The Impacts of Diversification Strategy on the Financial Performance of Insurers

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Abstract

The thesis examines the impacts of diversification strategy on the financial performance of firms in the insurance industry. It investigates the impacts of different dimensions of the diversification strategy, including product, geographic, staff, and technological diversification, on insurers' financial performance while considering some essential control variables such as type, size, age, and ownership structure of the companies. The research measures financial performance with the return on equity (ROE) and the return on assets (ROA).

The thesis employs the mixed methods research methodology using qualitative and quantitative data collected from Iranian insurance companies, while the data is analysed quantitatively. Two separate studies are conducted to evaluate the impacts of different dimensions of diversification strategy on firms' financial performance. Specifically, ***the first study*** focuses on the impact of technological diversification strategy on a firm's financial performance. This study uses the primary data associated with technological diversification through a questionnaire survey with managers from 31 Iranian insurance companies, as the data for technological diversification is not available as secondary data. The data associated with firms' financial performance is collected from reports annually published by the Central Insurance of Iran. Employing the Structural Equation Modelling method enabled by Smart PLS 3 software to analyse the primary data, the study reports mixed effects of technological diversification on the financial performance of Iranian insurers. ***The second study*** focuses on investigating the impacts of product, geographic and staff diversification strategies on the financial performance of Iranian insurers. This study employs secondary data collected from the annual reports of the Central Insurance of Iran (from 2011 to 2020). Using econometric techniques for panel data (e.g., fixed effects) enabled by EViews 10 software, the study finds some

significant impacts of different dimensions of diversification strategy on the financial performance of Iranian insurers.

This thesis is novel in several ways. First, it uses new measurement methods for different dimensions of the diversification strategy, specifically for product diversification and technological diversification. Second, this is the first study in diversification-firms' financial performance literature that combines all four dimensions in a single study. Third, this research benefits from different theoretical perspectives to synthesise the literature and interpret the findings. Therefore, the thesis is not bound or biased to any single theoretical lens. Finally, it provides robust and comprehensive findings for both researchers and practitioners in the insurance industry.

I hereby declare that:

1. I have not been enrolled for another award of the University, or other academic or professional organisation, whilst undertaking my research degree.

2. None of the material contained in the thesis has been used in any other submission for an academic award.

3. I am aware of and understand the University's policy on plagiarism and certify that this thesis is my own work. The use of all published or other sources of material consulted have been properly and fully acknowledged.

4. The work undertaken towards the thesis has been conducted in accordance with the SHU Principles of Integrity in Research and the SHU Research Ethics Policy.

5. The word count of the thesis is 60973 words.

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LIST OF ABBREVIATIONS

AVE: Average Variance Extracted

BI: Business Interruption

CAR: Contractors All Risk

CEO: Chief Executive Officer

CFA: Confirmatory Factor Analysis

CII: Central Insurance of Iran

CR: Composite Reliability

CV: Cross-Validated

EAR: Erection All Risk

EBIT: Earnings Before Interest and Taxes

EBITDA: Earnings Before Interest, Tax, Depreciation and Amortization

EFA: Exploratory Factor Analysis

EPS: Earnings Per Share

EPSGR: Earnings Per Share Growth Rate

EVA: Economic Value Added

GD: Geographic Diversification

GDP: Gross Domestic Product

GOF: Goodness of Fit

GS: Growth in Sales

HHI: Herfindahl Hirschman Index

IPR: Insurance Penetration Rate

IT: Information Technology

KS: Kolmogorov Smirnov

LP: Labour Productivity

MENA: Middle East and North Africa

MPT: Modern Portfolio Theory

MVA: Market Value Added

OLS: Ordinary Least Square

P&I: Protection and Indemnity

PD: Product Diversification

PLS: Partial Least Square

R&D: Research and Development

RAROA: Risk-Adjusted Return on Assets

RBV: Resource-Based View

RTD: Related Technological Diversification

ROA: Return on Assets

ROCE: Return on Capital Employed

ROE: Return on Equity

ROI: Return on Investment

ROS: Return on Sale

SD: Staff Diversification

SEM: Structural Equation Modelling

SGR: Sales Growth Rate

SIC: Standard Industrial Classification

TPL: Third-Party Liability

TSR: Total Shareholder Return

UAE: United Arab Emirates

UTD: Unrelated Technological Diversification

VIF: Variance Inflation Factor

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CHAPTER 1: OVERVIEW OF THE DBA THESIS

1.1. INTRODUCTION

This DBA thesis examines the effects of different diversification strategies on the financial performance of insurance firms in Iran. Diversification is one of the important corporate strategies used for growth and expansion by firms (Oladimeji and Udosen 2019, Capar and Kotabe 2003, Ansoff 1957). The research on how various diversification strategies affect firms' financial performance has been an attractive topic in strategic management, international business, economics and finance disciplines for several decades (Tanui and Serebemuom 2021, Aivazian et al. 2019, Peng et al. 2017, Ibrahim and Kaka 2007, Grant et al. 1988). Accordingly, there are different definitions of diversification strategy in business and management literature. In the strategic management context, which is the central theme of this study, diversification refers to how firms deal with new markets, products, geographic areas or technologies (Lee 2021, Kanodia 2020, Naglic et al. 2020, Jiao et al. 2020). In addition, it includes goals, directions and means by which it can be accomplished (Van Kranenburg et al., 2004).

Although there is a substantial body of research that investigates the relationship between diversification and firms' financial performance, the literature has not reached a consensus on the merits of such corporate strategy (Cahyo et al. 2021, Alhassan and Biekpe 2018, Zahavi and Lavie 2013, Elango et al. 2008, Pandya and Roa 1998, Clark and Speaker 1994, Dubofsky and Varadarajan 1987, Bettis 1981). This strategy has been referred to as the diversification puzzle in the literature and is yet to be resolved for both academics and business practitioners (Mushtaq Hussain Khan et al. 2016, Heathcote and Perri 2013, Statman 2004). While some studies highlighted the financial benefits of diversification strategies for firms (Schommer et al. 2019, Bhatia and Thakur 2018, Pandya and Rao 1998, Lang and Stulz 1994), others have criticized different forms and dimensions of these strategies (Peng and Lian 2020, Duho et al. 2019, Morris et al. 2017, Manyuru et al. 2017, Kim and Mathur 2008, Wan 1998). Some scholars have even used the term "di-worsification" (Hobson 2019, Lhabitant and Vicin 2004, Franco 2004) to refer to the situation where this strategy exacerbates firms' financial performance. Therefore, it is imperative to conduct further study on the impacts of diversification strategy on a firm's financial performance.

1.2. MOTIVATION AND SIGNIFICANCE OF THE STUDY

Diversification strategy deals with a wide range of activities, varying from diversifying across new products, new geographical areas (which can be either domestic or international), new technologies and also diversification of employees (Giarratana et al. 2021, Arday 2021, Tsai et al. 2020, Pan et al. 2019, Triguero-Sanchez et al. 2018, Krivokapic et al. 2017, Chen and Yang 2013, Foong and Idris 2012). While scholars (including the researchers mentioned above) have focused on one or two of these dimensions simultaneously in their studies, this thesis intends to examine corporate diversification from four dimensions, i.e., product, geographic, technological and staff diversification, to understand the impacts of these different strategies on the financial performance of firms in the insurance industry of Iran. Apart from the multi-dimensionality of the concept in terms of definitions and dimensions, success or failure of diversification in firms is highly dependent on the research contexts, disciplines, variables, methodologies and assumptions used by different researchers (Le 2019, Dhir and Dhir 2015, Purkayastha 2013, Datta et al. 1991, Hoskisson and Hitt 1990). It should be noted that various diversification strategies and their impacts on insurers' financial performance have been considered by insurance researchers as well (Denaro et al. 2020, Ai et al. 2018, Morris et al. 2017, Cole and Karl 2016, Berry-Stolzle et al. 2012, Elango et al. 2008, Liebenberg, and Sommer 2008, Li and Greenwood 2004), while the results of these studies were mixed.

It is worth mentioning that the motivations for this DBA research arise from not only the literature gaps but also the need for the real-world business that the author observed from a perspective of a practitioner in the insurance industry. Before starting doctoral studies in the UK, the author of this thesis used to work in the insurance industry for about ten years and witnessed that diversification and focus strategies were among the most critical and daily challenges of practitioners in the industry. The reason for the significance of diversification decisions for insurers is that they have to decide whether to accept or reject new risks in their operations which are linked to different aspects of diversification strategy (for example, product diversification or geographic diversification). In other words, as new risks appear due to technological, legal or biological reasons (which have not existed before), insurance companies have to decide on whether to absorb new risks or not.

On the one hand, no comprehensive study has been conducted in the insurance industry to clarify whether insurers benefit financially from all the above-mentioned dimensions of diversification or not. Having been employed in several insurance companies and different lines of business (such as liability, engineering and fire insurance departments), the author witnessed that even middle-level managers who were legally allowed to diversify decide about the diversification strategy according to their personal judgments, preferences or risk appetites, not based on scientifically solid conclusions. In addition, many of the top-level management teams follow their own interests while dealing with diversification decisions. The behaviour of top-level managers can be justifiable by the principal-agent view (agency) theory studied by many researchers in the diversification field (Lin and Kim 2020, Sener and Akben-Selcuk 2020, Dagnino et al. 2019, Alsmairat et al. 2018, Nguyen 2018). Based on the principal-agent theory, the benefits of diversification strategy will be collected by agents (managers), while shareholders are negatively affected by such decisions. Therefore, managers are most interested in and benefit from diversifying their companies in order to increase their power, make themselves wealthier and decrease the risk of their own unemployment (Volkov and Smith 2015, Aggarwal and Samwick 2003).

In addition, the PwC report (2015) reveals that new insurance products, product development, social change, risk management and natural hazards were among the top 10 risks in the insurance market, which can be collectively attributed to diversification strategy. For example, many catastrophic events such as earthquakes, floods, storms or volcanos regularly take place in different parts of the world, which impose huge amounts of loss upon governments, citizens and insurance companies as a result of one single incident. For example, the Christchurch earthquake in 2011 cost 15 per cent of New Zealand's GDP (Vucetich et al., 2014). In such cases, are diversified insurers more successful than their focused rivals? The answer to this question can be partially provided by examining how geographic dispersion and product diversification affect the financial performance of firms.

Similar to other financial services such as banks and securities, supervision of insurance activities is critical in any economy (Bach et al. 2021, Elderfield 2009, Schiro 2006). Government supervision exists in almost any insurance industry, including economies that follow the free market system to prevent market failures, although the degree of government supervision and intervention differs from one country to another (Askari Firouzjaei et al. 2020, Amin Tahmasbi and Shariatmadari 2018, Samadi and

Mohammadzade 2018). Accordingly, insurance laws and regulations in specific territories can sometimes restrict insurers to operate diversely or being more focused. Hence, insurers may sometimes be obliged to adopt specific strategies which are mandatory by laws and regulations rather than of their own choice. More specifically, this problem is strengthened in Iran's insurance context, as a highly regulated market. The Central Insurance of Iran (CII) is the regulatory and supervisory body of all commercial insurance lines, including direct insurance, reinsurance and protection and indemnity (P&I) clubs. Besides, "Iran's insurance supreme council", which operates as a division of the CII, ratifies different insurance laws and regulations (Karimi, 2008, page 20) to control commercial insurance operations in the country. These activities include (but are not limited to) identifying maximum and minimum permitted premium rates, determining types of insurance products sold in the market, issuance of business permits for insurance companies and brokers, and supervision of insurers on behalf of the government.

Also, there are other examples of anti-competitive rules in the insurance industry of Iran, which may affect the diversification strategies of insurers. For example, international insurers are not allowed to operate in the market unless authorized by both central insurance and the board of ministers of Iran. This problem can affect different dimensions of the diversification strategy, such as product and geographic diversification since the process of such authorization is legally complicated and time-consuming in Iran as the country has a very low level of economic freedom [1]. In addition, new insurance products which have not yet been sold in the market should be submitted to the CII first, and if authorized, the proposing insurance company can accept related risks in that new field. This bureaucratic process may lead insurers and customers to withdraw their requests that negatively affect insurance product diversity.

Moreover, based on the current regulations, Iranian insurers are allowed to operate either in the mainland or the economic free zones. Therefore, it is not possible for an insurance firm that is licenced to operate in a specific geographic area to accept risks outside that region, which contradicts the geographic diversification concept.

[1] According to this classification, the economic freedom indicators are divided into four groups: (1) Rule of law, (2) Government size, (3) Regulatory efficiency and (4) Open markets. Among these four indicators, business freedom as a measure of regulatory efficiency, and trade freedom as a measure of open markets have been more emphasized by the researcher in this section. Based on the global economic freedom ranking, Iran stands in the 168th rank among the 178 countries with a score of 47.2 out of 100 (Heritage report, 2021).

Furthermore, CII obliges Iranian insurers to use a unique software package for their underwriting and claim settlement operations. Therefore, the existence of such a mandatory monopoly has limited technological diversification incentives for the insurers in Iran.

The specific characteristics of the regulatory environment in Iran are aligned with the institution-based view of diversification which is focused on institutional differences between developing and developed countries (Ali et al. 2016, Zhang et al. 2015, Lee et al. 2008, Peng et al. 2005). The institution-based view suggests that the institutional frameworks that govern developing economies differ from those of developed countries. Therefore, it is not possible to generalize all diversification-related strategies for countries with different institutional frameworks (Ali et al. 2016, Zhang et al. 2015, Lee et al. 2008), which indicates the importance of this study in Iran's insurance market.

Another reason for studying the relationship between diversification and firms' financial performance in Iran's insurance industry is the contradictory results of previous studies in this field. The generalizability of the findings in diversification studies is problematic due to theoretical and methodological differences, in addition to the contextual dependencies which have been explained earlier. According to the vast amount of existing literature, eight strands can be identified on the relationship between diversification and firms' financial performance studies. *First*, a low level of diversification leads to better financial performance (Clark and Speaker 1994, Roger's 2001, Liebenberg and Sommer 2008, Shim 2011, Chen et al. 2013, Lee 2017 and Mehmood et al. 2019). *Second*, a high level of diversification leads to better financial performance (Grant et al. 1988, Meador et al. 1997, Pandya and Roa 1998, Highland and Diltz 2002, Estes 2014, Krivokapic et al. 2017, Shen et al. 2018, Lee and Kim 2020). *Third*, inconsistent and mixed relationships between diversification strategies and financial performance of firms (Elango et al. 2008, Biener et al. 2016, Kagzi and Guha 2018, Mehmood et al. 2019). *Fourth*, U-shaped relationship between diversification strategy and firms' financial performance (Mathur et al. 2001, Capar and Kotabe 2003, Thomas 2006, Ma and Elango 2008, Zahavi and Lavie 2013). *Fifth*, inverted U-shaped relationship between diversification strategy and firms' financial performance (Alhassan and Biekpe 2018, Santarelli and Tran 2016, Ali et al. 2016, Kim et al. 2016, Qian et al. 2010). *Sixth*, diversification strategy has no significant impact on firms' financial performance (Cahyo et al. 2021, Raei et al. 2015, Capar et al. 2015, Iqbal et al. 2012, Ravichandran et al. 2009). *Seventh*, related diversification (owning a number of different

business units which are all operating in similar businesses) leads to better financial performance (Oladimeji and Udosen 2019, Mehmood and Abdullah 2015, Oyedijo 2012, Bettis 1981). *Finally*, unrelated diversification (operations in various products and business lines that are not similar) leads to better financial performance (Morris et al. 2017, Chen and Yu 2012, Hoskisson 1987, Dubofsky and Varadarajan 1987).

In sum, there is no consensus in the literature on how firms are financially influenced by adapting diversification strategy. Many different interpretations of how diversification strategy is associated with firms' financial performance can be found by reviewing the literature (Lee et al. 2017, Guo and Cao 2012, Purkayastha et al. 2012). To address this literature gap, this thesis aims to examine the impacts of diversification strategies on the financial performance of Iranian insurance firms.

1.3. RESEARCH QUESTIONS AND RESEARCH OBJECTIVES

This thesis aims to examine the impact of diversification on the financial performance (ROA and ROE) of Iranian insurance companies. For this purpose, the researcher introduces four dimensions of diversification strategy: product, geographic, technological and staff diversification. Accordingly, the main research question of this thesis is formulated as below:

Research question: Does diversification strategy increase firms' financial performance, specifically in the insurance industry of Iran?

To answer the research question, the specific research objectives are set up below, using four dimensions of diversification strategy (i.e. product, geographic, staff and technological diversification) and two dimensions of firms' financial performance (i.e. ROA and ROE). While the first two research objectives use both qualitative and quantitative data for understanding the impact of technological diversification on firms' financial performance, the other eight research objectives benefit from quantitative data to investigate the relationship between different dimensions of diversification strategy (product, geographic and staff) and insurers' financial performance, respectively. However, quantitative data analysis techniques are applied to analyse all relationships between diversification dimensions and insurers' financial performance.

Research objective 1: To understand how technological diversification affects insurers' ROA.

Research objective 2: To understand how technological diversification affects insurers' ROE.

Research objective 3: To understand how product diversification affects insurers' ROA.

Research objective 4: To understand how product diversification affects insurers' ROE.

Research objective 5: To understand how geographic diversification affects insurers' ROA.

Research objective 6: To understand how geographic diversification affects insurers' ROE.

Research objective 7: To understand how staff diversification affects insurers' ROA.

Research objective 8: To understand how staff diversification affects insurers' ROE.

Research objective 9: To understand how product, geographic, and staff diversification (all together) affect insurers' ROA.

Research objective 10: To understand how product, geographic, and staff diversification (all together) affect insurers' ROE.

1.4. DEFINITIONS AND MEASUREMENTS

This section briefly explains the four dimensions of diversification and their measurement methods, firms' financial performance, and firms'-specific control variables, which are planned to be studied in the thesis.

1.4.1. DIMENSIONS OF DIVERSIFICATION

1.4.1.1. PRODUCT DIVERSIFICATION

Su and Tsang (2015) define product diversification as operations in several industries. However, Ramirez Aleson and Escuer (2002) have used a more specific definition

describing it as the expansion into businesses that are similar to or different from the current business of a firm. For this thesis, Iranian insurance companies are assumed to operate in the same industry (i.e., insurance), while they can potentially diversify across different insurance products or focus on specific line(s) of the business. This dimension of diversification strategy has attracted many scholars over the years, and there are plenty of studies that have investigated the relationship between product diversification and firms' performance (Giarratana et al. 2021, Deligianni et al. 2017, Foong and Idris 2012, Bausch and Pils 2009, Chang and Wang 2007, and Hitt et al. 1997). However, due to inconsistencies, their findings added more to the questions than answers about the relationship mentioned above.

1.4.1.2. GEOGRAPHIC DIVERSIFICATION

Subramaniam and Wasiuzzaman (2019) argue that geographic diversification is to diversify a business across multiple locations. Yildirim and Efthyvoulou (2018) have used a similar definition by stating that geographic dispersion within a region (inter-regional) or across new regions (intra-regional) is the concept of this strategy. However, due to the availability of data in this thesis, the first definition will be used. Hitt et al. (1997), Chang and Wang (2007), Kim and Mathur (2008), Schmid and Walter (2012), Krivokapic et al. (2017), Tsai et al. (2020) and Tanui and Serebemuom (2021) are among the scholars who have studied the relationship between geographic diversification and firms' performance, and their findings have been mixed and inconsistent.

1.4.1.3. TECHNOLOGICAL DIVERSIFICATION

Lin et al. (2006) believe that technological diversification is the extent to which a company diversifies its technological capabilities in relevant or irrelevant technological areas. Similarly, Breschi et al. (2003) argue that this strategy increases a firm's innovative activities over more than one unique technology. Although technological diversification is mainly studied in technology-intensive industries such as manufacturing and high-tech firms (Cheng et al. 2021, Pan et al. 2017, Lin and Chang 2015), this thesis attempts to identify the profitability implications of technological diversification in the insurance industry in Iran.

This aim is achieved in this study through a pilot study since there are no insurance-specific technological diversification measures, and the existing measures are not suitable for this thesis. Accordingly, technological diversification will be measured based on the identified elements extracted from interviews with experienced scholars and practitioners in the insurance context. Silverman (1999), Miller (2006), Leten et al. (2007), Chen and Yang (2013), Pan et al. (2019), Ceipek et al. (2019), and Lee and Le (2021) are some of the studies that examined the relationship between technological diversification and firms' financial performance in different industries and produced contradictory findings.

1.4.1.4. STAFF DIVERSIFICATION

There are several comparable definitions of staff diversification in the literature. For example, Saxena (2014) mentions age, cultural background, physical abilities and disabilities, race, religion, gender, and sexual orientation differences among employees as the indicators of staff diversification. Agrawal (2012) defines diversification of employees through workforce differences in terms of age, culture, education, employee status, marital status, gender, nationality, physical appearance, race, regional origin, religion, sexual orientation, and thinking style.

Although the relationship between staff diversification and firms' financial performance has not been studied in the insurance industry yet, some researchers such as Mirza et al. (2012), Hassan et al. (2015), Khan and Abdul Subhan (2019) and Suciu et al. (2020) have studied this relationship limitedly in other contexts. Therefore, this thesis is the first study that adds staff diversification dimension to the diversification-performance studies in the insurance context in Iran. The details of the definition and indicators of this dimension are included in Chapter 6.

