, 2022).

Practically, the study proposes a robust framework that can serve as a strategic guide for managers in the UAE. It identifies actionable measures to harness workforce diversity and promote innovation, aligning with national efforts to diversify talent and enhance competitiveness. It also complements UAE's policy initiatives, such as increasing women's participation in the workforce and promoting multiculturalism (UAE, 2021).





Importantly, this study introduces risk orientation as a moderating variable, an aspect largely neglected in prior diversity–innovation studies. While some researchers have explored knowledge management as a mediator (e.g., Chow, 2018), few have addressed how an organization’s risk tolerance can amplify or inhibit the benefits of diversity. Since innovation inherently involves uncertainty (Nawrocki & Jonek-Kowalska, 2022), risk orientation plays a pivotal role in enabling teams to explore novel ideas and challenge conventional norms.

Despite efforts to promote diversity, many steel manufacturers in the UAE still lack documented strategies or frameworks for managing diversity effectively. Prior research often grouped diverse industries together, without examining sector-specific challenges in innovation (e.g., Horbach & Jacob, 2018; Bae & Han, 2019). By focusing on the steel sector, this study delivers tailored insights relevant to a critical industry in the UAE economy.

Finally, this research responds to calls from scholars such as Østergaard and Timmermans (2023), who highlighted the need to move beyond merely identifying empirical links between diversity and innovation. Instead, this study dissects the underlying mechanisms—particularly the role of cognitive processes and risk orientation—to offer deeper, theory-driven insights. It lays the groundwork for evidence-based practices and policy recommendations aimed at unlocking the innovation potential of a truly diverse workforce.





1.9 Operational Definitions

- **Steel manufacturers:** Steel manufacturers are companies that spend continuously and substantially in processing, engineering, and information technology expansions. They produce straight length reinforcing bar (rebar) and rebar in coil, wire rod, hot rolled structural steel parts, such as pillars, columns, and sheet piles, direct reduced iron, and steel billets. Furthermore, they manufacture coil with thicknesses ranging from 1 millimetre to 25 millimetres and widths ranging from 1 meter to 2 meters, complementing the current steel commodity line manufactured in the UAE (Emirates Steel, 2024). The goods are sold and consumed in number of cities in UAE and exported to other parts of the world.



- **Innovation performance:** Innovation performance refers to the process that gives value addition as well as certain novelty to the customers, suppliers and organizations to develop services, products and procedure in order to ascertain new marketing ways. It involves conceptualizing and processing novel ideas that generate commercial values in the form of new products. Within the purview of business practices, innovations have an end goal of servicing customers' expectations in new ways (Jackson et al., 2013). In this study, innovation performance refers to the capability of Emirates Steel Manufacturers to develop and introduce new products, processes, or services. It is measured through a questionnaire assessing the speed of new product launches, uniqueness, number of new products, sales revenue, profits, idea generation, product improvement opportunities, innovation levels compared to competitors,





creativity rewards, removal of innovation obstacles, acceptance of employee proposals, support for innovative ideas, new development methods, and clear innovation policies.

- Workforce diversity:** Workforce diversity refers to the collective mixture of employees' differences and similarities (including individual characteristics, values, beliefs, experiences, backgrounds, preferences and behaviours). Workforce diversity is a broad range of variations influencing the interaction and actions of the people to achieve business goals (Ben-Amar, Cheng and McKenny, 2017). In this study, workforce diversity refers to the range of demographic and cultural characteristics among employees at Emirates Steel Manufacturers, including gender, age, education, religion, ethnicity, language, values, and norms. There is no universal acceptable dimensions or classification of work diversity but scholars used different dimensions to measure work diversity but based on the context of their study. Mohammad and Anders (2017) used ethnicity and education only; Taylor, (2011) used six dimensions; Kerga and Asefa (2018) used six dimensions; Krithi and Pai (2021) used more than six dimensions while Tjimuku and Atiku (2024) used five dimensions. It is based on this rationale, researcher borrowed the ideas from the mentioned studies to construct conceptual framework, objectives, questions and hypotheses for this current study.
- Age diversity:** Age diversity is basically the generation diversity, i.e., if the team members are of different age groups, they will have multiple level of skill sets and experiences. Different age groups will have different perceptions. For