1.4.2. MEASUREMENT OF DIVERSIFICATION

There are different methods for measuring diversification of firms, including the standard industrial classification (SIC) system (Lee et al. 2020, Wang et al. 2019), Herfindahl Hirschman Index (HHI) (Feng et al. 2021, Nasseh et al. 2021), and Jacquemin and berry entropy measure of diversification (Banerjee and Savitha 2021, Sandoval 2014).

However, among these famous methods, this study benefits from the HHI index and some other methods (specific to this thesis) to measure diversification. More details about the measurement of diversification will be provided later in Chapters 2, 5 and 6.

1.4.3. FIRMS' FINANCIAL PERFORMANCE

There is a growing body of literature investigating the relationship between firms' diversification strategies and their performance. Although there are different measures for firms' performance (e.g., objective vs subjective and financial vs non-financial measures), this thesis utilizes accounting performance measures including Return on Assets (ROA) and Return on Equity (ROE) to account for the financial performance of firms in alignment with previous literature (see Suciu et al. 2020, Tsai et al. 2020, Hassan et al. 2015, Mirza et al. 2012, Adamu et al. 2011). The reason for the popularity of the financial performance in the literature is that different areas of a company such as marketing, operations, human resources, and strategy will be finally compared against their impacts on firm performance (Richard et al., 2009). Besides, financial performance measures investigate the achievement of the firm's economic goals, which is a dominant focus in management studies on firm performance (Gentry and Shen, 2020).

1.4.4. FIRMS'-SPECIFIC CONTROL VARIABLES

This thesis uses age, size, ownership structure, and type of insurance firms as control variables. This is aligned with the literature, as many researchers have used these control variables while studying the relationship between diversification strategy and firms' financial performance in different industries, including insurance (e.g., Tsai et al. 2020, Liu 2020, Lee 2017, Krivokapić et al. 2017, Berry-Stölzle et al. 2012, Elango et al. 2008, Liebenberg and Sommer 2008). Chapter 4, 5 and 6 of this thesis provides more details of these four control variables.

1.5. DATA

Based on the models, variables, and different relationships between diversification strategies (product, geographic, technological and staff) and firms financial performance

(ROA and ROE) used in this study (which will be discussed later in different chapters of this thesis), both primary and secondary data is used to address the research questions. Hence, based on the availability and type of data, diversification-firms' financial relationships are analysed differently. More specifically, this thesis uses the annual reports of central insurance of Iran and financial statements of Iranian insurers to collect the data needed to measure the relationships between product, geographic and staff diversification and firms' financial performance. This secondary data is collected for a period of 10 years, from 2011 to 2020. For measuring the impacts of technological diversification on the financial performance of insurance firms, the primary data on technological diversification is collected through interviews and questionnaires for only one year. Besides, the financial statements of insurers are used to collect ROA and ROE data.

1.6. STRUCTURE OF THE THESIS

Apart from chapter one, which is the overview of this DBA thesis, the remaining chapters of the study are explained below:

Chapter 2 – Review of the literature: It provides a systematic and in-depth review of the existing literature about the topic of this thesis which is the impact of diversification strategy on the financial performance of firms. Different definitions and dimensions of diversification strategies in the literature, contextual dependency of diversification strategy-firms' financial performance relationships, and popularity of various variables, methodologies, and assumptions used by other researchers made the synthesis of the literature more critical for this study. In addition, as the relationship between diversification and firms' financial performance has been studied in different disciplines, including business and management, finance and economics, the literature review mainly focuses on strategic management discipline and, if possible, the insurance industry. After highlighting the literature's gaps, this chapter explains the study's conceptual framework at the end.

Chapter 3 – Research context (Iran's insurance industry): This chapter discusses the insurance industry of Iran through a comparison between Iran, regional and global insurance industries. It also explains the role of the regulatory body in the insurance market, Iranian providers of insurance coverages, types of available insurance products

for the customers, and finally, the industry's market structure. In addition to the literature review chapter, Chapter 3 contributes to the theories underpinning this study as well. In brief, this chapter highlights the significance of studying diversification in the Iran insurance context and understanding its financial implications for Iranian insurance companies by explaining the insurance industry structure in the country of study.

Chapter 4 – Research methodology: This chapter provides a detailed explanation of different philosophical and methodological positions in business and management studies. Comparing and contrasting those positions outlines the researcher's viewpoint in this study. It also demonstrates how different variables used in the]is thesis are constructed and defined. In addition, Chapter 4 explains the methods of data analysis applied in the study and justifies the researcher's choices. As the hypotheses introduced in the previous chapters have to be tested empirically later in Chapters 5 and 6, the detailed specifications of the constructed models are explained in chapter 4.

Chapter 5 – The relationship between technological diversification and firms' financial performance in Iran's insurance industry: From the data analysis point of view, this thesis is divided into parts, Chapter 5 and Chapter 6. Chapter 5 analyses and explains the relationship between technological diversification and the financial performance of Iranian insurance firms. In other words, this chapter attempts to answer the research question about whether technological diversification contributes to insurers' financial performance in Iran. As the data for technological diversification of insurers is not available in the CII annual reports, in this chapter, primary data is collected first and incorporated with secondary data of the financial performance of Iranian insurers. The related empirical results are reported in Chapter 5, and implications of technological diversification strategy have been discussed for the studied firms accordingly.

Chapter 6 – The relationship between staff, geographic and product diversification and firms' financial performance in Iran's insurance industry: In this chapter, panel data econometrics is used to measure the relationship between the three remaining dimensions of diversification strategy (that is, product, geographic and staff diversification) and the financial performance of insurers in Iran. The secondary data on different diversification strategies and financial performance of firms which is collected for a period of 10 years (from 2011 to 2020), is analysed in Chapter 6 and the various financial implications of product diversification, geographic diversification and staff diversification strategies of insurance companies in Iran are provided and discussed. The findings are diverse in terms

of the types of relationships, and it has been demonstrated in this chapter that not all diversification strategies are equally beneficial or destructive for different insurance companies.

Chapter 7 – Conclusion: The last chapter of this thesis provides some discussions on the findings of Chapter 5 and Chapter 6. To do so, it summarizes the literature review, and by focusing on the literature gaps, it evaluates the impacts of all four dimensions of diversification strategy on the financial performance of insurance firms in Iran. In addition to the contributions to professional practice, Chapter 7 discusses the theoretical contributions of the study to diversification-firms' financial performance literature. Finally, the limitations of the study are highlighted, and related suggestions for the future direction of studies are provided. Figure 1.2 summarises the overall research framework of this thesis below.

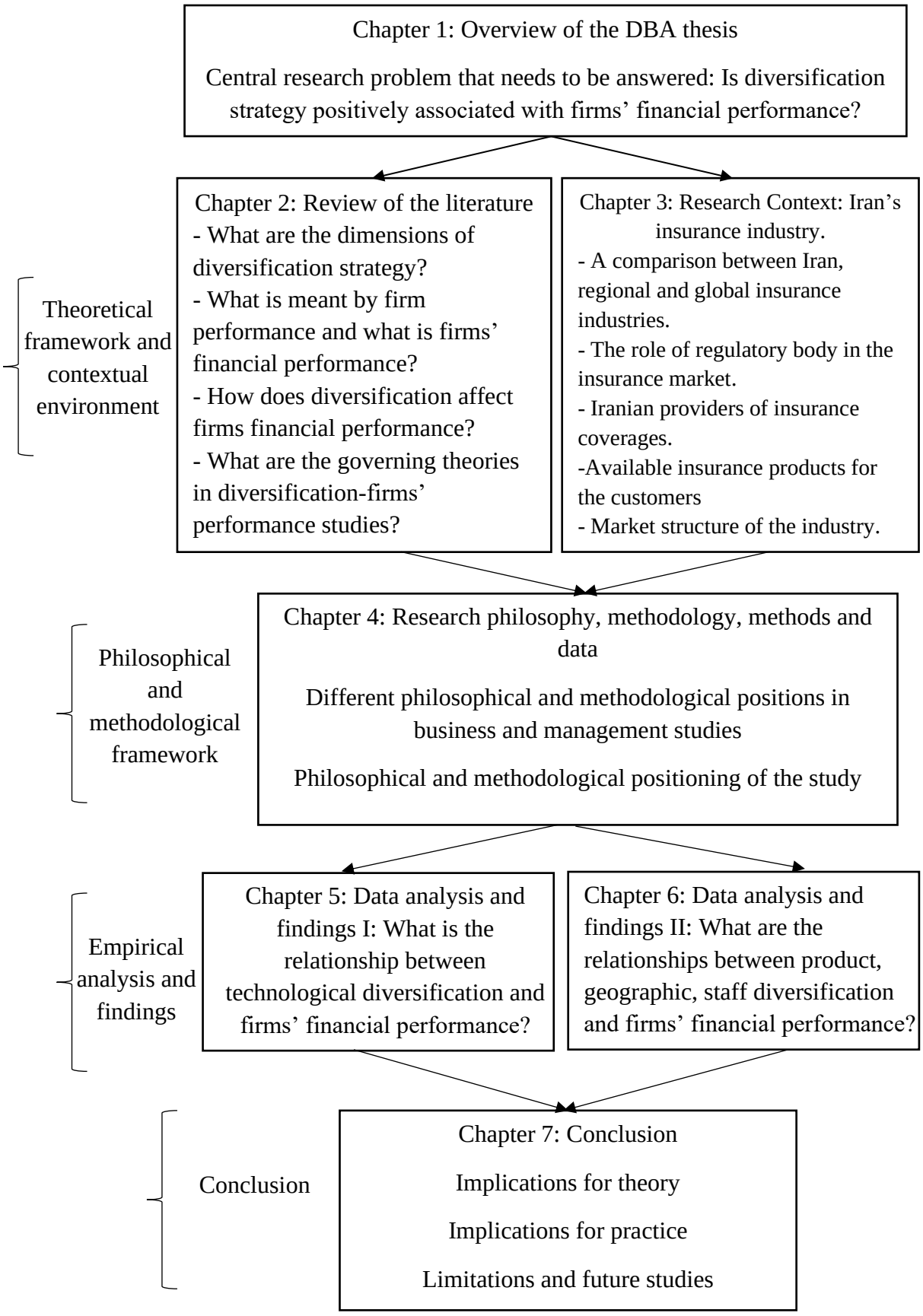

Figure 1.1: Summary of the overall research framework of the thesis

1.7. SUMMARY OF THE CHAPTER

The goal of chapter one is to provide an overview of this DBA research. The chapter started with an introduction to the study and aimed to clarify what the study is about. While in this chapter, the significance and motivation for this study are explained, it provides brief explanations of the significant elements of this study, including diversification strategy and its dimensions, financial performance of firms, and interactions of them, i.e., how diversification strategies can impact firms' financially. Furthermore, the data, research aims, and the proposed research questions of this thesis have been summarised in this chapter. In the end, the overall structure of the thesis and how different chapters contribute to explaining diversification-firms' financial performance relationships in Iran's insurance industry are presented in Chapter one.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

Chapter 2 provides an in-depth review of theoretical work and empirical research that studied the relationship(s) between different diversification strategies and firms' financial performance. Synthesizing such studies is functional to recognize various forms of diversification strategies that may affect firms' financial performance, as previous studies used different definitions and dimensions of diversification strategies and firms' financial performance. Besides, they applied mostly unsimilar theoretical frameworks, methodologies and variables in different contexts and time periods. Furthermore, since most of the extant studies focused on only one or limited dimensions of diversification strategy at the corporate level (for example, product diversification or geographic diversification), it is crucial for this thesis to understand the existing perspectives and combine them to measure diversification-performance relationship correctly. Hence, diversification strategy and financial measures of firms' performance are studied in this chapter, considering evidence from different industries, particularly the insurance industry.

More specifically, this literature review explores the potential impacts of diversification strategies on firms' profitability. As a result, exploration of unsimilar definitions of diversification, contextual dependency of the diversification-performance relationship and understanding different theoretical, methodological and variable construction approaches in this field is considered the critical steps toward developing other chapters of this thesis. And finally, Chapter 3 highlights the literature gaps by focusing on the diversification-performance relationship in the insurance industry and introduces the conceptual framework of the thesis.

2.2. STRATEGIC MANAGEMENT, STRATEGY AND DIVERSIFICATION AS THE CONTENT OF A COMPETITIVE STRATEGY

Diversification strategy, also known as economies of scope (Lo 2021, De Roest et al. 2018, Sakharov 2017, Chavas and Kim 2010), can be generally defined as a simultaneous departure from the current product line and the present market structure (Ansoff 1957). In different disciplines such as strategic management and economics, diversification has

been investigated in contrast to the focus or concentration strategy, also called economies of scale (De Roest et al. 2018, Peng et al. 2017, Dijkstra 2017 Mas et al. 2006). Additionally, various diversification strategies and their impacts on insurers' performance have been studied by insurance researchers as well (Denaro et al. 2020, Ai et al. 2018, Morris et al. 2017, Cole and Karl 2016, Berry-Stolzle et al. 2012, Elango et al. 2008, Liebenberg, and Sommer 2008, Li and Greenwood 2004).

This thesis aims to study diversification as a corporate competitive strategy and under the discipline of strategic management. According to Khalifa (2020), how a strategy is defined is crucial for gaining a competitive advantage. Therefore, a brief introduction about these basic concepts, i.e., strategy and strategic management, can be helpful to narrow down the extensive literature about diversification. The evolution of strategic management was almost begun in the middle of the twentieth century when firms moved from a relatively stable environment into a more rapidly changing and competitive environment, and firms decided where and how to do their future business through a systematic approach (Abreu Pederzini 2016 and Bracker 1980). Strategic management is defined as the set of actions and decisions leading to the formulation and implementation of strategies designed to achieve the objectives of an organization in a competitive market (Nag et al. 2007 and Pearce et al. 2000). Accordingly, a strategy can be defined as a pattern in the organization's significant decisions and actions and consists of a few key areas or dimensions by which the firm is distinguished from others (Nooraie, 2012). Moreover, Khalifa (2020) argues that strategy is the united body of navigating decisions explaining how a firm tries to overcome existing challenges through utilizing the resources and opportunities in the uncertain business environment.

In addition, strategic decisions (SD) have long been a topic of interest not only in different disciplines such as strategic management, organization theory, industrial organizations, marketing and finance but also in different contexts varying from manufacturing to the service sector (Alexander 1985, Eisenhardt 1989, Woolridge and Snow 1990, Hambrick et al. 2005, Blake and Moschieri 2017, Cenamor 2021). Different studies have looked at strategic decisions from different perspectives, which can be mainly classified into three categories as follow. The first is the content of a strategic decision covering topics such as diversification strategy, concentration strategy, cost leadership and product differentiation strategies (O'Brien et al. 2014, Banker et al. 2014, Cao et al. 2021). The second is the strategic decision-making process, which explores how strategic decisions are made and what factors affect them (Menda and Dilts 1997,

De Wit and Meyer 2010, Merendino et al. 2018, Chin et al. 2021). The third is the implementation of a strategic decision that addresses the modes of operationalization of strategic decisions such as mergers and acquisitions, internal growth and R&D (Shayne Gary 2005, Gomes et al. 2013, Bena and Li 2014, Alon et al. 2020, Ding et al. 2021).

Figure 2.1 illustrates the three elements of strategic decisions. However, the central focus of this review of literature is diversification as the content of the strategic decision and its impacts on the financial performance of firms. Therefore, to have a systematic literature review approach and address the research questions directly, other dimensions of a strategic decision mentioned above, i.e., strategic decision-making process and operationalization modes of a strategic decision, are not included in this chapter. In other words, how diversification decisions are made (strategic decision-making process) or how they are being implemented in organizations (SD implementation) are not covered in this literature review.

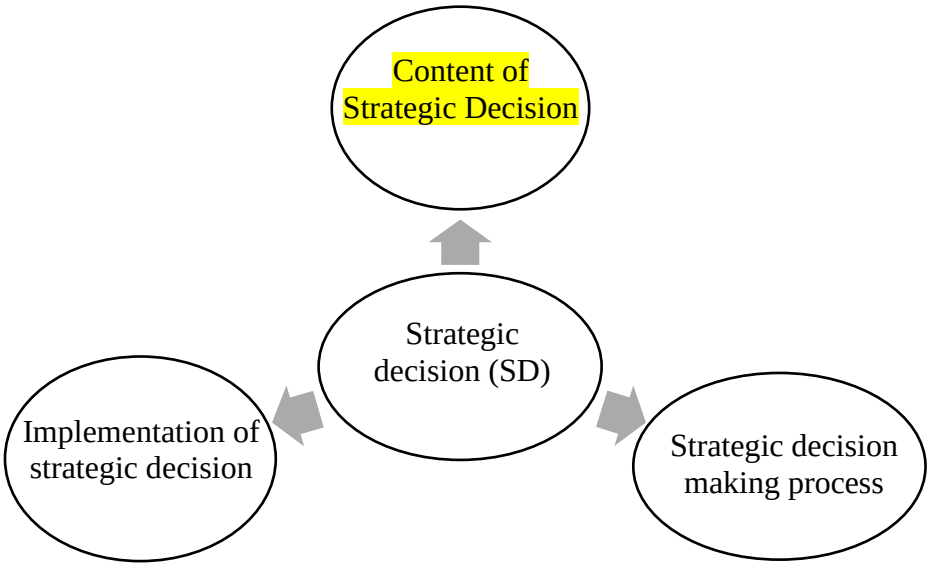

Figure 2.1: Different elements of strategic decisions (Source: adapted from different studies)

2.3. DEFINITIONS OF DIVERSIFICATION STRATEGY

Many definitions and measures can be found about diversification strategy in different disciplines. One of the reasons behind these variations is that diversification is a multi-dimensional phenomenon (Kenny, 2009). For instance, in finance and even risk

management disciplines, the concept of diversification can be highly attributed to Harry Markowitz's theory of portfolio selection (1952) which is advocated for risk-averse investors who expect more return for their investments. While in strategic management terminology, it refers to how firms deal with new markets, new products, new geographic areas or new technologies (Kanodia 2020, Naglic et al. 2020, Jiao et al. 2020, Lee 2021). It includes the goals, directions and means by which diversification strategy should be accomplished (Van Kranenburg et al., 2004).

Since the diversification concept was added to the business and management discipline in 1957 by Ansoff, other similar and different definitions of diversification strategy have been introduced by many researchers afterwards. Ansoff (1957) argues that diversification is a business strategy for developing new markets with new products. Based on the product/market matrix (Figure 2.2) introduced by Ansoff in 1957, diversification is one of the four growth strategies that a firm can adopt. Unlike three other strategies, i.e., market penetration (present product and present market); market development (present product and new market) and product development (new product and present market), in diversification strategy (new product and new market), firms considerably need new skills, knowledge, technological and financial resources (Ansoff, 1957).

		Products	
		Present	**New**
Markets	**Present**	Market penetration	Product development
	New	Market development	Diversification

Figure 2.2: Products/markets matrix (source: Ansoff, 1957)

However, more recent definitions of diversification strategy include: heterogeneity of output (Gort 1962); the strategy of adding related or similar product or service lines to the existing core business (Rumelt, 1974); collections of businesses in different industries (Bettis and Hall, 1982); operating in different businesses simultaneously (Pitts and Hopkins, 1982); a tool for spreading the base of a business to achieve improved growth and/or reduce overall risk (Ramanujam and Varadarajan, 1989); variation between businesses within a company (Kenny, 2009); capturing new

markets and new industries, dealing with new customer segments, introducing new products, utilizing various types of organizational resources, and international expansions of firm's operations (Knecht, 2013); and increase in a firm's active industries (Lo, 2021). In the insurance context, diversification strategy is defined as adding new product lines to the core business of firms (Ai et al. 2018, Peng et al. 2017, Lee 2017, Shim 2011, Elango et al. 2008, Meador and Ryan Jr 1997) and penetrating new geographic regions (Krivokapic et al. 2017, Che and Liebenberg 2017, Berry-Stolzle et al. 2012, Shim 2011, Elango et al. 2008, Cummins et al. 1999) which are similar to the existing definitions used in other contexts. Table 2.1 represents a summary of famous diversification strategy definitions.

It can be concluded that Gort (1962), Rumelt (1974), Bettis and Hall (1982), Pitts and Hopkins (1982), Meador and Ryan Jr (1997), Elango et al. (2008), Kenny (2009), Peng et al. (2017), Lee (2017), Ai et al. (2018) and Lo (2021) define diversification strategy as product diversification while Ansoff (1957) considers product diversification and market diversification as the definition of this strategy. However, although Knecht's (2013) definition seems to be more comprehensive than others, as new products, new markets, new industries and geographic expansion are included among the features of a diversified firm, it is not yet sufficient for what is meant by diversification in this thesis. Based on different dimensions of diversification strategy being studied in this thesis (i.e. product, geographic, staff and technological diversification), the researcher defines diversification strategy as moving a firm's current boundaries. This comprehensive definition of diversification strategy covers different areas in a firm where diversification strategy can be applied.

Table 2.1: A summary of diversification strategy definitions (Sources: adopted from several studies)

Year	Researcher(s)	Definition
1957	Ansoff	A business strategy for developing new markets with new products
1962	Gort	Heterogeneity of output
1974	Rumelt	The strategy of adding related or similar product or service lines to existing core business
1982	Bettis and Hall	Collections of businesses in different industries
1982	Pitts and Hopkins	Operating in different businesses simultaneously
1989	Ramanujam and Varadarajan	A tool for spreading the base of a business to achieve improved growth and/or reduce overall risk
2009	Kenny	Variation between businesses within a company
2013	Knecht	Capturing new markets and new industries, dealing with new customer segments, the introduction of new products, utilizing various types of organizational resources, and international expansions of firm's operations
2021	Lo	Increase in a firm's active industries

2.4. DIMENSIONS OF THE DIVERSIFICATION STRATEGY

Corporate diversification literature demonstrates that this strategy entails a wide range of activities, varying from diversifying across new products, new geographical areas (domestic or international), new technologies and even staff diversification (Figure 2.3). Therefore, comprehensiveness is one of the main strengths of this research. While previous researchers focused on one or some (not all) of these dimensions in their studies, this thesis intends to study corporate diversification in all four dimensions, i.e., product, geographic, staff and technological diversification. Table 2.2 represents the specific definitions of different dimensions of diversification strategy provided by different scholars and the related studies around each of these dimensions.

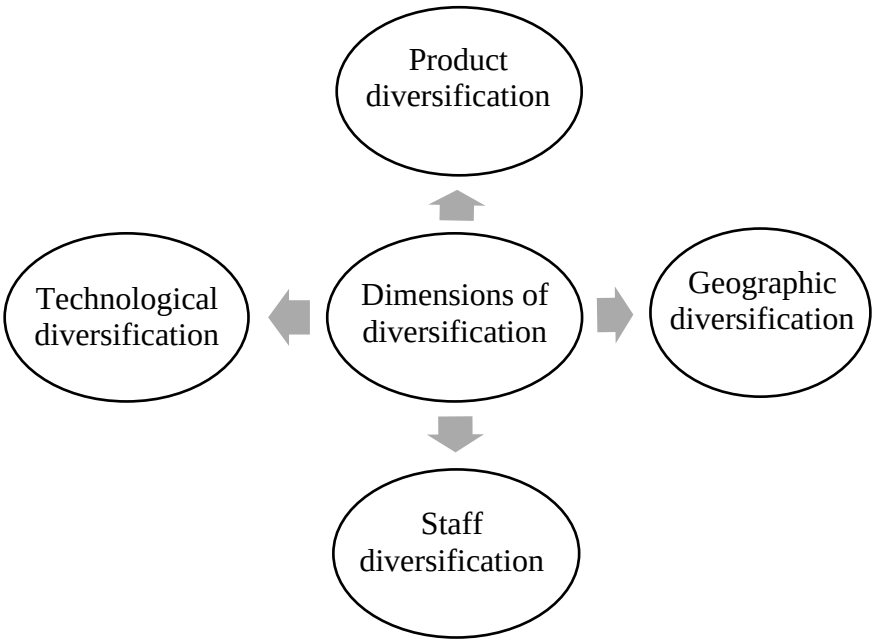

Figure 2.3: Different dimensions of the diversification strategy (Source: adapted from several studies)

Table 2.2: Definitions of diversification strategy dimensions and the corresponding literature (Sources: adopted from several studies)

Dimension of corporate diversification	Definition(s) of each dimension	Related studies
Product diversification	- Operations in several industries (Su and Tsang, 2015). - Expansion into businesses that are similar to or different from the current business of the firm (Ramirez Aleson and Escuer, 2002).	Hitt et al. (1997) Chang and Wang (2007) Bausch and Pils (2009) Foong and Idris (2012) Deligianni et al. (2017) Giarratana et al. (2021)
Geographic diversification	- Diversification of a business across multiple locations (Subramaniam and Wasiuzzaman, 2019). - Geographic dispersion within a region (inter-regional) or across new regions (intra-regional) (Yildirim and Efthyvoulou, 2018).	Hitt et al. (1997) Chang and Wang (2007) Kim and Mathur (2008) Schmid and Walter (2012) Krivokapic et al. (2017) Tsai et al. (2020) Tanui and Serebemuom (2021)
Staff diversification	- Age, cultural background, physical abilities and disabilities, race, religion, gender, and sexual orientation differences among employees (Saxena, 2014). - It means workforce differences in terms of age, culture, education, employee status, marital status, gender, nationality, physical appearance, race, regional origin, religion, sexual orientation, and thinking style (Agrawal, 2012).	Ngo et al. (1998) Yusuf (2005) Dagsson (2011) Mirza et al. (2012) Schwab et al. (2016) Tanui et al. (2017) Triguero-Sanchez et al. (2018) Arday (2021)
Technological diversification	- The extent to which a company diversifies its technological capabilities in relevant or irrelevant technological areas (Lin et al., 2006). - Increase firm's innovative activities over more than a unique technology (Breschi et al., 2003).	Silverman (1999) Miller (2006) Leten et al. (2007) Chen and Yang (2013) Pan et al. (2019) Ceipek et al. (2019) Lee and Le (2021)

As illustrated in Table 2.2 and Figure 2.3, by the development of corporate diversification strategy literature from its introduction in the 1950s, the researchers added more definitions and dimensions of this competitive strategy to the literature over the past decades. Therefore, the current scope of diversification strategy is much beyond only product diversification or geographic diversification, including in the insurance industry.

2.5. DIVERSIFICATION BREADTH: RELATED VS UNRELATED DIVERSIFICATION

In addition to the dimensions of diversification strategies discussed above, diversification breadth has also been studied extensively in the literature. Some of the diversification strategy researchers suggest that the success of corporate diversification relies on the breadth of diversification, i.e., relatedness vs unrelatedness of diversification (Bettis 1981, Chatterjee and Wernerfelt 1988, Park 2002, Seifzadeh 2017, Lohwasser et al. 2019). Relatedness or unrelatedness of diversification strategy is mainly attributed to the relatedness or unrelatedness among different product or service markets (Schommer et al., 2019). This topic has been investigated by many researchers in the insurance context as well. For instance, Berry-Stolzle et al. (2012) studied related and unrelated diversification strategies among property-liability insurers. In another study, Oladimeji and Udosen (2019) compared unrelated and related diversifiers' organizational performance in Nigeria. In addition, related product diversification is studied in the US health insurance market by Shi et al. (2016). Moreover, the same strategy is compared with product focus in the US life insurance industry (Meador et al., 2000). Figure 2.4 demonstrates the breadth of diversification strategy.

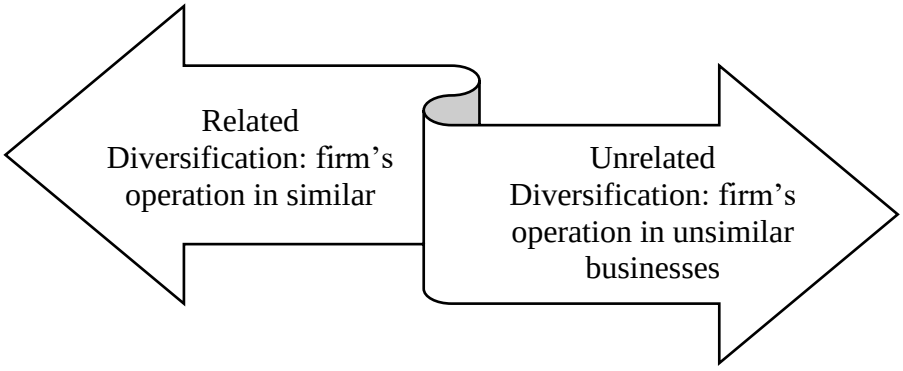

Figure 2.4: The breadth of diversification strategy: related vs unrelated diversification (Source: Adopted from several studies)

2.5.1. RELATED DIVERSIFICATION

Different studies have claimed that firms' financial performance is improved through related diversification. Related diversification occurs when a company owns a number of different business units operating in similar businesses (Rowe and Wright 1997, Ramaswamy et al. 2017, Nwakoby and Hediwa 2018). It is claimed that related diversification not only leads firms to take advantage of their extensive knowledge over a number of business areas (Tanriverdi & Venkatraman, 2005) but also results in fostering their distinctive capabilities such as assets utilization and cost-effectiveness of production through economies of scope (Merino et al. 2014, Helfat and Eisenhardt 2004, Markides and Williamson, 1994). In particular, unlike a focused firm that produces only one product or service and tolerates the fixed costs without benefiting from the existent extra production capacity, related diversified firms can benefit from cost-sharing in similar lines of business and decrease associated production expenditures (Lohwasser et al., 2019).

2.5.2. UNRELATED DIVERSIFICATION

Unrelated diversification is the strategy that a firm adapts through operation in various products and business lines that are not similar (He et al. 2021, Ramaswamy et al. 2017, Picone and Dagnino 2016, Chatterjee and Wernerfelt 1988). Although some researchers advocate both related and unrelated diversification strategies for organisational growth (La Rocca and Stagliano 2012, Ng 2007, Ramaswamy et al. 2004), it should be highlighted that the costs associated with unrelated diversification are more than the costs of related diversification (Lohwasser et al. 2019). While unrelated diversification may create value for firms (Nwakoby and Hediwa, 2018), it is not easy for unrelated diversifiers to mobilize their slack resources or their organizational knowledge and R&D capabilities compared to related diversifiers. However, many studies have reported positive outcomes for firms pursuing unrelated diversification strategies (Li et al. 2020, Ljubownikow and Ang 2020, Nachum 2004).

2.6. PROXIES FOR THE DIVERSIFICATION STRATEGY

There are different methods to measure diversification. This section investigates the literature to understand the different measurements of diversification strategies that have been used in previous research.

2.6.1. THE STANDARD INDUSTRIAL CLASSIFICATION (SIC) SYSTEM

The standard industrial classification (SIC) system is a numerical system for classifying firms' activities. Based on the SIC method, each establishment of a firm (such as plants) is classified based on its main activity (Sambharya 2000, Hoskisson et al. 1993, Montgomery 1982). For measuring firms' diversification, the standard industrial classification system employs data extracted from the firms' financial statements to measure diversification. In fact, firms' sales details are categorized using the classification system, which easily measures corporate diversification (Montgomery, 1982). Although some of the researchers have used this method of diversification measurement in the literature (Lee et al. 2020, Wang et al. 2019, Daud et al. 2018, Bayramov and Abbas 2017, Kapaya et al. 2017), this method is not free from limitations. Martin and Sayrak (2003) argue that the SIC method for measuring corporate diversification cannot capture the distribution or relative significance of firms' involvement in each specific segment of an industry. They also add that the complexities and subtleties of using SIC at different levels may lead researchers to misestimate business relatedness.

2.6.2. HERFINDAHL HIRSCHMAN INDEX (HHI)

The Herfindahl Hirschman Index is a method of measuring a firm's concentration ratio. Therefore, one minus HHI demonstrates the diversification ratio (Kim et al. 2019, Rubio-Varas and Munoz-Delgado 2019, and Chikoto et al. 2016). HHI varies between 0 and 1 ($0 < HHI < 1$). As a result, the lower the degree of a firm's concentration is, the higher the level of its diversification will be. HHI index (concentration ratio) and diversification index are defined as below:

Equation 1: The HHI index

$$\text{HHI} = \sum_{j=1}^{N} P_j^{\,2}$$

Therefore:

Equation 2: Diversification index

$$\text{Diversification} = 1 - \text{HHI}$$

where P_j is the percentage contribution of the line of business j within a firm.

Scholars have extensively used this method in different contexts and disciplines to measure the diversification ratio of a firm (Feng et al. 2021, Azmi et al. 2019, Kim et al. 2019, Chikoto et al. 2016, Teimet et al. 2011). Similarly, the Herfindahl Hirschman Index is a popular measure for diversification researchers in the insurance context (Nasseh et al. 2021, Milidonis et al. 2019, Shim, 2017, Lee 2017, Shi et al. 2016, Moriya et al. 2010).

2.6.3. JACQUEMIN AND BERRY ENTROPY MEASURE OF DIVERSIFICATION

This method of diversification measurement is known as entropy measure and is well-established in the literature. The entropy index captures different elements for measuring diversification strategy, including (a) the number of different product or industry segments in which a firm operates, (b) the relative portion of each segment or industry in the total sales of the firm and (c) relatedness or unrelatedness of different product segments or industries (Shao et al. 2020, Ceptureanu et al. 2017, Martin and Sayrak 2003). The latest proxy in the Jacquemin and Berry entropy method is specifically helpful to measure the relatedness or unrelatedness of a firm's diversification strategy through segment classification (Bhatia and Thakur, 2017). Entropy measure has been widely used in diversification studies in the context of insurance (Banerjee and Savitha 2021, Krivokapic et al. 2017, Sandoval 2014, Elango et al. 2008). The formula of Jacquemin and berry entropy measure of diversification is presented below in Equation 3 (Shao et al. 2020, Ceptureanu et al. 2017, Singh et al. 2007, Vachani 1991):

Equation 3: Total diversification

$$\text{Total Diversification (TD)} = \sum_{j=1}^{m} p_j \ ln\left(\frac{1}{p_j}\right)$$

Where the total diversification is the summation of the related and unrelated diversification, *m* is the number of product/industry segments, P_j is the share of segment $_j$ sales from the firm's total sales, and *ln* is the natural logarithm.

Table 2.3 summarizes different methods of diversification strategy measurement.

Table 2.3: Summary of diversification measurement methods (Source: adapted from other studies)

Diversification measurement method	Definition/Formula	Related studies
Standard industrial classification (SIC) system	It employs data extracted from the financial statements of firms to measure diversification.	Lee et al. (2020) Wang et al. (2019) Daud et al. (2018) Bayramov and Abbas (2017) Kapaya et al. (2017)
Herfindahl Hirschman Index (HHI)	$\text{HHI} = \sum_{j=1}^{N} P_j^{\ 2}$ Diversification = 1 – HHI	Feng et al. (2021) Nasseh et al. (2021) Milidonis et al. (2019) Azmi et al. (2019) Kim et al. (2019) Shim (2017) Lee (2017) Chikoto et al. (2016) Shi et al. (2016) Teimet et al. (2011) Moriya et al. (2010)
Jacquemin and Berry entropy measure	Diversification = $\sum_{j=1}^{m} p_j \ ln\left(\frac{1}{p_j}\right)$	Banerjee and Savitha (2021) Krivokapic et al. (2017) Sandoval (2014) Elango et al. (2008)

2.7. CHOOSING DIVERSIFICATION AS A COMPETITIVE STRATEGY FOR A FIRM

As partially mentioned above, in spite of the potential benefits, diversification strategy may be associated with considerable costs as well (Duijm and van Beveren 2020, Lee 2017, Benito Osorio et al. 2012, Zhou 2011). Acquiring new technologies, buying new offices, hiring new staff, more emphasis on R&D, coordination between different lines of business, and adding a new production line to the current business, are unattainable without extensive expenditures. As a result, there are many unsuccessful examples of diversification strategies in the world (Cadenas et al. 2021, Du et al. 2020, Zhou 2011, Ahn 2009, Chatterjee et al. 2003, Hitt et al. 1998, Bane and Neubauer 1981). Therefore, it is crucial to understand why firms diversify.

Firms might pursue different reasons by adopting a diversification strategy for their growth. Some of the most significant benefits of diversification strategy, suggested by the extant literature, can be named as (a) to increase shareholder wealth (Hyland and Diltz, 2002), (b) in response to changes in private benefits, rather than risk reduction (Aggarwal and Samwick, 2003), (c) capturing rivals' markets as a new entrant (Bhatt, 1987), (d) to increase market power through conglomerate power (Montgomery, 1994) (e) to reduce managerial risks and exaggerate the output of diversification as managerial effort (Rose, 1997) (f) to utilize excess production capacity (Montgomery, 1994) (g) to maximize manager's benefits (Montgomery, 1994), (g) robust growth while maintaining maximized profit (Shin et al., 2015) and finally (h) to maximize financial performance (Fox and Hamilton, 1994).

By looking at the reasons mentioned above for adopting diversification strategies for firms, it can be concluded that synergy and market power are among the common reasons. Synergy can be achieved by integrating resources used by different strategic business lines or merging those strategic lines of business to lead to unique opportunities that would not exist previously. In other words, synergy is achievable through utilizing the inputs that can be jointly shared between the existing business units and a business unit that is newly added into a firm (Zhou, 2011). Ahuja and Novelli (2017) argue that synergy can take different forms. It can be maintained by using the existing resources or benefiting from marketing and R&D capacities, brand names distribution channels for developing new products or services (Malhotra and Osiyevskyy 2019, Saftiana et al. 2018, Clarke and Brennan 1990, Hoskisson and Hitt 1988).

In addition, market power or conglomerate power can be obtained in different ways. Montgomery (1994) discusses the examples of market power as using a firm's profits from market A in order to pursue predatory pricing policies in market B (cross-subsidization), some forms of tacit collusion when two rivals perceive their interdependence due to the presence of both in different markets and reciprocal purchases which restricts other rivals. Similarly, Mwau Mulwa et al. (2015) discuss that diversified firms exercise their market power to control prices by offering exciting discounts, cross-subsidies, practising reciprocal purchasing to hinder other rivals from entering their markets. Moreover, Azar (2017) argues that diversifiers can benefit from market power in the labour market and pay their employees fairly. In the next section of this chapter (section 2.8), the reasons for diversification are attributed to the common theories about this competitive strategy in more detail.

2.8. DOMINANT THEORIES UNDERPINNING THE DIVERSIFICATION STRATEGY LITERATURE

Even though a large number of researchers in management, economics and finance disciplines are considerably optimistic about the benefits of diversification (Schommer et al. 2019, Bhatia and Thakur 2018, Benito Osorio et al. 2012, Pandya and Rao 1998, Lang and Stulz 1994), some other scholars have strongly criticized different forms and dimensions of diversification strategy (Peng and Lian 2020, Duho et al. 2019, Morris et al. 2017, Manyuru et al. 2017, Kim and Mathur 2008, Wan 1998). Diversification is even called "di-worsification" by some literature (Franco L.G. 2004). Similarly, insurance scholars found contradictory outcomes of diversification strategy. For example, while Lee (2017) reported the negative impact of diversification on the performance of property and liability insurers, Alzoubi (2020) and Peng et al. (2017) demonstrated positive impacts of diversification strategies on the overall risk and performance of insurance firms, respectively. As a result, synthesising the literature seems to be a necessary but not an easy job considering the large number and different categories of studies in the diversification literature. It entails highlighting different theoretical perspectives about firms' incentives that engage in diversification strategies (Purkayastha et al., 2012) and following and developing the discussions in section 2.7.

2.8.1. THE MODERN PORTFOLIO THEORY (MPT)

The Modern portfolio theory was initially developed by the Nobel Prize winner economist Harry Markowitz, in his paper published in 1952 (Beyhaghi and Hawley 2013, Rasiah 2012, Alexander 2009). The basic ideas for the diversification strategy, which is the central concept of modern portfolio theory, originates from the famous proverb "never put all your eggs in one basket" (Zoghlami 2020, Mangram 2013, Toh and Kim 2013). On many occasions, choosing a diversification strategy is justified by reducing a firm's risk exposure. From this point of view, diversification strategy operates in accordance with the modern portfolio theory. Many studies used the MPT concept in corporate diversification research (Anderson et al. 2011, Chiu 2007, Wang and Barney 2006, Lev and Amihud 1981, Rugman 1976). This theoretical perspective has been used in some diversification studies in the context of insurance as well (Agbo and Nwankwo 2020, Fali et al. 2020, Maseki et al. 2019, Oladimeji and Udosen 2019, Shuang and Chao 2018). However, as modern portfolio theory was initially designed to guide securities managers who are attempting to anticipate the risk outcomes of stock diversification, some researchers claim that it may not be an appropriate guide for predicting the risk outcomes of corporate diversification (Lubatkin and Chatterjee, 1994).

2.8.2. THE INSTITUTION-BASED VIEW THEORY

Diversification strategy entails different outcomes for firms that adopt it in different countries. While some studies reported positive outcomes of corporate diversification for firms in developed countries (Williamson et al. 2021, Kim et al. 2015, Park and Jang 2013), some scholars reported similar positive outcomes in developing economies (Selcuk 2015, Ishak and Napier 2006). On the other hand, adverse outcomes of diversification strategy are reported in both developed and developing countries (Doaei et al. 2014, Daud et al. 2009, Wan and Hoskisson 2003). These diverse findings can be explained by the institution-based theory of corporate diversification. North (1991) first conceptualized an institutional view of firms' strategies in the famous article "Institutions". The institution-based theory of corporate diversification is focused on the institutional differences between developing and developed countries (Ali et al. 2016, Zhang et al. 2015, Lee et al. 2008, Peng et al. 2005). This theory states that based on the economic condition of a specific country (that is developed or developing), a

diversification strategy may assist firms to overcome market imperfections (Peng et al., 2005). Besides, it suggests that the institutional frameworks (legal, cultural, and administrative) that govern developing economies differ from developed countries. Therefore, it is impossible to blindly prescribe the same diversification-related strategies for countries with different institutional frameworks.

It should be noted that some other scholars have also highlighted the institution-based theory with different names. For example, Tan and Chintakananda (2016), Benito Osorio et al. (2012), Li and Yue (2008), and Wan and Hoskisson (2003) discussed the role of the home country environment on the diversification strategies of firms. They argued that ignoring home countries' economic, legal, and institutional characteristics is a major limitation of the previous studies in the extant literature.

Similar to the modern portfolio theory discussed in Section 2.8.1, the institution-based view has been considered a theoretical perspective by some researchers in the insurance sector (Li et al. 2014, Berry-Stolzle et al. 2012, Kedia et al. 2006). Hence, this thesis also incorporates this view as one of the helpful theoretical perspectives into the analysis and findings of the diversification-firms' financial performance relationship.