the successful innovation performance, age diversity plays a significant role (Andrusiv et al., 2020; Sung & Choi, 2019). Age diversity refers to the inclusion and equitable treatment of employees from various age groups within the organization. It is measured by equal opportunities for training and career development for all age groups, inclusive problem-solving practices, potential conflicts due to age differences, and the presence of age diversity in the workplace.

- **Gender diversity:** Gender diversity refers to the workforce that comprise of male and female employees. It is the just or fair distribution of different genders in a group of people that work together. At work place the gender diversity positively contributes towards the performance of the organization (Kato & Kodama, 2017). Gender diversity refers to the equitable treatment and inclusion of both male and female employees within the organization. It is measured by non-discriminatory innovation practices, efforts to attract and hire women, fair treatment regardless of gender, growth opportunities for women, encouragement of career development for women, training and development programs meeting gender criteria, and gender diversity in decision-making.
- **Educational diversity:** Educational diversity within the workforce refers to a workgroup comprising individuals with varying levels of education and skills. This study divides education diversity into five categories; (1) secondary school, (2) diploma, (3) bachelors, (4) masters, and (5) Ph.D. Sartore (2020) stated that much educational diversity affects individual outcomes such as the ability to work together. Each level of education produces workforce with



different skill sets; thus, combining employees with variety of knowledge and skills is expected to boost innovative performance. Education diversity pertains to the variety of educational backgrounds among employees and their equitable treatment within the organization. It is measured by the organization's recruitment practices based on education, opportunities for employees with lower qualifications, prevention of conflict due to educational differences, the impact of education on confidence, inclusive decision-making, and equal treatment regarding educational diversity.

- **Religious diversity:** Religious diversity in this study refers to group of people who embrace different religious beliefs. Common religions in the world are Islam, Christianity, Buddhism, and Hinduism. Religious diversity not only strengthen human relationships but can also improve the retention of employees (Miller, 2023). Religious diversity in this study refers to the inclusion and equitable treatment of employees from various religious backgrounds within Emirates Steel Manufacturers. It is measured through items assessing the organization's efforts to attract and hire individuals from different religions, provide growth opportunities regardless of religion, address employees' religious needs, ensure participation in decision-making, and maintain a religiously diverse workplace.
- **Ethnic diversity:** Ethnic diversity refers to *the coexistence of people from various racial and cultural backgrounds differing in skin colour*, beliefs, customs and practices (Catherine, 2015). In this study, ethnic diversity means work team having diverse ethnic backgrounds. This type of diversity can affect



the psychological wellbeing of the people (Enchautegui-de-Jesús, Hughes, Johnston, & Oh, 2006). Ethnicity diversity refers to the representation and fair treatment of employees from different ethnic backgrounds within the organization. It is measured by the organization's ability to attract and hire minorities, provide equitable growth opportunities, address self-esteem issues related to ethnicity, prevent conflict due to ethnic differences, ensure inclusive decision-making, and maintain ethnic diversity in the workplace.