2.8.3. THE RESOURCE-BASED VIEW (RBV) THEORY

A diversification strategy may require a firm to possess and employ an extensive range of resources to produce its diverse range of products or services. Based on the resource-based view introduced by Barney (1991), firms utilize a combination of resources and capabilities owned or controlled by them to sustain a competitive advantage over their rivals. The resources can be tangible like physical assets (property, plant, and machinery), or intangible like human capital, patents, technological knowledge and know-how. In addition, diversified firms should foster their capabilities. A capability is interpreted as the ability of a firm to benefit from its resources effectively (Bayon and Aguilera 2021, Ferreira and Fernandes 2017, Nath et al. 2010). The RBV focuses on the firms' available resources, as firms' resources, capabilities, and competencies lead to continuous competitive advantages (Carmeli and Tishler, 2004). Mwau Mulwa et al. (2015) discuss that firms can grow due to the successful recognition of their unique capabilities based on the available resources that lead them to acquire valuable competitive advantages.

In brief, from the lens of the RBV theory, diversification strategy centres on how resources are allocated in different lines of business in a firm to reduce production costs and effective competition against rivals are guaranteed. More specifically, resource-based view theory states that firms can choose particular forms of diversification strategies if their current pool of resources and capabilities are sufficient (Benito Osorio et al., 2012). Applying the RBV theory, Wan et al. (2011) argue that related diversifiers may outperform focused firms and unrelated diversifiers since the first group of firms can maximize their utilization of resources across various businesses. Hence, advocators of RBV theory in diversification studies believe that sharing the resources and capabilities among different and new units within a firm can lead to productivity, superior performance and an increase in the firm's value (Wijayanto et al. 2019, Clulow et al. 2007, Donthu et al. 2005). This theoretical perspective has many advocators among diversification strategy researchers in the insurance context (Altuntas et al. 2019, Anoke 2019, Oladimeji and Udosen 2019, Kogo and Kimencu 2018, Selma 2014, Berry-Stolzle and Altuntas 2010, Callaway 2008). Similarly, the resource-based view of diversification will be used to justify some of the models and findings of this thesis.

2.8.4. THE AGENCY THEORY (PRINCIPAL-AGENT THEORY)

Since the introduction of the agency theory by Jensen and Meckling (1976), it has become a crucial element of firms' theory in different disciplines, including business, management, economics and law (Panda and Leepsa 2017, Pepper and Gore 2015, Fayezi et al. 2012). In addition, it turned into the main theoretical framework for top managers rewards on executive compensation area of research (Gayle and Miller 2018, Mengistae and Colin Xu 2004). The agency theory explains the condition in which the principal authorises another person named agent for controlling and decision-making in specific operations (Vitolla et al. 2020, Zogning 2017, McColgan 2001, Eisenhardt 1988). The agency problems appear due to opportunistic behaviours, as agents' decisions influence their own welfare and affect principal welfare (Ding et al. 2021, Braun and Guston 2003). However, whereas some managers act as empire builders (Gong et al., 2017), some other agents (managers) fully face the actual negative consequences of their failure. While some managers only benefit from a fraction of the positive outcomes of their decisions (Jensen and Meckling, 1976). Such conflicts will be worsened if the two parties, i.e., principals and agents, have unsimilar risk appetites (Jensen, 1986).

The agency theory has also been extensively investigated in diversification studies (Lin and Kim 2020, Sener and Akben-Selcuk 2020, Dagnino et al. 2019, Alsmairat et al. 2018, Nguyen 2018). This theory suggests that the benefits of diversification strategy will be collected by agents (managers), while shareholders are negatively affected by such decisions. Volkov and Smith (2015) claim that managers are most interested in and benefit from diversifying their companies in order to increase their power, make themselves wealthier and decrease the risk of their own unemployment. In other words, firms' managers want to maximize their utility by taking such decisions (Aggarwal and Samwick 2003). However, there are some criticisms of the principal-agent theory. For example, Perrow (1986) argues that the positivist researchers view of agency theory can be problematic, as it is mainly focused on the managers (agents) side of the principal-agent theory, while this problem can be related to the owners (principals) side as well.

This theoretical viewpoint of diversification strategy has attracted a group of insurance scholars in the literature to warn the owners about the negative impacts of many diversification decisions made by managers in insurance companies (Morris et al. 2017, Shi et al. 2016, Colquitt and Sommer 2003, Krishnaswami and Pottier 2001, Pottier and Sommer 1997, McNamara and Rhee 1992). Similar to literature, the researcher will benefit from agency theory while discussing some of the findings of this thesis.

2.8.5. THE MARKET POWER THEORY

The market power or conglomerate power is a common theory in oligopoly markets and industries (Chatterjee 1991, Bresnahan 1989). The market power theory is mainly based on the anticompetitive impacts resulting from different strategies, including diversification (Mwau Mulwa et al. 2015, Hankir et al. 2011). Montgomery (1994) highlights the examples of market power wherein: (a) one firm uses its profit from a market in order to support its pricing strategy in another market (also known as cross-subsidization), (b) tacit collusion, and (c) reciprocal purchases to restrict other competitors. Similarly, Lin et al. (2021) argue that the diversification strategy can improve market power by effective allocation of resources and also benefiting from cross-subsidization activities. Hence, this theory suggests the diversification strategy to improve firms' financial performance.

Savitha et al. (2019), Peng et al. (2017), Burca and Batrinca (2014), Pavic and Pervan (2010), Hao and Chou (2005), Meador and Ryan Jr (2000) are among the scholars who studied diversification strategy in the insurance industry from the lens of market power theory. As the insurance industry of Iran follows an oligopoly market structure (as discussed in Chapter 3 in detail), it would be useful to investigate whether diversifiers benefit from the market power generated from the diversification strategy in Iran's insurance industry.

Figure 2.5 demonstrates the theoretical perspectives of diversification strategy. In addition, a summary of these theoretical perspectives and the related studies are presented in Table 2.4.

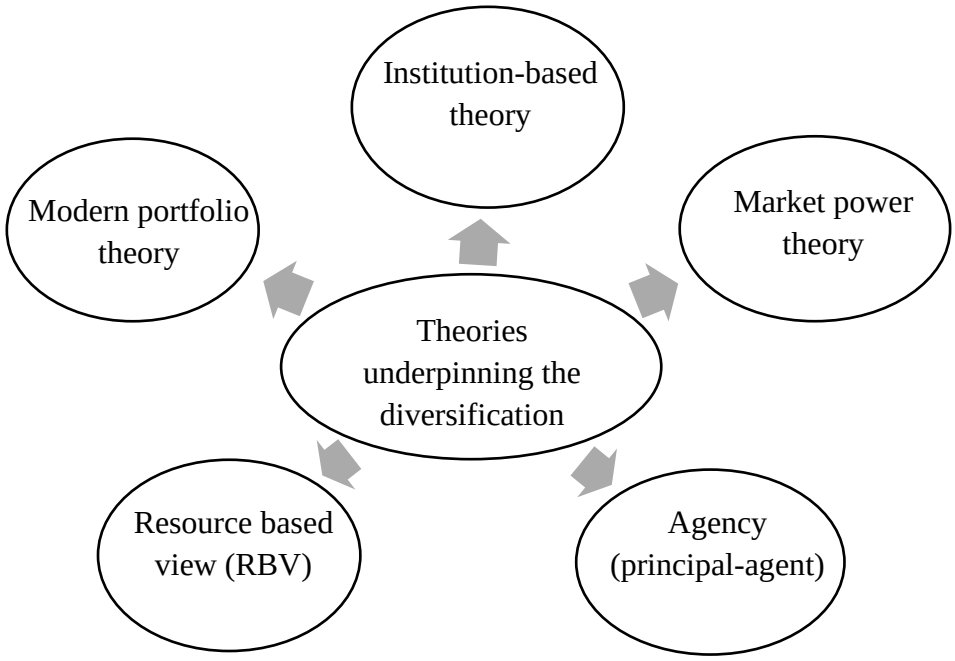

Figure 2.5: The theories governing the diversification literature (Source: Adapted from several studies)

Table 2.4: A summary of the theoretical perspectives of diversification strategy and the related studies (Source: adapted from several studies)

Theoretical perspective	Definition	Related articles
Modern Portfolio Theory (MPT)	Never put all your eggs in one basket.	Zoghlami (2020) Agbo and Nwankwo (2020) Fali et al. (2020) Maseki et al. (2019) Oladimeji and Udosen (2019) Shuang and Chao (2018) Mangram (2013) Toh and Kim (2013)
Institution-based theory	The institutional frameworks which govern developing economies are different from developed countries. Therefore, the success of diversification strategy depends on the home countries' economic, legal, and institutional conditions.	Ali et al. (2016) Tan and Chintakananda (2016) Zhang et al. (2015) Li et al. (2014) Berry-Stolzle et al. (2012) Benito Osorio et al. (2012) Li and Yue (2008) Kedia et al. (2006) Peng et al. (2005) Wan and Hoskisson (2003)
Resource-based view (RBV) theory	Firms can choose particular types of diversification strategies if their current pool of resources and capabilities are sufficient.	Wijayanto et al. (2019) Anoke (2019) Altuntas et al. (2019) Oladimeji and Udosen (2019) Kogo and Kimencu (2018) Selma (2014) Benito Osorio et al. (2012) Wan et al. (2011) Berry-Stolzle and Altuntas (2010) Callaway (2008) Clulow et al. (2007) Donthu et al. (2005)
Agency (principal-agent) theory	The condition in which the principal authorises another person named agent for controlling and decision-making in specific operations. The agency problems appear due to opportunistic behaviours, as agents' decisions influence their own welfare and affect principal welfare.	Ding et al. (2021) Vitolla et al. (2020) Lin and Kim (2020) Sener and Akben-Selcuk (2020) Dagnino et al. (2019) Alsmairat et al. (2018) Nguyen (2018) Zogning (2017) Braun and Guston (2003) McColgan (2001) Eisenhardt (1988)

Market power theory	It is mainly based on anti-competitive impacts resulting from different strategies, including diversification strategy. According to this theory, diversification strategy can improve firms' financial performance.	Savitha et al. (2019) Peng et al. (2017) Mwau Mulwa et al. (2015) Burca and Batrinca (2014) Hankir et al. (2011) Pavic and Pervan (2010) Hao and Chou (2005) Meador and Ryan Jr (2000) Lin et al. (2001) Chatterjee (1991) Bresnahan (1989)

Each of these theoretical perspectives has specific implications for firms' performance. For example, while modern portfolio, resource-based view and the market power theories advocate the benefits of diversification for firms' performance, the agency theory highlights the negative impacts of this strategy for firms. In addition, based on the institution-based view, diversification may have positive, negative, or insignificant impacts on firms' performance in institutionally different countries. The details of the relationships between diversification strategy and financial performance of firms are presented in section 2.11, considering the mentioned above theoretical perspectives.

2.9. DEFINITIONS AND CATEGORIES OF FIRM'S PERFORMANCE

Nowadays, companies are inevitably under severe competitive pressure to accomplish their tasks more effectively than other rivals in the challenging business environment. Therefore, monitoring and improving performance seems to be a primary goal of any business entity. "Firm performance" is one of the most critical topics that attracted researchers' attention in different disciplines (Gavrea et al., 2011). In addition, different areas such as marketing, operations, human resources, and strategy have also been compared against their impacts on the firm performance (Richard et al., 2009). As a result, understanding and measurement of firm performance are crucial for managers, practitioners and scholars. Unsurprisingly, there are many definitions, measures and categories of a firm's performance, and it has been the area of interest in business, management, finance and economics research. Historically, firms' performance and organizational efficiency were considered as equivalents. From this perspective, a firm is a social system that utilizes limited resources and capabilities to accomplish its mission.

In this way, a firm's performance is considered productivity and resilience (Taouab and Issor, 2019). On the other hand, Porter (1986) argues that the performance of a firm is linked to how successfully it creates value for the customers. Below, different categories of firms' performance measures are presented.

2.9.1. SUBJECTIVE VS OBJECTIVE MEASURES OF FIRM'S PERFORMANCE

As discussed earlier, there are different ways to measure firms' performance. For example, Richard et al. (2009) divide firm performance measures mainly into objective and subjective measures. Based on this category, objective measures which are numerically calculated can be named as:

(a) Accounting measures such as return on assets (ROA), return on equity (ROE), profit margin, market share, and cash flow from operations. Those measures are the most popular tools for measuring a firm's performance (Ngware et al. 2020, Luu et al. 2019, Goddard et al. 2008).

(b) Financial market measures including stock price, the market value of the firm, Earnings per share (EPS) and total shareholder return (TSR). Such measures are mainly used to discuss firm's performance in terms of shareholder return.

(c) Mixed accounting/financial market measures, which include balanced scorecard, cash flow per share, Tobin's Q, and economic value added (EVA).

In addition, Richard et al. (2009) mention some subjective measures of a firm's performance, such as customer satisfaction, social performance, and environmental performance. However, although the subjective measures of a firm's performance are almost popular among researchers, these measures should be used cautiously, as subjectivity may increase the bias and error of respondents (McGuire et al., 1990).

2.9.2. FINANCIAL VS NON-FINANCIAL MEASURES OF FIRMS' PERFORMANCE

Another popular way of clustering the measures of firms' performance is to divide performance into financial and non-financial categories (Pham 2020, Ahmad and Zabri

2016, Ahmed and Manab 2016, Fullerton and Wempe 2009, Skrinjar et al. 2008). According to this classification, a firm's financial performance is mainly connected to the data extracted from the firm's financial information (e.g. balance sheet and income statement). The financial performance investigates the achievement of the firm's economic goals, which is a dominant focus in management studies on firm performance (Gentry and Shen, 2020). In addition, a firm's financial performance is a critical factor in evaluating its top management team success, as the financial performance can be considered the reflection of the firm's different strategies (Pham, 2020). Some of the researchers have used different categories for firms' financial performance. For instance, Gentry and Shen (2020), Purkayastha et al. (2012) and Moore (2001) divide financial performance into accounting measures and market measures. Measures such as growth in turnover, earnings per share (EPS), return on investment (ROI), return on sale (ROS), debt to asset ratio, market return, Tobin's Q, market value added (MVA), return on assets (ROA) and return on equity (ROE) are among the most popular parameters used to measure the financial performance of firms (Ahmed and Manab 2016, Ellinger et al. 2002, Moore 2001, McGuire et el. 1988). However, financial performance measures have been criticized as they are historical and exhibit the only previous performance of the firm, i.e., they do not indicate the long-term performance of firms (Venanzi 2012, Ritchie and Kolodinsky 2003) and ignore many of the firm's stakeholders (Hussain and Hoque (2002). In addition, data manipulation and unethical accounting conduct are among the factors that can make financial performance measures misleading (Sharma 2020, Jaijairam 2017).

On the other hand, although financial statements have traditionally influenced performance measurement, non-financial performance measures have also attracted researchers' interest in the literature since the 1980s (Hernauce et al., 2012). Gomes et al. (2004) believe that financial performance measures are not capable of capturing firms' requirements in the changing business environment, which may result in short-term thinking. Additionally, Banker et al. (2000) claim that non-financial measures of firms' performance are valuable indicators of the future financial performance of companies. Hernauce et al. (2012) argue that financial and non-financial performance measures are linked, as improving non-financial performance leads to better financial performance in many markets. Examples of non-financial measures of firms' performance include process improvements, customer satisfaction, capacity utilization, employee satisfaction, product or service quality, productivity and business efficiency to measure firm

performance (Anwar and Shah 2021, Ahmed and Manab 2016, Ahmad and Zabri 2016). However, as non-financial measures of the firm's performance are usually extracted using interviews and questionnaires, the sample size, validity, and reliability of the outcomes should be cautiously considered (Hernauce et al. 2012, Chatterji and Levine 2006). Table 2.5 summarizes different categories of firm's performance measures.

Table 2.5: Measures of firms' performance (Source: Adapted from several studies)

Type of classification		Definitions/Examples	Related studies
Objective vs subjective measures of firm's performance	Objective measures of firm's performance	• Accounting measures such as return on assets (ROA), return on equity (ROE), profit margin, market share and cash flow • Financial market measures such as stock price, the market value of the firm, Earnings per share (EPS) and total shareholder return (TSR) • Mixed accounting/financial market measures such as balanced scorecard, cash flow per share, Tobin's Q and economic value added (EVA)	Ngware et al. (2020) Luu et al. (2019) Richard et al. (2009) Goddard et al. (2008)
	Subjective measures of firm's performance	• Customer satisfaction • Social performance • Environmental performance	Richard et al. (2009) McGuire et al. (1990)
Financial vs non-financial measures of firm's performance	Financial measures of firm's performance	• Investigating the achievement of the firm's economic goals. Examples: growth in turnover, earnings per share (EPS), return on investment (ROI), return on sale (ROS), debt to asset ratio, market return, Tobin's Q, market value added (MVA), return on assets (ROA) and return on equity (ROE)	Gentry and Shen (2020) Ahmed and Manab (2016) Purkayastha et al. (2012) Venanzi (2012) Ritchie and Kolodinsky (2003) Ellinger et al. (2002) Moore (2001) McGuire et al. (1988)
	Non-financial measures of firm's performance	• Process improvements • Customer satisfaction • Capacity utilization • Employee satisfaction • Product or service quality • Productivity • Business efficiency	Anwar and Shah (2021) Ahmed and Manab (2016) Ahmad and Zabri (2016) Hernauce et al. (2012) Hernauce et al. (2012) Chatterji and Levine (2006) Banker et al. (2000)

2.10. POPULAR VARIABLES IN DIVERSIFICATION STRATEGY-FIRMS' PERFORMANCE RESEARCH

As discussed earlier in this chapter, since Ansoff (1957) introduced diversification as a growth strategy for firms, an extensive body of literature has been developed investigating this strategy. Le (2019), Dhir and Dhir (2015), Purkayastha (2013), Datta et al. (1991), and Hoskisson and Hitt (1990) argue that (a) diversification is a multidimensional strategy, with various definitions and scope, (b) it is mainly dependent on the contexts, and the disciplines of the studies, and (c) variables, methodologies and assumptions used by different researchers can impact the results of the studies. Other researchers partially support these ideas (Benito Osorio et al. 2012, Keats 1990, Reed and Luffman 1986). Therefore, as different definitions and dimensions of diversification strategy have been explained in this review of literature, it is essential to understand the range of variables used in diversification-firms' performance studies. Besides, more details about the specific methodologies and methods used in extant research on diversification strategy and firms' financial performance relationship will be discussed in Chapters 4, 5 and 6.

Table 2.6 summarizes some of the diversification-firms' performance studies. As it can be seen, variables are divided into three groups: independent variable(s), dependent variable(s) and control variable(s) in this table. This method is consistent with the general categorization of variables in research (Kaliyadan and Kulkarni, 2019). Through using different variables, Table 2.6 reveals how "diversely" researchers have investigated the relationship between diversification strategy and firms' performance so far.

Table 2.6: Different variables used in diversification-firms' performance studies (Source: adapted from several studies)

Researcher(s)	Independent variable(s)	Dependent variable(s)	Control variable(s)
Varadarajan (1986)	Product diversification	Return on equity (ROE) Return on total capital (ROC) Sales growth rate (SGR) Earnings per share growth rate (EPSGR)	• None
Lopez Zapata (2019)	Product diversification	Return On Assets (ROA) Growth in Sales (GS) Labor Productivity (LP)	• Economic cycle
Su and Tsang (2015)	Product diversification	ROA	• Firm size • Advertising intensity • R&D intensity • CEO duality • Industrial level of charity giving • Outside director ratio • Board size
Adamu et al. (2011)	Product diversification	ROA ROE Return on Capital Employed (ROCE) Profit margin	• None
Chang and Wang (2007)	Geographic diversification	Tobin's Q	• Product diversification • Firm size
Hitt et al. (1997)	Geographic diversification	ROA R&D intensity Sales Debt to asset ratio Det to sales ratio	• Product diversification • Country scope • Number of mergers, acquisitions and strategic alliances • Firm size
Shi et al. (2018)	Geographic diversification	Tobin's Q	• Firm-level characteristics • Home country characteristics • Retailer portfolio characteristics
Tsai et al. (2020)	Geographic diversification	ROA	• Firm age • Firm size • Firm leverage (debt ratio)

Kim et al. (2009)	Technological diversification	Tobin's Q	• Firm size • Return on sales (ROS) • Firm technology stock (TS)
Lee et al. (2017)	Technological diversification	Tobin's Q	• Firm size • Financial slack
Chen et al. (2013)	Technological diversification	ROA Tobin's Q Economic value added (EVA) (Market value-added) MVA	• Firm size • R&D intensity
Liu (2020)	Technological diversification	Net income	• Firm age • Ownership type • R&D input • Industry type
Suciu et al. (2020)	Staff diversification	Return on assets (ROA) Return on equity (ROE) earnings before interest and taxes (EBIT) Earnings before interest, tax, depreciation and amortization (EBITDA)	• None
Khan and Abdul Subhan (2019)	Staff diversification	ROA ROE	• Firm size
Mirza et al. (2012)	Staff diversification	ROA ROE	• None
Hassan et al. (2015)	Staff diversification	ROA ROE	• Firm age

As illustrated in Table 2.6, the prior research used different variables to investigate the relationship between firms' diversification strategies and financial performance. It can be concluded that although some of the variables, including ROA, ROE, firm age and firm size, have been used more commonly by previous scholars, no study investigates the relationship between all four independent variables (product diversification, geographic diversification, staff diversification, and technological diversification) and firms' financial performance in one study. In addition, none of the previous researchers has controlled for the impacts of age, size, ownership structure and type of the firm in a single research. To address this research gap, the thesis attempts to examine multiple dimensions of diversification strategies and their impacts on a firm's financial performance while controlling for multiple firm's-specific variables.

2.11. THE DIVERSIFICATION STRATEGIES AND A FIRM'S FINANCIAL PERFORMANCE NEXUS

There is a substantial body of literature that examines the relationship between diversification strategies and the financial performance of firms in different disciplines and contexts (Grant et al. 1988, Ibrahim and Kaka 2007, Kahloul and Hallara 2010, Peng et al. 2017, Tanui and Serebemuom, 2021). This form of competitive strategy has been even called the "diversification puzzle" in the literature, as it is still unresolved for both academic and business practitioners (Statman 2004, Heathcote and Perri 2013, Mushtaq Hussain Khan et al. 2016). Complications of this strategy not only arise from the fact that diversification is a multi-dimensional concept in terms of definition and scope but also as it is highly dependent on the research contexts, disciplines, theoretical perspectives, variables, methodologies and assumptions used by different researchers (Le 2019, Schommer et al. 2019, Lee 2017, Dhir and Dhir 2015, Purkayastha 2013, Benito Osorio et al. 2012, Pandya and Rao 1998, Datta et al. 1991, Hoskisson and Hitt 1990). The differences mentioned above have made it challenging to generalize the findings of previous research investigating diversification and firms' financial performance relationship. Therefore, this research topic, i.e., how diversification strategy is associated with firms' financial performance, is still attractive for many researchers (Lee et al. 2017, Guo and Cao 2012, Purkayastha et al. 2012). This section attempts to categorize the perspectives of previous studies about the relationship between diversification strategy and firms' financial performance.

2.11.1. A LOW LEVEL OF DIVERSIFICATION LEADS TO BETTER FINANCIAL PERFORMANCE

The first research stream emphasizes the idea that a low level of diversification (high level of focus) leads to better financial performance. The primary assumption of this category is that the level of diversification has a linear and inverse relationship to the financial performance of firms (linear discount model). In other words, the costs of high levels of diversification outweigh its benefits, whereby focused firms outperform their more diversified competitors. For example, Clark and Speaker (1994) argue that there would be a considerable decrease in banks' financial performance after implementing a diversification strategy. Similarly, Rogers (2001) findings on Australian companies reveal that more focused (less diversified) firms have benefited from higher profitability.

According to the findings of Liebenberg and Sommer (2008), undiversified insurers in property and liability lines outperform diversified insurers financially. According to Berger et al. (2010), diversification will result in reduced profits and higher costs in Chinese banks. In addition, Shim (2011) states that more focused insurers in the US property-liability insurance industry outperform product-diversified insurers, implying that the cost of diversification is higher than its benefit. There are also more recent studies that have supported a negative relationship between diversification and firms' performance. For instance, Chen et al. (2013) explain that technological diversification negatively impacts Tobin's Q and MVA of the smartphone manufacturers. By studying the product diversification of Taiwanese insurers in marine insurance, Lee (2017) claims that undiversified insurance companies considerably outperform the diversified ones financially. Finally, Mehmood et al. (2019) research on 520 firms from Pakistan, India, Sri Lanka, and Bangladesh demonstrates that geographic diversification has a negative impact on Tobin's Q. Higher management costs of more diversified firms (Lee 2017, Palich et al., 2000), cross-subsidization and over-investment (Berger and Ofek 1995), inefficient allocation of resource such as capital in diversified firms compared to undiversified rivals (Lee 2017, Purkayastha et al. 2012, Berger and Ofek 1995), and inefficient corporate governance system (Mehmood et al., 2019) are among the reason behind this inverse relationship. As discussed in section 2.8, this perspective can be justified by the agency view or institutional-based view of diversification.

2.11.2. A HIGH LEVEL OF DIVERSIFICATION LEADS TO BETTER FINANCIAL PERFORMANCE

In this strand of literature, researchers suggest that a high level of diversification (low level of focus) leads firms to show better financial performance. The core idea of this group of studies is that the level of diversification has a linear and positive relationship to the financial performance of the firms (linear premium model). For instance, Grant et al. (1988) state there is a direct relationship between product diversification and profitability in the manufacturing sector in the UK. Meador et al. (1997) indicated a positive relationship between diversification and cost efficiency in the US life insurance industry. According to Pandya and Roa (1998), on average, diversified firms show better performance than undiversified firms on risk and return dimensions. In another study, Highland and Diltz (2002) suggest that diversified companies gain more cash than those

that are not diversified. More recently, Estes (2014) shows that diversification has a positive relationship with the performance of community banks in the United States. In the insurance context, Krivokapic et al. (2017) believe that product diversification is positively related to ROA and ROE of Serbian insurers, and diversified insurers are expected to surpass focused insurers. Similarly, Shen et al. (2018) claim product diversification can improve the profit growth of firms. Finally, Lee and Kim (2020) highlighted the positive impact of staff diversification on cost savings.

Different reasons can be used to justify this view, namely: (a) More diversified firms benefit from market power advantages than non or less diversified firms (Lin et al. 2021, Mwau Mulwa et al. 2015, Palich et al. 2000). (b) Diversified firms use their financial advantage resulting from greater debt capacity and lower tax burdens (Schmid and Walter 2009, Berger and Ofek 1995). (c) The synergy effect that is achieved through utilizing the inputs that can be jointly shared between the existing and new business units of a firm (Malhotra and Osiyevskyy 2019, Ahuja and Novelli 2017, Zhou, 2011). As discussed in section 2.8, this perspective can be justified by the modern portfolio theory, market power theory and resource-based view of diversification.

2.11.3. INCONSISTENT AND MIXED RELATIONSHIPS BETWEEN DIVERSIFICATION STRATEGIES AND FINANCIAL PERFORMANCE OF FIRMS

Based on this group of studies, the relationships between diversification strategies and the financial performance of firms are not consistent. In other words, the researchers who belong to this group believe that not all dimensions of diversification strategies can benefit firms financially. For example, Mehmood et al. (2019), by studying 520 firms from different Asian countries, conclude that product diversification is significantly and positively associated with return on equity (ROE) and Tobin's Q, while it has an insignificant impact on return on assets (ROA). They also find that geographic diversification has a significant and positive impact on ROA, whereas its impact on Tobin's Q is significantly negative, and additionally, geographic diversification has an insignificant impact on the ROE of firms. The authors attributed the different outcomes of different aspects of diversification strategy to inefficient utilization of firms' resources.

Kagzi and Guha (2018), by measuring the financial benefits of diversification for board members of Indian firms, find that age diversity positively, whereas education diversity negatively influences firm financial performance. However, they argue that

gender diversity does not significantly influence the firm performance financially. In addition, Biener et al. (2016) argue that geographic diversification can improve the financial performance of reinsurers and property-casualty insurers in the Swiss insurance sector, while the same strategy can negatively impact life insurers. In another study, Shi et al. (2015) state that small insurance companies can benefit from product diversification in the US health insurance sector, but not from geographic diversification, while for large insurers, the opposite results are obtained. Finally, Elango et al. (2008) believe that financial performance (ROA and ROE) associated with product diversification in the US property and liability insurance sector is contingent upon an insurers' degree of geographic diversification. They add that the extent of product diversification shares a complex and nonlinear relationship with ROA and ROE. As discussed in section 2.8, this perspective can be justified by different theoretical viewpoints of diversification, including the RBV and institutional-based view of diversification.

2.11.4. U-SHAPED RELATIONSHIP BETWEEN DIVERSIFICATION STRATEGY AND FIRMS' FINANCIAL PERFORMANCE

Some researchers report a U-shaped relationship between diversification strategy and the financial performance of firms. They argue that diversification decreases the financial performance up to a point, and from that point, more diversification leads to better financial performance. For example, Capar and Kotabe (2003) found a curvilinear U-Shaped relationship between geographic diversification and return on sales (ROS) of 81 German service firms. Similarly, Thomas (2006) claims that there is a U-shaped relationship between geographic diversification and Mexican firms' financial performance. In another study, Mathur et al. (2001) highlight the U-shaped relationship between diversification and ROA and ROE of Canadian firms. Besides, Zahavi and Lavie (2013) confirmed the U-shaped relationship between product diversification and sales growth of 156 US firms. This relationship has been reported in the insurance sector as well. Ma and Elango (2008) indicate a U-shaped relationship between product and geographic diversification and risk-adjusted return on assets (RAROA) where RAROA decreases up to a certain point, beyond which increases in product and geographic diversification result in increased RAROA. As discussed in section 2.8, this perspective can be justified by different theoretical views of diversification.

2.11.5. INVERTED U-SHAPED RELATIONSHIP BETWEEN DIVERSIFICATION STRATEGY AND FIRMS' FINANCIAL PERFORMANCE

Based on this fifth category of findings in diversification-firms' financial performance literature, the relationship between diversification and firm performance is an inverted U-shaped. Accordingly, the firms' financial performance increases up to a point due to diversification strategies, and from that point, further diversification entails poor financial performance. It implies that firms should carefully figure out the optimal levels of diversification to outperform their rivals. Santarelli and Tran (2016) found out that diversification has a curvilinear effect on profitability, i.e., it improves firms' return on sales (ROS) up to a certain point, after which a further increase in diversification is associated with declining ROS, by studying Vietnamese firms. By examining 141 firms listed in the Pakistani stock market, Ali et al. (2016) confirmed that firms' product and geographic diversification and ROA follow an inverse U-shaped relationship. Therefore, according to the authors, excessive diversification can create agency problems and internal inefficiencies, which decrease ROA. Similarly, Qian et al. (2010) reported an inverted U-shaped relationship between geographic diversification and ROA of 123 US-based manufacturing MNEs. Measuring technological diversification-sales growth relationship for Korean companies, Kim et al. (2016) demonstrated that inadequate and redundant technological diversifications involve poor financial performance. The inverted U-shaped relationship between diversification strategy financial performance has been tested in the insurance industry as well. Alhassan and Biekpe (2018) claim that through product diversification, South African insurers' equity ratio and ROA increase to a point, following a sharp decrease, after this point. As discussed in section 2.8, this perspective can be justified by different theoretical views of diversification, including RBV or the agency theory.

2.11.6. DIVERSIFICATION STRATEGY HAS NO SIGNIFICANT IMPACT ON FIRMS' FINANCIAL PERFORMANCE

In this category, scholars suggested that diversification has no impact on the financial performance of the companies. For instance, by studying US corporations, Ravichandran et al. (2009) concluded that related product diversification has no impact on firms' profitability and firms' value measured by ROA and Tobin's Q, respectively. Similarly, Iqbal et al. (2012) believe that there is no significant positive relationship between product

diversification and Pakistani firms' ROA and ROE. They explain that based on their sample, the financial performance of highly diversified firms, moderately diversified firms or more specialized firms were not much different. In another study, Raei et al. (2015) argue that product diversification strategy has no impact on ROE and Tobin's Q of Tehran exchange listed companies. In addition, Capar et al. (2015), after studying 258 firms from 13 industries, highlight that geographic diversification has no impact on ROA. Moreover, Cahyo et al. (2021), by studying 127 Indonesian Stock Exchange listed firms, confirmed there is no relationship between product diversification and ROE. According to this point of view, as diversification strategy entails huge costs for firms (Duijm and van Beveren 2020, Lee 2017, Benito Osorio et al. 2012, Zhou 2011), it is not the best strategic option for them, particularly if they do not possess sufficient financial resources. As discussed in section 2.8, this perspective can be justified by the RBV and institutional-based view of diversification.

2.11.7. RELATED DIVERSIFICATION LEADS TO BETTER FINANCIAL PERFORMANCE

This group of researchers argue that related diversified companies have better financial performance than unrelated diversified firms. These scholars believe that firms may benefit from related diversification by deriving a significant advantage from accumulating strategic assets and the potential links between their strategic business units (Markides and Williamson, 1994). Besides, Chatterjee and Wernerfelt (1991) mention that excess physical, financial and knowledge-based resources motivate firms to adopt related diversification strategies. For example, Bettis (1981) used a sample of 80 firms and demonstrated that related diversified firms' ROA is higher than unrelated diversified firms. Oyedijo (2012) studied 48 Nigerian firms listed in the stock exchange and concluded that related diversified firms outperform unrelated diversified firms in terms of ROE, ROA, sales growth, and profit margin. In another research, by studying 31 Nigerian firms, Oladimeji and Udosen (2019) showed that related diversified firms benefit from higher ROA and ROI than unrelated diversifiers. Similarly, Mehmood and Abdullah (2015) demonstrated that related diversified Malaysian firms have a higher Tobin's Q than unrelated diversified firms. As discussed in section 2.8, this perspective can be justified by the modern portfolio theory, market power theory and resource-based view of diversification.

2.11.8. UNRELATED DIVERSIFICATION LEADS TO BETTER FINANCIAL PERFORMANCE

Although most previous studies demonstrated that related diversification leads to better financial performance than unrelated diversification (Nigam and Gupta 2020, Marouan 2020, Oyedijo 2012, Ng 2007), a group of studies advocate that unrelated diversified firms are more robust than related diversified companies financially. The advocators of this category believe that due to institutional differences, risk mitigation practices, increased market power, and portfolio management, unrelated diversifiers financial performance is more successful than related diversifiers (Purkayastha et al. 2012, Hill and Hoskisson 1987). For example, Dubofsky and Varadarajan (1987) found out unrelated diversification led to better financial performance over related diversification. Also, Hoskisson (1987) proved that the ROA of unrelated diversified firms is higher than their competitors with related diversified strategies. Similarly, Chen and Yu (2012) investigated 98 firms listed in the Taiwanese stock exchange and figured out companies engaged in unrelated diversification strategies outperformed those engaged in related diversification strategies. In addition, unrelated diversified Nigerian firms showed higher ROE than related diversified firms (Oladimeji and Udosen, 2019). Finally, in the insurance context, Morris et al. (2017) claim that insurers employing unrelated diversification strategies demonstrate more robust accounting performance (ROA) than insurers with more related diversification strategies. Table 2.7 summarizes all diversification-firms' financial performance relationships in some selected studies. As discussed in section 2.8, this perspective can be justified by the modern portfolio theory, market power theory and resource-based view of diversification.

Table 2.7: Diversification-firms' financial performance relationships (Source: adapted from several studies)

Diversification-financial performance relationship	Dimension of diversification strategy	Financial performance measure(s)	Related studies
A low level of diversification leads to better financial performance	• Product diversification • Geographic diversification • Technological diversification	ROA ROE MVA Tobin's Q	Clark and Speaker (1994) Rogers (2001) Liebenberg and Sommer (2008) Shim (2011) Chen et al. (2013) Lee (2017) Mehmood et al. (2019)
A high level of diversification leads to better financial performance	• Product diversification • Geographic diversification • Staff diversification	ROA ROE ROS ROI Sales growth	Grant et al. (1988) Meador et al. (1997) Pandya and Roa (1998) Highland and Diltz (2002) Estes (2014) Krivokapic et al. (2017) Shen et al. (2018) Lee and Kim (2020)
Inconsistent and mixed relationships between diversification strategies and financial performance of firm	• Product diversification • Geographic diversification • Staff diversification	ROA ROE Tobin's Q	Elango et al. (2008) Biener et al. (2016) Kagzi and Guha (2018) Mehmood et al. (2019)
U-shaped relationship between diversification strategy and firms' financial performance	• Product diversification • Geographic diversification	ROA ROE ROS Sales growth Risk-adjusted ROA (RAROA)	Mathur et al. (2001) Capar and Kotabe (2003) Thomas (2006) Ma and Elango (2008) Zahavi and Lavie (2013)
Inverted U-shaped relationship between diversification strategy and firms' financial performance	• Product diversification • Geographic diversification • Technological diversification	ROA ROS Equity ratio (total equity divided by total assets)	Qian et al. (2010) Santarelli and Tran (2016) Ali et al. (2016) Kim et al. (2016) Alhassan and Biekpe (2018)

Diversification strategy has no significant impact on Firms' financial performance	• Product diversification • Geographic diversification • Technological diversification	ROA ROE Tobin's Q	Ravichandran et al. (2009) Iqbal et al. (2012) Chen et al. (2013) Raei et al. (2015) Capar et al. (2015) Cahyo et al. (2021)
Related diversification leads to better financial performance	• Product diversification • Technological diversification	ROA ROE ROI Sales growth Profit margin Tobin's Q	Bettis (1981) Oyedijo (2012) Mehmood and Abdullah (2015) Oladimeji and Udosen (2019)
Unrelated diversification leads to better financial performance	• Product diversification	ROA ROE	Dubofsky and Varadarajan (1987) Hoskisson (1987) Chen and Yu (2012) Morris et al. (2017) Oladimeji and Udosen (2019)

2.12. RESEARCH GAPS AND THE CONCEPTUAL FRAMEWORK OF THE STUDY

The literature of diversification as a corporate strategy and its implications for the financial performance of firms entail different, inconsistent, even contradictory conclusions that might not draw a clear path for scholars, managers and decision-makers whether to choose specialization (focus) strategy or diversification strategy for firms' growth. There are several reasons behind the existing variations in the literature, which are highlighted as literature gaps in this thesis. They include using various definitions (scope and breadth) for diversification strategy, differences in research disciplines, contexts, variables, methodologies, different theoretical viewpoints, time dependency of diversification studies, and environmental factors.

One of the most significant reasons behind the differences and contradictions between the findings in the literature is the difference in contexts (Biener et al. 2021, Prada et al. 2017, Sorensen and Madsen 2012, Chari et al. 2008). Basically, researchers may come to different conclusions based on the specific characteristics of the contexts of studies, i.e., the industry or sector in which their studies have been conducted. For example, Lin and Chang (2015) found that technological diversifiers have a better financial performance than their focused competitors, which can be strengthened or

weakened by the contextual factors that confirm this viewpoint. Therefore, although the experience of other researchers in different industries should not be ignored, in order to come to a more accurate conclusion about diversification-firms' financial performance, this relationship has to be sifted through in specific contexts to solve the diversification puzzle. As mentioned earlier, this thesis is the first study investigating the impacts of product, geographic, staff and technological diversification strategies on the financial performance of insurance firms, and more specifically, the insurance firms in Iran.

The second reason for such inconsistencies in the findings of diversification-firms' financial performance studies lies in the definitions and dimensions of diversification since different researchers have used this concept in a relatively narrowed-down form. In other words, while diversification as a corporate strategy that firms use to grow their businesses has different dimensions such as product diversification, geographical diversification, technological diversification, and staff diversification, narrowing down the definition of diversification into only one or two of these dimensions seems to be a significant shortcoming of the past literature. In addition, based on the definition of diversification strategy in this thesis, which is moving beyond the firm's current boundaries, the diversification concept seems to be broader than being studied in only one dimension or a few lines of a business (for example, product diversification in non-life insurers). Some of the previous studies in various industries and specifically in the insurance sector have been included in different sections of this chapter so far (for example, Alhassan and Biekpe 2018, Lee 2017, Morris et al. 2017, Krivokapic et al. 2017, Biener et al. 2016, Shi et al. 2015, Elango et al. 2008, Liebenberg and Sommer 2008, Meador et al. 1997) to demonstrate that this strategy has not been investigated comprehensively in many contexts, including insurance. However, the limitations in the accessibility of data (for confidentiality or competitive reasons) have to be considered in previous studies, particularly in the insurance industry as a highly regulated and competitive industry. In order to overcome this problem, this research defines diversification broadly, which include all four dimensions (product, geographic, technological, and staff diversification). Furthermore, to the best of the researcher's knowledge, no prior studies have investigated the relationship between technological or staff diversification and the profitability of insurance companies. Therefore, this thesis aims to study all four dimensions of diversification in the whole insurance industry of Iran and all existing lines of business instead of focusing on some of the insurance firms which offer limited insurance products.

The next reason behind the existence of different results in the diversification-performance literature is the wide range of variables used in this research area (Dhir and Dhir 2015, Purkayastha 2013, Datta et al. 1991). This issue has been extensively discussed in sections 2.9 and 2.10 of this chapter. However, this study utilizes ROA and ROE as two financial ratios that are primarily used in the literature to measure firms' financial performance objectively, controlling for firms' specific variables such as age, size, ownership structure and type of the firm, to investigate the relationships between different dimensions of diversification strategy and firms' financial performance.

Besides, differences in the theoretical viewpoints underpinning the literature play a vital role in various findings on the relationships between diversification and firms' financial performance. However, it is not possible to reach a solid conclusion about the benefits of a specific strategy based on one theoretical perspective solely (Palich et al. 2000, Seth, 1990). Therefore, to address this shortcoming of the previous studies that have adopted only one theory of diversification while studying the diversification-firm's financial performance relationship, this thesis is not bound to only one theoretical viewpoint. Instead, the researcher used different theories of diversification to understand and justify the relationships between this competitive strategy and firms' financial performance in the insurance industry of Iran.

Moreover, as most of the diversification-performance studies have been conducted in the developed economies (Palich et al. 2000, Nachum 2004, Benito Osorio et al. 2012, Nguyen 2018), to account for the institutional differences of the countries that diversifiers are settled in, which are sometimes known as environmental factors (Benito Osorio et al. 2012, Miller and Yang 2016), this study focuses on a developing economy, i.e., Iran to investigate this relationship.