- **Language diversity:** Language diversity, referring to Yanaprasart (2016) means the differences between different languages and the ways that people communicate with each other. In this study language study means the ability of people with different languages working together to effectively communicate (Yanaprasart, 2016). In this study, language diversity will be measured on grounds of Arabic and English language mode of communication. Language diversity in this study pertains to the presence and inclusion of employees speaking different languages within the organization. It is assessed through the absence of communication problems due to language differences, inclusive problem-solving practices, the presence of language diversity, and the impact of language diversity on innovative performance and unity.
- **Values diversity:** Values diversity are the beliefs with which the society agree and approves, it defines the priorities and thinking patterns of the individuals (White, 2018). When members of Emirates steel manufacturers do to acknowledge the benefits of their differences and similarities then there is value diversity. They intentionally work to build sustainable relationships among



people and institutions with diverse membership. Therefore, values diversity at work place refers to the existence of group having multiple values (Lopez-Rocha, 2006). Values diversity in this study refers to the inclusion and fair treatment of employees with different personal values within the organization. It is assessed through the organization's concern for employees' values, fair treatment regardless of values, positivity about values diversity, the impact of value diversity on innovation, and the attraction of innovative practices due to organizational values.

- **Norms diversity:** Norms diversity based on Yee and Davidson (2021) defined as the most important factor that guides the individual behavior. Norms diversity at work place refers to the existence of work team having diverse behavior, moving in multiple dimensions and promoting innovative environment (Linnehan, Chrobot-Mason & Konrad, 2006). Norms refer to the established standards and behaviors within the organization. It is measured by the organization's commitment to standard norms, active listening and openness to suggestions, open-mindedness, reliance on successful norms from past experiences, the breakdown of norms into behaviors, dignified and respectful treatment among members, and a system of mutual accountability.
- **Risk Orientation:** Risk Orientation involves a measure of the inherent risk a person is likely to accept. DiVito and Bohnsack (2017) view risk orientation as one way entrepreneur's maneuver. The risk orientation process affects one's approach to decision-making, change, conflict and just about any situation faced at work. Risk orientation refers to the organization's attitude towards taking





risks in the pursuit of innovation. It is measured by the presence of an innovative management team, the manager's confidence and ability to bear personal loss from innovation failures, willingness to undertake actions that competitors avoid, and the belief that the company can withstand losses from innovation failures.

1.10 Scope of the Study

The scope of this study involves only three key variables (workforce diversity, innovation performance and risk orientation). Workforce diversity is measured based on age, gender, education, religion, ethnic, language, values and norms; thus, do not cover any other measures of diversity. Innovation performance, in this study, refers broadly to organisational innovation activities relevant to the UAE steel industry context. Although the construct includes aspects such as process improvements, production methods, and technological innovation, the operationalisation primarily emphasises new product development (NPD) due to its measurability and relevance within participating firms. Other innovation types, such as green innovation or marketing innovation, were not explicitly measured.

Geographically, the research investigated was conducted in UAE only particularly the steel manufactures in UAE. Hence, the findings of this study do not include responses from other countries of other sectors contributing to UAE economy. In terms of the method, this study applied PLS-SEM, which is an established quantitative data analysis used to measure the impact of independent variables on a





dependent variable. On that note, this study provided statistical results that validated the proposed workforce diversity and innovation performance model.

1.11 Research Structure

This study is organized into five chapters, each structured as follows:

- **Chapter One: Introduction**

This chapter provides an overview of the study, including the research background, problem statement, research objectives, research questions, conceptual framework, hypotheses, scope, and significance of the study.

- **Chapter Two: Literature Review**

This chapter discusses the theoretical foundation of the study and reviews relevant literature on workforce diversity, innovation performance, and risk orientation. It also outlines the development of the research hypotheses.

- **Chapter Three: Research Methodology**

This chapter details the research design and methodology, including the procedures and phases of data collection and analysis.

- **Chapter Four: Results and Discussion**

This chapter presents the findings of the study and provides a discussion of the analysed results in relation to the research objectives and hypotheses.





- **Chapter Five: Conclusion and Contributions**

The final chapter summarizes the key findings, highlights the contributions of the research, and discusses its limitations. It also offers recommendations for future studies and practical implications.

1.12 Chapter Summary

Chapter one of this study has given the research overview where the study background, the problem statement, research objectives and questions are discussed. Also, it presents the research framework, hypothesis, research contribution, scope and a summary of the research structure.