In addition, the time dependency factor of the diversification-firm's financial performance relationships is highlighted in the literature (Schommer et al. 2019, Benito Osorio et al. 2012, Neffke et al. 2011). Therefore, regardless of the historical findings and trends, this thesis collects the relevant data for ten years (from 2011 to 2020) to investigate the impacts of diversification on insurance companies at the present time.

Overall, this thesis aims to use a broader definition of diversification through using and combining its different applicable dimensions for the insurance industry (product, geographic, technological and staff diversification), considering appropriate and popular financial performance variables (ROA and ROE), while controlling for firm's

age, firm's size, the ownership structure of firms and firm's type impacts on the relationships. Incorporating the variables mentioned above in the context of this study for the first time (insurance industry) makes this research a comprehensive study in the literature of diversification-financial performance. To summarize, the proposed conceptual framework for this research is illustrated in Figure 2.6. The relevant hypotheses derived from this literature review and theoretical framework will be discussed in Chapters 5 and 6 in detail.

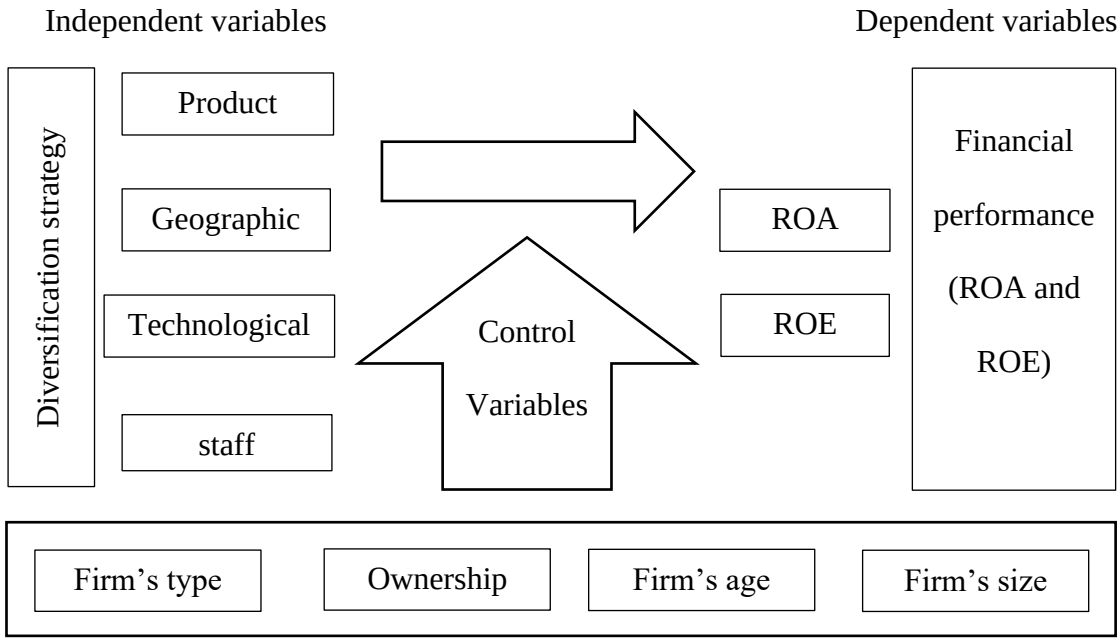

Figure 2.6: The conceptual framework of the Research

As discussed later in Chapter 5, the measurement method of technological diversification is customized for the Iranian insurance industry in this thesis, and through primary data collection, technological diversification is defined for the first time in the context of the study. On the other hand, proxies for the product, geographic and staff diversification are explained in detail in Chapter 6. In order to measure these three dimensions, the thesis applied secondary for ten years. It is worthwhile mentioning that in this thesis, product diversification is measured using two different indicators: the number of policies and the total premium collected in any specific line of business. Furthermore, geographic diversification means the number of branches and sales agents of an insurance company in this study. Moreover, three measures are defined for staff diversification, including work experience, gender and education of staff.

In addition, this thesis assumes that firms diversify based on their available resources, which is consistent with the RBV of diversification. In other words, diversifiers are supposed to have enough resources in order to pursue a diversification strategy. Therefore, any negative or insignificant relationship between diversification and firms' financial performance is moderated by factors other than resources that can be studied under the agency theory or institutional-based view of diversification.

2.13. SUMMARY OF THE CHAPTER

This chapter reviewed and analysed the previous studies about diversification strategies and the financial performance of firms. The existence of different definitions and dimensions of diversification strategies in the literature, contextual dependency of diversification-firms' performance relationships, having been studied in different disciplines (including business and management, finance and economics), and various variables, methodologies and assumptions which other researchers have used, made the synthesis of the literature much important for this study.

As a result, this literature review consists of 11 main sections, excluding the chapter's introduction, summary, and conclusion. The first section discussed diversification strategy from the lens of strategic management, which is the general theme of this thesis. After that, several definitions of diversification are provided and discussed. It helped to understand how broad (or narrow) diversification strategy is defined by pioneer researchers in this field (Ansoff 1957 and Gort 1962) and how those definitions evolved over time. Then, different dimensions of diversification strategy are introduced in section 2.4. This thesis introduced four dimensions of diversification strategy: product diversification, geographic diversification, technological diversification and staff diversification. No evidence shows these four dimensions have been studied simultaneously in one study. Besides, to the best of the researcher's knowledge, while the last two dimensions, i.e., technological and staff diversification, have been studied very limitedly in the context of insurance, all four dimensions are new to be studied in Iran's insurance industry. In addition, the breadth of diversification and relatedness vs unrelatedness of diversification strategies are discussed in this chapter. However, similar to the literature in other disciplines, examples of both related and unrelated diversification can be found among insurers (Krivokapic et al. 2017, Berry-Stolzle et al. 2012).

The next section of this chapter explains different measurements of diversification. Standard industrial classification (SIC) system, Herfindahl Hirschman Index (HHI) and Jacquemin and berry entropy measure of diversification are introduced as three common methods for measuring diversification strategies. However, this study will use HHI and other methods discussed later in chapters 5 and 6. Furthermore, the reasons for the attractiveness of diversification strategies for firms and dominant theories underpinning diversification strategy literature are discussed in sections 2.7 and 2.8, respectively. Modern portfolio theory (MPT), institution-based theory, resource-based view (RBV) theory, agency (principal-agent) theory, and market power theory are among the most common theories about diversification strategies that have been covered in this chapter. Continuing with definitions of firms' performance, section 2.9 explains different categories of this concept, including subjective vs objective and financial vs non-financial measures of a firm's performance. However, this thesis utilizes financial measures to investigate firms' performance. After that, popular variables in diversification strategy-firms' performance research are discussed. In addition to the four dimensions of diversification strategy used as independent variables, this study measures the financial performance of firms by ROA and ROE, which are the most common measures in the literature, while controlling for firms' specific elements including size, age, ownership structure and type of insurance companies.

One of the most challenging and interesting parts of this literature review is presented in section 2.11. This section explains how diversification strategies can affect firms' financial performance. By synthesizing the literature of diversification-firms' financial performance, eight groups of relationships are found by previous researchers: Low level of diversification leads to better financial performance, that can be summarized as (1) Low level of diversification leads to financial performance, (2) high level of diversification leads to better financial performance, (3) inconsistent and mixed relationships between diversification strategies and financial performance of firms, (4) U-shaped relationship between diversification strategy and firms' financial performance, (5) inverted U-shaped relationship between diversification strategy and firms' financial performance, (6) diversification strategy has no significant impact on Firms' financial performance, (7) related diversification leads to better financial performance, and (8) unrelated diversification leads to better financial performance. The existence of so many contradictory findings of the diversification-firms' financial relationship highlights the importance of reviewing and investigating Iran's insurance market to provide policy and

managerial implications for regulators and insurance firms management teams. Accordingly, based on the definitions, dimensions, theories, variables, and methods of calculations introduced for diversification strategies, firms' financial performance and their relationships in this chapter, section 2.12 highlights the literature gaps and the conceptual framework of this thesis. The other chapters of this study benefit from this literature review, specifically Chapters 5 and 6 that focus on the relationships between technological, staff, geographic and product diversification and ROA and ROE of Iranian insurers.

CHAPTER 3: RESEARCH CONTEXT: IRAN'S INSURANCE INDUSTRY

3.1. INTRODUCTION

This chapter explains the insurance industry of Iran, its role in Iran's economy and its position among neighbour countries and other regions. It focuses on some of the critical insurance and economic indicators such as insurance penetration rate (IPR), insurance premium and gross domestic product (GDP). Additionally, it provides an overview of the insurance industry in Iran, its market structure, the active insurance firms and their market share. As discussed in Chapter 2 (Literature Review), the contextual, environmental and time dependencies of diversification strategy in relation to the firms' financial performance are significantly highlighted by researchers (Biener et al. 2021, Schommer et al. 2019, Prada et al. 2017, Miller and Yang 2016, Sorensen and Madsen 2012, Benito Osorio et al. 2012, Neffke et al. 2011, Chari et al. 2008).

In contrast to developed economies, Iran as a developing economy lacks well-established institutions to facilitate the insurance business, while institution based theory of corporate diversification is mainly focused on the institutional differences between developed and developing economies (Ali et al. 2016, Zhang et al. 2015, Lee et al. 2008, Peng et al. 2005). The concept of the institution based theory is built on how different institutions (for example, laws and regulations, cultures and beliefs) are formed over time and in which ways changes of these institutions affect firms' strategy selection and financial performance in a country (Chen et al. 2020, Peng et al. 2018, Kim et al. 2010). However, as most studies on the relationship between diversification and firms' financial performance have been conducted in developed countries (Palich et al. 2000, Nachum 2004, Benito Osorio et al. 2012, Nguyen 2018), which are institutionally different from developing nations, the previous findings of the literature may not be simply generalizable from one economy to another. Consequently, it is crucial to focus on studying this relationship in developing countries such as Iran.

Apart from the author's familiarity with Iran's insurance industry due to working in different Iranian insurance firms for about ten years, another reason for choosing this market is the accessibility of data. Wang and strong (1996) argue that data accessibility and quality (completeness and accuracy) are among the critical factors for reliable research. Therefore, this can be a personal motive for the researcher, as the central

insurance of Iran (CII) provides comprehensive and detailed data of Iranian insurance companies annually, facilitating the investigations intended by this thesis.

3.2. A COMPARISON BETWEEN IRAN, REGIONAL AND GLOBAL INSURANCE INDUSTRIES

In the modern world, individuals and governments are more interested in risk transfer techniques, including insurance, as a mechanism to mitigate the negative impacts of unfavourable, loss-producing incidents (Okonkwo and Eche, 2019). In addition, insurance companies make important contributions to nations' economies, and Iran is no exception. In order to understand the role of the insurance industry in Iran's economy, some basic definitions are provided in this section.

One of the most important indicators of the development of the insurance industry in any country is the insurance penetration rate (Alhassan and Fiador, 2014), where a higher insurance penetration rate in an economy indicates its more developed insurance industry. The insurance penetration rate is defined as the total amount of insurance premiums collected in one country expressed as a percentage of the gross domestic product (GDP). Therefore, the insurance penetration rate is the ratio of the total premium generated in an economy divided by the GDP (Okonkwo and Eche, 2019).

The other important concept used in this chapter is the premiums per capita index, which is defined as the total insurance premiums collected in an economy in one year divided by the country's total population in the same year (Balcilar et al. 2019, Beenstock et al. 1988). To demonstrate the importance of the insurance industry to Iran's economy, Tables 3.1 and 3.2 compare Iran's insurance industry to those of other countries, both regionally and globally, using insurance penetration rate and premiums per capita. Since the data of Table 3.1 is extracted from the annual reports of central insurance of Iran, to follow their classification approach, the region is defined the same in this study which includes Iran, Saudi Arabia, Kuwait, United Arab Emirates (UAE), Egypt, Qatar, Oman, Bahrein, Pakistan and Kazakhstan accordingly.

Table 3.1: Iran vs global economics and insurance indexes comparison (Source: central insurance of Iran annual report 2020)

Economic vs insurance indexes		2018	2019
Economic indexes	Ranking of the country based on GDP	29	26
	GDP per annum (billion USD)	443.3	475.9
	Population (in million)	82.1	83.1
Insurance indexes	The total premium collected (billion USD)	10.9	12
	Total premium collected growth rate adjusted by inflation (%)	9.4	10.3
	Ranking of the country based on the total premium collected	40	38
	Share of life insurance premiums collected (%)	14.5	14.3
	premiums per capita (USD)	133	145
	Insurance penetration rate (%)	2.46	2.52

Table 3.2: Iran, regional and global insurance industries statistics (Source: central insurance of Iran annual report 2020)

Title		2018	2019
Iran's insurance industry	Total premium collected growth rate (%)	9.4	10.3
	Share of life insurance premiums collected (%)	14.5	14.3
	premiums per capita (USD)	133	145
	Insurance penetration rate (%)	2.46	2.52
Regional insurance industry	Iran's share of total premiums collected (%)	15.1	15.7
	Total premium collected growth rate in average (%)	-1.6	5.7
	Share of life insurance premiums collected in average (%)	27.4	27.3
	Premiums per capita in average (USD)	132	134
	Insurance penetration rate in average (%)	2	1.9
Global insurance industry	Iran's share of total premiums collected (%)	0.18	0.19
	Total premium collected growth rate in average (%)	2.4	2.3
	Share of life insurance premiums collected in average (%)	46.9	46.3
	Premiums per capita in average (USD)	682	818
	Insurance penetration rate in average (%)	6.1	7.2

As shown in Tables 3.1 and 3.2, while Iran's insurance penetration rate in 2019 is higher than the regional average (2.52 per cent and 1.9 per cent, respectively), it is far below the global average in the same year (7.2 per cent). It implies that the insurance industry is less developed in Iran compared to the developed economies. Besides, the

share of life insurance policies in the total portfolio of insurers is another index for understanding how developed an insurance industry is. Outreville (1996) argues that the life insurance share of the total insurance portfolio is small in many developing economies, as life insurance might be perceived as irrelevant or inappropriate for ideological, cultural, or religious reasons. This argument is confirmed by comparing the total share of life insurance from the total insurance premiums collected in Iran with regional and global trends in Table 3.2. While Iran's share of life insurance policies from total premiums collected in 2019 is 14.3 per cent, the respective average ratios are 27.3 per cent and 46.3 per cent regionally and globally. Based on the institutional-based view of firms, such statistics can also strengthen the significance of studying diversification-firms' financial performance relationship in Iran's market exclusively to understand whether diversified firms (such as general insurers) or focused firms (for example, life insurers) are more financially successful. By doing so, the central insurance of Iran can take appropriate policies to encourage new firms how to operate in the market, i.e., as general insurers or life insurers. Tables 3.3 and 3.4 compare premiums per capita and insurance penetration rates of Iran, some developing and developed countries with the global average for a period of 10 years (2010 to 2019), respectively. The ten years period trends confirm the above discussion about institutional-based theory as well.

Table 3.3: Iran, selected developing countries, selected developed countries and global average premiums per capita (USD) (Source: central insurance of Iran annual report, 2020)

Country \ Year		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Selected developing countries	Kuwait	236	289	337	284	291	269	280	201	315	318
	Qatar	619	530	696	945	979	1268	1288	-	-	489
	Pakistan	6	8	9	9	11	12	13	13	16	12
	Egypt	19	21	22	23	24	23	23	16	16	19
	UAE	1248	1380	1464	881	974	1102	1102	1436	1305	1302
Selected developed countries	USA	3759	3846	4047	3992	4017	4096	4174	4216	4481	7495
	Japan	4390	5169	5168	3888	3778	3554	3732	3312	3466	3621
	UK	4497	4535	4350	4511	4823	4359	4064	3810	4503	4362
	France	4187	4041	3544	3669	3902	3392	3395	3446	3667	3719
	Germany	2904	2967	2805	2976	3054	2563	2548	2687	2908	2934
Iran		77	93	141	84	96	96	112	123	133	145
Global average		627	661	656	645	662	627	634	650	682	818

Table 3.4: Iran, selected developing countries, selected developed countries and global average insurance penetration rates (%) (Source: central insurance of Iran annual report, 2020)

Country \ Year		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Selected developing countries	Kuwait	0.5	0.5	0.5	0.5	0.6	0.9	0.9	0.7	1	1
	Qatar	0.8	0.5	0.6	1	1	1.5	2	-	-	0.7
	Pakistan	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.9
	Egypt	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.6	0.6
	UAE	2.1	1.8	2	2	2.2	2.4	2.9	3.7	2.9	3.1
Selected developed countries	USA	8	8.1	8.2	7.5	7.3	7.3	7.3	7.1	7.1	11.4
	Japan	10.1	11	11.4	10.3	10.8	11.4	9.5	8.6	8.9	9
	UK	12.4	11.8	11.3	10.8	10.6	10	10.2	9.6	10.6	10.3
	France	10.5	9.5	8.9	8.6	9.1	9.3	9.2	9	8.9	9.2
	Germany	7.2	6.8	6.7	6.5	6.5	6.2	6.1	6	6	6.3
Iran		1.4	1.4	1.9	1.7	1.9	2.1	2.2	2.3	2.46	2.52
Global average		6.9	6.6	6.1	6.3	6.2	6.3	6.2	6.1	6.09	7.23

It is concluded from Table 3.4 that there is a meaningful difference between developed and developing countries' insurance penetration rates. Besides, the selected developing countries are all Muslim countries that are geographically close to Iran or are the neighbours of this country. However, apart from the economic reasons (such as GDP per capita), low shares of life insurance from the total portfolio of the insurance industry is known as one of the significant reasons for low insurance penetration rates among the Muslim nations, which is attributed to their cultural characteristics (Zerriaa and Noubbigh 2016, Hashempoor 2013, Feyen et al. 2011). Similarly, according to the Zurich Re report (2015), cultural and religious beliefs are among the main factors of relatively low demand for insurance in the Middle East and North Africa (MENA) countries, which are all Muslim nations[2]. Therefore, from an institutional-based view, firms' strategic choices might differ based on the institutional features of their home countries. Therefore, the above statistics and arguments reinforce the need to study the diversification-performance relationships for insurers in developing countries such as Iran, a Muslim country with specific economic, social, cultural and religious characteristics.

3.3. PROVIDERS OF INSURANCE COVERAGE IN IRAN

Before starting the discussion in this section, it should be noted that social security insurance products are excluded from the statistics and operations of the insurance industry according to existing laws and regulations in Iran. In other words, the commercial insurance lines are separated from the country's social insurance lines, which is compatible with the general categorization of insurance in the literature (Wen and Wallace 2019, Lewis and Lloyd-Sherlock 2009, Marmor and Mashaw 2006). While the "insurance industry" deals with all commercial lines of insurance, social lines are handled by the Ministry of Welfare and Social Security of Iran. Therefore, in this thesis, Iran's insurance industry means all the operations and insurance coverages offered by Iranian commercial insurers. According to the central insurance of Iran annual report, 33 domestic insurance firms were active in Iran's insurance industry in 2020. From the ownership structure point of view, 29 of these insurers are private firms, three companies are semi-private, and there is only one insurance company that the government wholly

[2] By Muslim nation, the author means any country that the majority of its population are Muslim.

owns. While the oldest modern insurance company has been operating in Iran's market since 1935, more insurance companies have joined the market over time. For example, the newest insurance firm has been operating in the industry for just over a year.

Among those 33 insurance companies, two firms that have been established recently are focused on life insurance lines. In addition, two firms are active in the reinsurance area, two firms are exclusively focused on the protection and indemnity (P&I) coverages, and the others are all general insurers, i.e., they have been licenced by the central insurance of Iran to accept life and non-life risks. Furthermore, while 27 insurance companies are allowed to operate in the whole country, six firms are licenced to operate only in economic free zones.

Moreover, it should be mentioned that, since the Islamic Revolution in 1979, all foreign insurance companies used to work in Iran were closed due to nationalization and confiscation (Hashempoor, 2013). Therefore, no foreign direct insurance company is allowed to work in the country due to the laws and regulations. In the last 42 years, the insurance-related interactions of Iran with other countries have been limited to reinsurance operations and insurance of off-shore projects. However, due to heavy US economic sanctions against Iran in recent decades, the vast majority of the international insurance and reinsurance firms cooperating with Iranian insurers and reinsurers left the market in order to prevent being punished financially by the US government. Table 3.5 demonstrates all active Iranian insurance firms in 2020, their ownership structure, geographic and product domains of activity, and, finally, their age.

Table 3.5: Iranian insurance firms' information
(Source: central insurance of Iran annual report 2020)

Number	Insurer's name	Ownership structure	Geographic domain of activity	Age of the insurer (year)	Type of the insurer
1	Iran	Public	Whole country	86	General insurer
2	Asia	Semi-private	Whole country	62	General insurer
3	Alborz	Semi-private	Whole country	62	General insurer
4	Dana	Semi-private	Whole country	32	General insurer
5	Parsian	Private	Whole country	18	General insurer
6	Tose'e	Private	Whole country	18	General insurer
7	Razi	Private	Whole country	18	General insurer
8	Kar Afarin	Private	Whole country	18	General insurer
9	Sina	Private	Whole country	18	General insurer
10	Mellat	Private	Whole country	18	General insurer
11	Omid	Private	Economic free zones	17	General insurer
12	Amin Re	Private	Whole country	17	Reinsurer
13	Hafez	Private	Economic free zones	17	General insurer
14	Dey	Private	Whole country	16	General insurer
15	Saman	Private	Whole country	16	General insurer
16	Iran Moein	Private	Economic free zones	15	General insurer
17	Novin	Private	Whole country	15	General insurer
18	Pasargad	Private	Whole country	14	General insurer
19	Moalem	Private	Whole country	13	General insurer
20	Mihan	Private	Whole country	12	General insurer

21	Iranian Re	Private	Whole country	11	Reinsurer
22	Kowsar	Private	Whole country	10	General insurer
23	Ma	Private	Whole country	10	General insurer
24	Kish P&I	Private	Economic free zones	10	P&I club
25	Arman	Private	Whole country	9	General insurer
26	Qeshm P&I	Private	Economic free zones	8	P&I club
27	Asmari	Private	Economic free zones	8	General insurer
28	Taavon	Private	Whole country	8	General insurer
29	Sarmad	Private	Whole country	8	General insurer
30	Tejarate No	Private	Whole country	5	General insurer
31	Khavar Mianneh Life	Private	Whole country	4	Life insurer
32	Hekmate Saba	Private	Whole country	4	General insurer
33	Baran Life	Private	Whole country	1	Life insurer

By dividing lines of insurance business into life and non-life, in addition to different types of life insurance policies, Iranian insurance companies offer a wide range of products, including fire insurance, cargo insurance, liability, third-party liability (TPL) and comprehensive auto insurance, marine insurance, aviation insurance, health and medical insurance, money insurance, credit insurance, engineering insurance, oil and petroleum insurance, and casualty insurance. Moreover, other lines of business that are less common in the country, such as fidelity guarantee insurance and livestock and poultry insurance, are covered under the category of “other lines” of insurance coverages, as compared to other lines of business, they are not big enough to be considered as separate lines in the insurance industry (the CII annual report 2020).

Theoretically, general insurers can operate more diversely in terms of insurance products. In other words, product diversification based on the number of business lines can be expected to be higher among general insurers than focused insurers (for example,

life insurers and P&I clubs) in the insurance industry of Iran. However, although the Iranian general insurers are licenced to accept risks in all of the insurance products mentioned above, according to the CII annual report (2020), they are not equally active in entire lines of business. Furthermore, while some insurers are interested in offering their customers new insurance products (for example, cyber insurance), other insurance companies are reluctant to operate in such fields. These differences can be studied under diversification strategies of firms which is the focus of this thesis. Table 3.6 summarizes the primary insurance coverages sold by Iranian insurers and their respective shares of the total premiums generated in the industry in 2019.

Table 3.6: Insurance products and their respective shares of the total premiums generated in Iran's market in 2019 (Source: central insurance of Iran annual report 2020)

Types of the commercial insurance	Number	General category	Insurance coverages	Share of the total premiums generated in the industry
Life insurance	1	Life insurance	Level term, decreasing term, increasing term, whole of life	14.3
Non-life insurance	2	Fire insurance	Industrial, non-industrial, home, warehouse, shop and mall	4.4
	3	Cargo insurance	Imported and exported goods, domestic cargo, oil and petroleum cargo, Hajj cargo	1.3
	4	Casualty insurance	Workmen's compensation, group and individual casualties, Hajj and expatriate casualties, education and occupational casualties	0.8
	5	Auto insurance	Driver's casualty, Comprehensive auto insurance, third-party liability (TPL) insurance	45.65
	6	Health and medical insurance	Family, individual and group medical insurance, expatriate medical insurance, Hajj medical insurance	22.9
	7	Marine insurance	Hull, machinery, marine cargo and liability	1
	8	Aviation insurance	Hull, the liability of passengers, crew and comprehensive	0.9
	9	Engineering insurance	Erection all risk (EAR), construction all risk (CAR), machinery break down, computer and electrical equipment, business interruption (BI)	1.8

	10	Money insurance	Cash in safe and cash in transit	0.02
	11	Liability insurance	Professional liabilities, general liabilities, contractors liabilities, cargo liability insurance, product liability, public liability	4.6
	12	Credit insurance	Loan credit insurance, exporters credit insurance	0.01
	13	Oil and petroleum insurance	Fire and engineering	2.3
	14	Other types	fidelity guarantee insurance, livestock and poultry insurance	0.02

It is concluded from Table 3.6 that the main focus of the insurance industry in Iran is on auto insurance and health and medical coverages since they are ranked as the first and the second popular lines of the insurance business (45.6 per cent and 22.9 per cent, respectively). Considerable demand for auto insurance in Iran can be attributed to the fact that it is compulsory to purchase this coverage for Iranian car owners. Besides, many Iranian firms purchase health and medical insurance for their employees, which leads this line of business to stand in the second rank of attractive insurance coverages in the country. To control for the variations in different types of insurance, product diversification will be studied as one of the main dimensions of diversification strategy in this thesis.

3.4. CENTRAL INSURANCE OF IRAN: THE REGULATORY AND SUPERVISORY BODY OF THE INSURANCE INDUSTRY

Insurance firms contribute to the economic growth of nations through financial compensation of losses by providing economic safety for business entities (Rusetskiy et al., 2018). In addition, they play an important role in any country's monetary and credit policies (Hashempoor 2013) and are considered a key element of economic developments of nations (Hussein and Alam 2019, Liedtke 2007). As a result, similar to other financial services such as banks and securities, supervision of insurance activities is critically significant in any economy (Bach et al. 2021, Elderfield 2009, Schiro 2006). In 1920,

international insurance firms started to sell insurance products in Iran. Fifteen years later (in 1935), the first Iranian insurance company was established, which is still operating in the market until this date. In addition to the regular business of insurance (that is, underwriting and claims handling), this firm (named Iran insurance company) was assigned to act as the regulatory body of the market by Iran's government in those years.

As the supervision of other insurers and selling insurance products used to be done simultaneously by this company, it led to negative impacts on the competition of other Iranian insurance companies (Karimi, 2008, page 19), as Iran insurance company could restrict the operations of other rivals in the market to capture their market share. Moreover, as a result of an increase in the number of insurance companies in the market in the following years, the need to supervise the industry through an independent governmental organization increased. Such an organization could also facilitate developing some standards for the insurance operations to protect both insurers and insureds in Iran (Hashempoor, 2013). Therefore, the government decided to establish the central insurance of Iran in 1971. This organization is the regulatory and supervisory body of all commercial insurance activities, including direct insurance, reinsurance and P&I clubs. The establishment of the central insurance of Iran created more consistency for the industry. Since then, "Iran's insurance supreme council", which operates as a division of the CII, is the body that ratifies different insurance laws and regulations (Karimi, 2008, page 20) to expand commercial insurance in the country. These activities include (but are not limited to) identification of maximum and minimum permitted premium rates, identifying types of insurance products that are sold in the market, issuance of business permits for insurance companies and brokers, supervision of insurers on behalf of the government, domestic and international reinsurance operations, and provision of insurance statistics for market transparency.

Government supervision exists in almost any insurance industry, including those economies that follow free market system to prevent market failures, while the degree of government supervision and intervention is different from one country to another (Askari Firouzjaei et al. 2020, Amin Tahmasbi and Shariatmadari 2018, Samadi and Mohammadzade 2018). The other main reason for government intervention in the insurance market is to support insurance companies in offering appropriate products at fair prices while maintaining the quality of services (Farshbaf Maherian 2008, page 82). However, based on the discussions mentioned above, and as stated by other scholars (Ghahroud et al. 2021, Sanayei et al. 2009), the insurance market in Iran is highly

regulated, and the government intervention in this industry is quite high. As a result, any activity of insurance firms is under the strict supervision of Iran's government. However, Karimi et al. (2010) argue that the existence of sophisticated rules and regulations is one reason for the poor development of the insurance market in Iran, and therefore, deregulation is necessary for this industry.

More specifically, firms diversification or focus strategies are also affected by the regulatory body of the Iran insurance industry. For example, actuarial calculations (upper and lower limits for the premium rates of insurance policies) are done by the CII, and all Iranian insurers are supposed to follow the prescribed rates, which can negatively affect competition in the market. Furthermore, another anti-competitive restriction is that international insurers are not allowed to operate in the market freely. Instead, according to the Act on Establishment of Central Insurance of Iran and Insurance Operation (1971), foreign insurers are only allowed to enter the domestic market if authorised by the central insurance and the board of ministers of Iran. Besides, new insurance products which have not been sold in the market yet should be submitted to the CII first, and if authorized, the proposing insurance company can accept related risks in that new field. It should be mentioned that this process is both time consuming and complicated, which may push the potential insured to find another way to manage the risk (for example, risk tolerance or insuring the risk with foreign insurers). Such complications that can affect firms' diversification strategies are valuable to be studied under the institutional view of diversification.

There are also some geographic and technological limitations for insurers in the market imposed by the CII. Based on the current regulations, Iranian insurers are allowed to operate either in the mainland or economic free zones. Therefore, it is not possible for an insurance firm that is licenced to operate in a specific geographic area to accept risks outside that region. It leads to operational and marketing complications as many of the insured's risks are spread in both mainland and the economic free zones. In addition, to maintain access to insurance companies' data, the CII obliged Iranian insurers to use a specific software package for their underwriting and claim settlement operations. Although insurance technology is not limited to information technology (IT), the government has created a mandatory monopoly for insurers in IT in the country. According to the abovementioned examples, the importance and relevance of the institutional-based view theory of diversification are more highlighted for Iranian

insurers. Therefore, understanding the diversification-firms' financial performance relationship in this market is needed to be studied.

3.5. MARKET STRUCTURE OF IRAN'S INSURANCE INDUSTRY

Table 3.7 demonstrates the direct insurers' market share in 2019. Although in 2010, one governmental insurance company had a 45 % market share of Iran's insurance industry, several private insurance companies have been added to the market during the last ten years. Nevertheless, the governmental sector is still very powerful and possesses almost one-third of the industry income (32.3 %), while semi-private insurers captured 22.9 % of the market, and 44.8 % of the market belongs to 28 private firms. From a market structure point of view, the big five insurance companies have collected 62.2 % of the total generated insurance premiums in Iran's insurance industry, representing an oligopolistic market structure. Additionally, the Herfindahl Hirschman Index of concentration (HHI) is widely used to determine the competition in a market (Alihodzic 2021, Odinokova and Istomina 2018). According to the CII, the latest HHI score of Iran's insurance market is 1538. Following the rule of thumb used in the literature, as the HHI score between 1000 and 1800 indicates moderate concentration (Ukav, 2017), it is confirmed that oligopoly exists in the country's insurance industry.

Table 3.7: Iranian direct insurers' market shares in 2019 (Source: central insurance of Iran annual report 2020)

Number	Direct insurer's name	Ownership structure	Market share (%)
1	Iran	Public	32.3
2	Asia	Semi-private	9.8
3	Alborz	Semi-private	5.2
4	Dana	Semi-private	7.9
5	Parsian	Private	4.7
6	Tose'e	Private	0.0
7	Razi	Private	1.7
8	Kar Afarin	Private	2
9	Sina	Private	2.2
10	Mellat	Private	2.4
11	Omid	Private	0.2
12	Hafez	Private	0.1
13	Dey	Private	6.8
14	Saman	Private	2.2
15	Iran moein	Private	0.4
16	Novin	Private	1.6
17	Pasargad	Private	5.4
18	Moalem	Private	3.9
19	Mihan	Private	0.5
20	Kowsar	Private	4.1
21	Ma	Private	1.7
22	Kish P&I	Private	0.1
23	Arman	Private	0.7
24	Qeshm P&I	Private	0.2
25	Asmari	Private	0.2
26	Taavon	Private	0.6
27	Sarmad	Private	1.6
28	Tejarate No	Private	1
29	Khavar Mianneh Life	Private	0.04
30	Hekmate Saba	Private	0.3

An oligopoly is a market structure where power and market share are distributed only among a small number of companies (Rosenberg and O'Halloran 2014). In addition, the dynamic of oligopolistic markets is more complicated than other market structures, as companies should take into account consumers' behaviours and the rivals' reactions as well (Sarafopoulos and Papadopoulos 2019). Olah et al. (2019) state that in an oligopolistic market, a limited number of firms mainly determine the price of products, which most probably will be accepted and followed by smaller rivals. It is much similar to the insurance industry of Iran as the biggest companies in the market, which are governmental or semi-governmental, are known to be price leaders. However, as price war is not much common in an oligopolistic market (Brock 2006, Vickner and Davies 2000), firms are interested in pursuing other patterns of competition such as product differentiation or diversification strategies (Brumand 2020, Sarafopoulos and Papadopoulos 2019, Nagurney and Li 2014, Kawasaki et al. 2014, Mazzeo 2002, Pearson 1993). In addition, based on the market power theory, firms are interested in diversification in oligopoly markets and industries (Chatterjee 1991, Bresnahan 1989). Therefore, investigating diversification strategy in Iran's insurance industry is also justifiable from this theoretical perspective.

3.6. SUMMARY OF THE CHAPTER

This chapter discussed the insurance industry of Iran through a comparison between Iran, regional and global insurance industries, explaining the role of the insurance regulatory body and Iranian providers of insurance coverages, types of available insurance products for the customers, and finally, the industry's market structure. The regulatory body in the industry is the central insurance of Iran which tightly supervises insurance companies. Commercial insurance firms include direct insurers (life and general insurers), reinsurers and protection and indemnity (P&I) clubs. Although all governments supervise the insurance sector, all 33 providers of different insurance coverages are affected by the policies, laws and regulations governing the market. It includes insurers' strategic decisions about diversification. Therefore, as discussed earlier in this chapter, different dimensions of diversification strategy (such as product, geographic and technological diversification) are controlled by the government to some extent. This reality is justifiable by the institution-based view theory of diversification, which explains that the financial outcomes of different diversification strategies depend on the country's institutional

structure. Therefore, the chapter highlighted the significance of studying diversification in the Iran insurance context and understanding its financial implications for Iranian insurers.

CHAPTER 4: RESEARCH METHODOLOGY

4.1. INTRODUCTION

This chapter discusses the philosophical position of this thesis, as well as research methodology and methods used to examine the relationship between diversification strategy and firms financial performance in the Iranian insurance sector. It is followed by explaining how and why various models are developed in this thesis. Additionally, the chapter presents the types of data used in this thesis, sampling method, sample size, validity, reliability, generalizability and ethical issues involved in this study. Furthermore, while this chapter aims to explain and demonstrate how various variables used in this thesis are constructed and defined, emphasis is given to discussing how the theoretical framework of the investigated models is extracted through using associated variables and why multiple regression analyses are necessary as the major tools of analysis in the study.

4.2. PHILOSOPHY OF RESEARCH

The philosophy of research involves the following key elements, including research paradigms, ontological, epistemological and axiological positions of a researcher, choosing research strategy, research problem formulation, collection of data, and finally, data analysis techniques. Research philosophy can be defined as a set of beliefs and assumptions about the development of knowledge (Saunders et al., 2016, p. 124). A researcher may deal with a number of assumptions in the course of their research. These assumptions can be related to what is meant by reality (ontological assumptions), what is meant by knowledge (epistemological assumptions), how the researcher's beliefs and values influence the process of research (axiological assumptions) and also methodological assumptions (Saunders et al. 2019, p. 130). The set of the assumptions mentioned above determines how research questions, methods, and interpretation of findings in a study are framed.

It is important to mention that ontology, epistemology, axiology, methodology and methods indeed do not exist in isolation individually; instead, they interact with one another, and each of these terms supports and is supported by others during the course of research (Crotty 1998). Similarly, Stanley (2012) argues that ontological assumptions cannot be separated from other assumptions, including epistemological and

methodological ones. In addition, according to Crotty's study (1998), methods and methodology should be constructed concerning the epistemological and ontological stance, while the research design or strategy indicates the researcher's world view and knowledge perceptions. Therefore, gaining a deep insight into the philosophy of research such as ontological, epistemological, and axiological positions seems to significantly impact how researchers choose relevant methodologies and methods to research any discipline, including business and management. Figure 4.1 illustrates a flowchart of different research philosophy terms and their brief definitions.

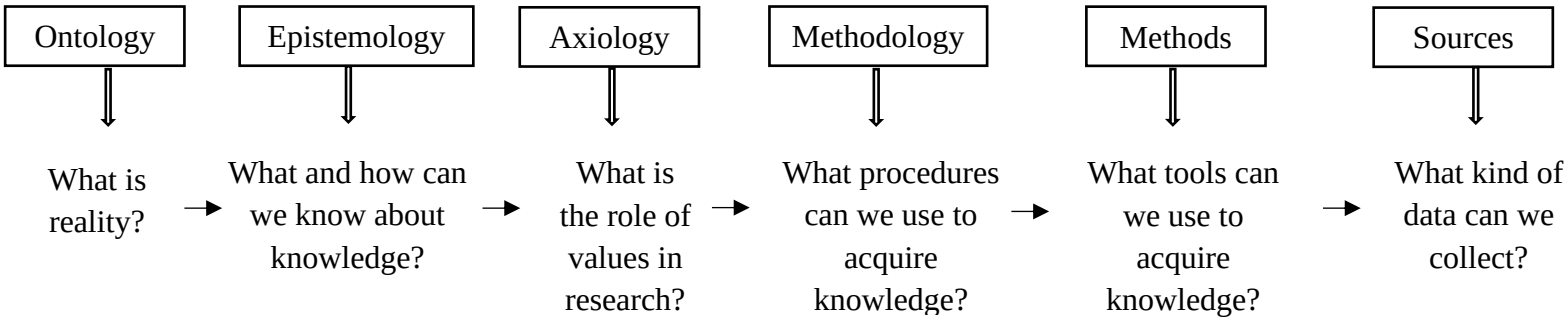

Figure 4.1: A flowchart of research philosophy terms
(Source: Indarti 2016 and McGregor 2018)

4.2.1. ONTOLOGY AND ONTOLOGICAL POSITIONS

Ontology is defined as the presuppositions or innate conceptions about the nature of this world (Chatterjee, 2013). Ejnavarzala (2019) emphasise that ontology deals with the existential conditions related to different social, cultural, and political phenomena. As a result, ontology can be interpreted as how people think about the world and understand the nature of realities (Killam 2013, p 7). In other words, what constitutes reality and how human beings can understand existence is the concept of ontology. As illustrated in Figure 4.2, if different ontological positions are considered a spectrum, positivist, objectivist or realist ontology vs subjectivist, relativist or idealist ontology are located on the opposite sides of this spectrum (Moon and Blackman, 2014).

Objective ontology believes that social phenomena and their meanings exist independently from social actors (Bahari, 2012). That is why in positivism, theoretical statements are tied to empirical observation and testing. Although it had been used substantially in natural science, positivism was developed in social science in the nineteenth century by the popularity of statistical methods (Hasan, 2016). Generally speaking, positivist researchers believe that knowledge is created only by observation of the empirical world which is mostly objective and deals with statistics, numbers and quantitative methods. They also usually look for causal relationships between phenomena and claim that the mission of science is to predict and control such social or natural phenomena (Tacq, 2011). More focused theoretical background, easier data collection (even for large sets of data) and a more straightforward way of clustering and comparing the data are among the characteristics of a positivist ontology.

Accordingly, this study adopts an objective ontology, as it aims to conduct an empirical study on the relationship between firms' financial performance and diversification strategy among Iranian insurers. Moreover, it benefits from statistical models to investigate the relationship, which is aligned with the literature provided in this section. However, there are some criticisms of objective or positivist ontology. For example, Wicks and Freeman (1998) claim that positivist ontology does not consider the significant role of human beings in different social processes, i.e., positivist researchers usually neglect the subjective impacts of people on social and organizational concepts and the meaning they attribute to such concepts.

As mentioned earlier, the other end of ontological positions is the subjectivist or idealist ontology. Researchers emphasize that cultural interactions and interpretations of people and concepts are fundamental in studying social phenomena in this ontological category. Additionally, subjectivists claim that what is understood as a social reality is created by how researchers attribute specific meaning to them (Haiming, 2011). Such an ontological position enables these researchers to discover social processes and phenomena in more detail and depth. Therefore, they can understand more sophisticated situations, especially while studying humans as an integrated part of social studies. In spite of the strength mentioned above of subjectivist ontology, some criticisms come with it as well. For example, the process of collection, interpretation and classification of data in subjectivism can be more time-consuming and complicated than objectivism. Another problem of this ontological position is that as researchers have more uncertainty and sometimes have unclear patterns in their works, subjectivist studies can be considered less credible than realists research (Al-Saadi, 2014).

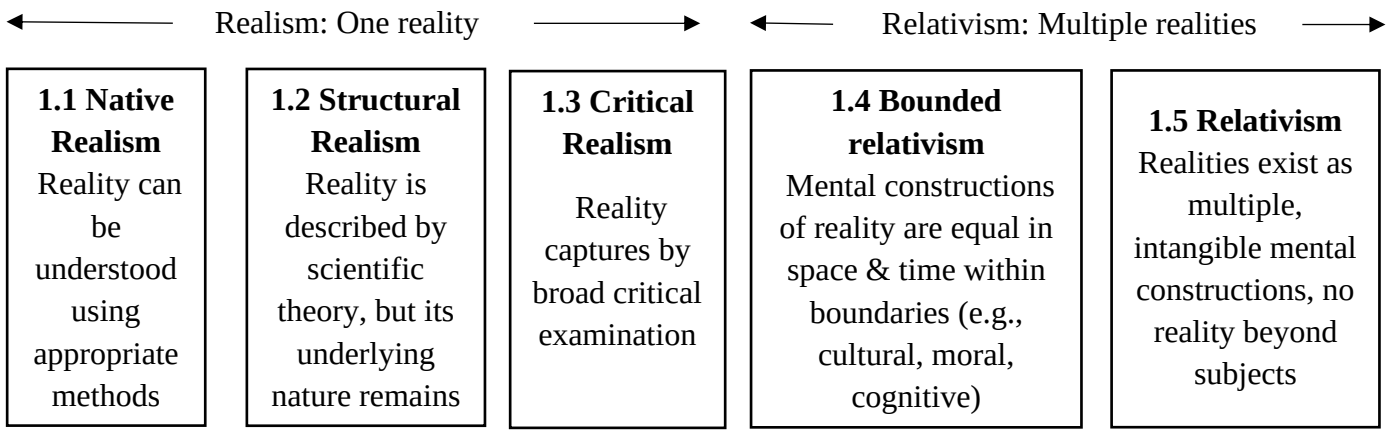

Figure 4.2: Ontology: What exists in the human world that we acquire knowledge about? (Source: Moon and Blackman, 2014)

4.2.2. EPISTEMOLOGY AND EPISTEMOLOGICAL POSITIONS

By epistemology, philosophers refer to the aspect of metacognition that focuses on the nature of knowledge, the forms it takes, its sources, the norms and standards used in its justification and its limits (Smith and Wiser 2015). Moon and Blackman (2014) state that epistemology deals with those aspects of knowledge such as validity, scope, and methods of acquiring it; for example, what constitutes a knowledge-based claim; how knowledge is produced or acquired and how the applicability of knowledge can be determined. In other words, what constitutes valid knowledge and how it can be obtained depends on one's epistemological position. In fact, epistemology is a tool that enables individuals to distinguish rational from irrational and science from non-science (Johnson and Duberley, 2000).

If epistemology is considered as a spectrum, as illustrated in Figure 4.3, there are two opposite tails in this spectrum that researchers can adopt: positivist epistemology and subjectivist epistemology. Positivist epistemology, which is also known as objectivist, uses senses such as what can be seen, heard or smelt to gather objective evidence for testing theories. Researchers with positivist epistemological positions assume that objects or social concepts such as organizations stand independent from people (Holtz and Odağ 2020). In other words, it is an indication of the position that social entities exist in reality external to social actors (Mukhles, 2020). Additionally, they use statistics and numbers to find facts and measure concepts such as performance or quality and believe that studies without such framework might be biased and unscientific (Cohen et al., 2007). According to the discussion above, this thesis takes objective epistemology, as it tries to measure whether diversified insurers outperform focused insurers or not. ***Therefore, this thesis assumes that concepts such as product diversification or geographic diversification and their financial impacts on firms can be studied objectively, i.e., independently from people's perceptions.***

On the opposite end of the epistemology spectrum, subjectivist epistemology is located and is sometimes known as idealist. Researchers with such an epistemological position claim that what people perceive and experience are based on how they conceptually understand the world (McAuley, Duberley and Johnson, 2014). Subjectivism mainly claims that objects do not entail any meaning in themselves, but the individuals give meaning to those objects (Mukhles, 2020). Subjectivists criticize positivism and believe that the classic viewpoint of positivism is not sufficient for

studying and exploring human-related actions, and it does not have the capacity to consider the subjective nature of human reasoning and choices completely (Evely et al., 2008).

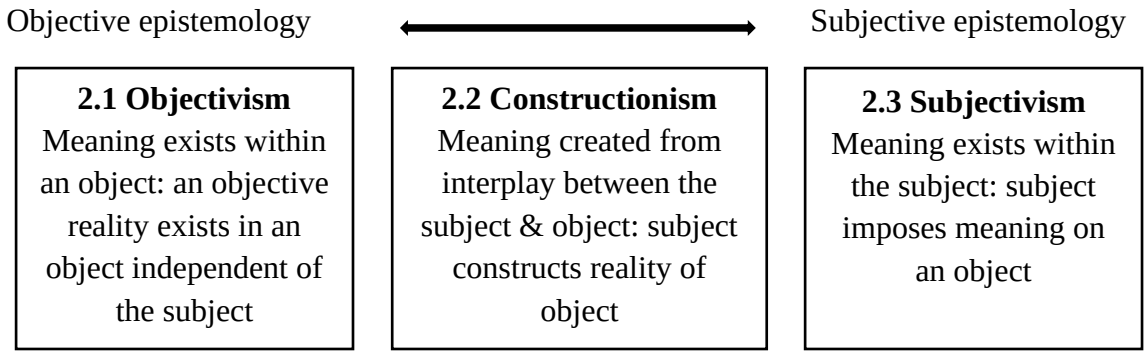

Figure 4.3: Epistemology: How do we create knowledge?
(Source: Moon and Blackman, 2014)

4.2.3. AXIOLOGY AND AXIOLOGICAL POSITIONS

The origin of axiology is the Greek word *axiom*, which means value (Killam, 2013 and McGregor, 2018). In the research methodology context, axiology mainly deals with beliefs and values that affect the researcher's decisions in the process of a study and tries to address values in research. As a matter of fact, axiology entails questions about how researchers deal with not only their own values but also the values of the research participants (Biedenbach and Jacobsson, 2016). Heron (1996) believes that researchers may take different axiological positions by demonstrating their values as the basis of their judgements during research. Biddle and Schafft (2015) state that axiology plays a significant role in articulating and choosing research questions and showing interest in an issue over others. Therefore, preferring one topic to another topic or choosing one specific data collection technique or a philosophical position in research instead of others are all indications of the axiology of a researcher. ***From the axiological viewpoint, this study is value-free and detached from the values of the researcher and participants since it aims to measure the financial impacts of adopting a growth strategy on insurance companies in Iran.***

Table 4.1 summarizes different ontological, epistemological and axiological positions. As illustrated in this table, objectivism involves value-free studies and the detachment of the researcher's values from the research process. At the same time,

subjectivism is value-bounded, where researchers and their values are the integrated part of the research process, including data collection and analysis.

Table 4.1: Ontological, epistemological and axiological positions (Source: adapted from several studies)

Type of assumption	Questions	Objectivism vs Subjectivism	
		Objectivism	**Subjectivism**
Ontology	- What is meant by reality? - What is the world from the perspective of a researcher? For instance: What are organizations and people who work in organizations like?	There is only an actual reality that exists outside, and researcher tries to find this.	Realities are conventional or nominal, and there are multiple realities, not only one.
Epistemology	- What is meant by knowledge? - What factors differentiate knowledge from non-knowledge? - How can knowledge be expanded?	Follows the assumptions of natural sciences. Deals with facts, rules, numbers, and observable phenomena. Looks for generalisation.	Follows the assumptions of arts and humanities. Deals with opinions, narratives, social construct, meanings attributed to phenomena.
Axiology	- How can values play a role in studies? - How should researchers deal with their values in the research process? - How should the values of other participants be considered in research?	Value-free Detachment	Value-bounded Integrated and reflexive

4.2.4. PHILOSOPHICAL POSITIONS IN BUSINESS AND MANAGEMENT RESEARCH

Ontology and epistemology greatly influence researchers in different facets of management, including how they perceive and construct social phenomena such as organisations, investigate them, and pursue their research questions. As one of the aims of research in the business and management discipline is to avoid inconsistency regarding

ontological and epistemological assumptions deployed by researchers (Johnson and Duberley, 2000), researchers must understand different combinations of ontological and epistemological assumptions. Similar to any other classification in the philosophy of research topics, there are different clustering approaches to management and business research. Figure 4.4 illustrates the philosophical positions matrix with epistemological subjectivism vs objectivism on the horizontal axis and ontological subjectivism vs objectivism on the vertical axis. It can be seen in the figure that a subjective epistemology can be combined with either objective or subjective ontologies. On the other hand, an objective epistemology can only be combined with an objective ontology. Not surprisingly, a researcher cannot have a subjective view of ontology, i.e., assumes that reality is the product of the human cognitive process while having an objective epistemological position that claims meanings exist within an object (Johnson and Duberley 2000, p. 180).

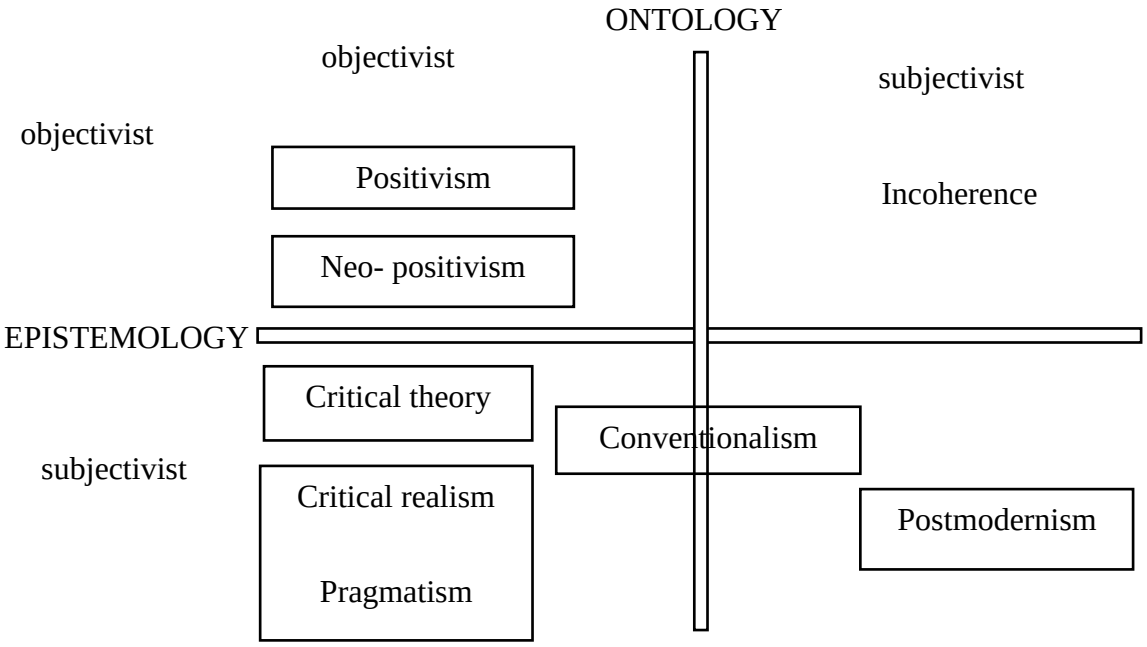

Figure 4.4: Different philosophical positions in business and management research (Source: Johnson and Duberley, 2000)

In the top left corner of the matrix, positivism and neo-positivism perspectives are located where objective epistemology and objective ontology are combined. Positivism uses empiricism to falsify or verify theories and believes that only through a neutral and objective observation can researchers gain knowledge (Hjorland, 2005). In addition, positivists use statistics to determine a causal relationship between objects so that the

mission of knowledge is to identify, predict and control social or natural events (Khanna, 2018). Similarly, Saunders et al. (2016) relate positivism to the philosophical position of the natural scientists, which involves elaborating on observable social realities to provide law-like generalisations. On the other hand, neo-positivism has a realist ontology. From the epistemological point of view, it objectively processes the subjective data collected through structured interviews, content analysis and focus groups. Neo-positivism applies statistical and mathematical methods to analyze qualitative data in organizations. This issue can be highlighted as the most crucial difference between positivism and neo-positivism in management research (Diaz, 2014).

In the bottom right corner of Figure 4.4, postmodernism and partially conventionalism are located with subjective ontology and subjective epistemology. Post-modernist researchers are interested in the constructed nature of individuals and organizations, the relationship between knowledge and power, how language is built, and how people make differences between several positions and discourses (McAuley et al., 2014). Similarly, Saunders et al. (2016) state that postmodernism emphasises the role of language and power relations, questioning established methods of thinking and providing a chance for other marginalised views to be heard. Besides, postmodernism believes that truth claims are socially constructed to serve the interests of particular groups, and their aim of the research is to deconstruct (Kellner, 1988). As shown in Figure 4.4, conventionalism sometimes takes objective ontology, while it takes subjective ontology on some occasions. It should be noted that it overlaps with postmodernism and critical theory (Chernoff, 2009).

Critical theory, critical realism, and pragmatism occupy the objective ontology and subjective epistemology quadrant in Figure 4.4. It explores the key aspects of society and organizations by raising questions about the nature of society and tries to understand how communications are impacted by power and special interests (Kemmis 2007, pp. 124-125). For example, feminism as one of the branches of this category emphasizes that the world is patriarchal and the culture it inherits is masculine (Moon and Blackman 2014). In addition, feminism tries to demonstrate gender inequalities in organizations and how such issues can be reduced. The other perspective, i.e., pragmatism originally started at the beginning of the 20th century to solve social problems in the united states and has become more popular since the 1970s. Pragmatists believe that an ideology is true if only it helps the society to reach more equity, justice, or freedom (Gray, 2014) and use all approaches to understand the research problem. The last category in this quadrant is

critical realism (CR), a relatively new position in research philosophy. Critical realism claims that reality can be identified and consists of material objects, ideas, and discourses, while only something is considered real if it affects behaviour and makes a difference (Gorski, 2013). According to critical realists, there is a reality that exists independently of researchers' beliefs about it, and while observation might make researchers more confident about what exists, the existence is independent of observation (Haigh et al., 2019).

As emphasized before, other philosophical positions in business and management research are beyond this thesis's scope. For example, symbolic interactionism, phenomenology and hermeneutic are among other philosophical positions that researchers may show interest in, which generally argue that natural science methods are not applicable in social science and interpretations of reality are culturally derived and historically situated. ***However, this thesis adopts positivism as its corresponding research paradigm, and its ontology and epistemology are objective from a philosophical point of view.*** In addition, this study uses quantitative data analysis techniques to investigate a causal relationship between diversification and firms' financial performance, which is consistent with the positivist philosophy.

4.2.5. RESEARCH PARADIGMS

Research paradigms were first introduced by Kuhn (1962), who defines research paradigm as a philosophical way of thinking. However, in business and management research, a paradigm is defined as the set of assumptions, practices, and agreements among a group of scholars (Lewis and Grimes, 1999). Similarly, Clarke and Clegg (2000) believe that paradigms consist of systematic sets of ideas, values, methods, problems, and corresponding standard solutions. Easterby-Smith et al. (2008) discuss that the main components of scientific research paradigms can be summarized as epistemology, ontology, and methodology. There are different categories of scientific research paradigms. For example, Zukauskas (2018) clusters paradigms into (1) positivist, (2) interpretivist or constructivist, (3) transforming and (4) pragmatist groups. Patel (2015), on the other hand, categorises them into positivist, interpretivist or constructivist, pragmatist, subjectivist and critical as main research paradigms.

As discussed earlier in this chapter, the research paradigm of this thesis is positivism. By adopting objective ontology and epistemology, the study examines the existing theories on the diversification-firms' financial performance relationship through a quantitative methodology. Before continuing to the methodology section, a summary table of different ontologies, epistemologies, terminologies, methods, and data collection methods associated with each of the paradigms is presented below (Table 4.2).

Table 4.2: Research paradigms, associated ontologies, epistemologies, terminologies, methodologies, methods, and means of data collection (source: Zukauskas et al., 2018)

Research paradigm: All of the theoretical and methodological assumptions adopted by the scientific community	**Ontology:** focused on what exists, and it is about the nature of reality	**Epistemology:** how the researcher can obtain knowledge about the phenomena of interest	**Terminology often associated with basic research paradigms**	**Basic methodology:** Qualitative, quantitative, mixed	**Research methods:** systematic procedures and tools used for collection and analysis of data	**Data collection measures**
Constructivism	Relativistic Reality is socially or experimentally based, local, and specific in nature	The knowledge consists of mental structures that are surrounded by the relative agreements	• Naturalistic • Phenomenological • Hermeneutics • Interpretivist • Ethnographic • Participants values • Social and historical interpretation • Theory creation	Mostly qualitative methods, although quantitative methods can be used in some cases.	• Case studies • Interviews	• Interview • Observation • Document study • Image data analysis
Interpretivism	Researcher and reality are inseparable	The knowledge is based on the abstract descriptions of meanings and is formed of human experiences			• Case studies • Interviews • Phenomenology • Ethnography • Ethnomethodology	

Symbolic interpretivism	Research and reality intertwine	Knowledge is created through social interactions and their resulting meanings	• Symbolic interaction		• Grounded theory	
Pragmatism	The reality is vague but based on the language, history, and cultural respect	Knowledge is extracted from experience. The researcher restores subjectively assigned and "objective" meaning of other actions	• Action consequences • Focused on problems • Pluralist • Focused on the application in the real world • Mixed methods	Qualitative and/or quantitative methods	• Interview • Case study • Surveys	• Both tools from positivist and interpretivist can be applied. For example, interviews, observation, testing, experimentation
Positivism	The reality is objective and perceived	Acquisition of knowledge is not connected to values and moral content	• Experimental • Half experimental • Correlating • Reductionism • Theory examination • Causal relationship • Determination • Regulatory	Mostly quantitative, although in some cases qualitative methods can be used, as well	• Survey • Experiment • Quasi-experiment	• Experiments • Half experiments • Tests • Scales

4.2.6. THEORY DEVELOPMENT APPROACHES

Researchers use theories in different parts of their studies, such as review of the literature, analysis or even findings sections. Therefore, using theories is mainly related to the characteristics of a study and how it is designed. A research approach is about the place and role of theory in research, and there are two major contrasting approaches for theory development: deductive approach and inductive approach (Kim 2021, Young et al. 2020, Woiceshyn and Daellenbach 2018). In the deductive approach, theories and hypotheses are developed, and a research strategy is applied to test the hypothesis, while in the inductive approach, data is collected first, then a theory is developed as a result of data analysis (Varpio et al. 2020, Hakansson, 2013). In fact, in a deductive approach, the researchers follow a top-down approach, i.e., from theories to hypotheses, then to the data, to confirm, complete or contradict the existing theory (Creswell and Plano Clark, 2007). It is similar to the approach of this thesis, which tries to test the theories and constructed hypotheses through the collected data and understand how the theories about diversification-firms' financial performance work in the insurance industry of Iran. Therefore, the research approach of this thesis is deductive.

Zalaghi and Khazaei (2016) argue that in an inductive approach, the researchers deal with a bottom-up approach, i.e., starting with data collection, generating some themes and creating theories related to those themes. In other words, the deductive approach is from a general to a specific level of focus, while in contrast, the inductive approach is from a specific to a general level of focus. In addition, the deductive approach seeks causal relationships between variables, while the inductive approach tries to investigate the nature of the research problem (Hakansson, 2013). However, some researchers introduced a third research approach named an abductive approach (Awuzie and McDermott 2017, Behfar and Okhuysen, 2018). An abductive approach moves back and forth while combining deductive and inductive approaches (Shani et al. 2020, Suddaby 2006). As a result, the abductive approach starts with observing a significant and surprising fact first, then tries to devise credible theories to justify how this could have happened (Saunders et al. 2016, Reichertz 2007 p. 218). Figure 4.5 represents the interactions of theory and practice in deductive, inductive and abductive approaches, while Table 4.3 provides a summary of specifications of each of the approaches.

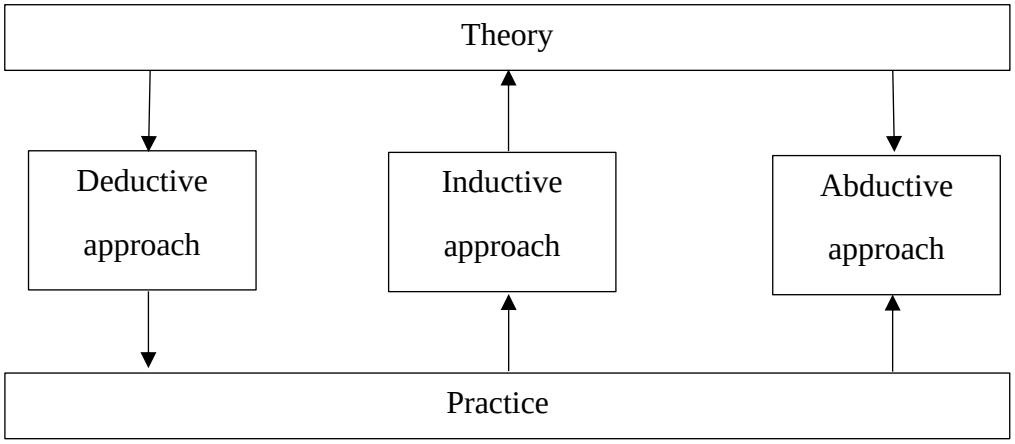

Figure 4.5: Theory and practice interactions in deductive, inductive and abductive approaches (Source: Costa et al., 2017)

Table 4.3: Characteristics of abductive, inductive and deductive approaches (Source: De Brito and Laan, 2010)

Theory development approach	Deductive approach	Inductive approach	Abductive approach
Starting point	Theoretical framework	Empirical observations (theory is not present)	Empirical observations (unmatched by/ deviating from the initial theory)
Aim	Testing or evaluating an existing theory	Developing a new theory	Developing new understanding
Drawing conclusions	Confirmation or falsification	Generalisation or transferability of results	Providing suggestions (for future research directions or theories)

4.3. METHODOLOGY AND METHODS

Research methodology and research methods are related but not the same concepts. According to Grix (2002), research methodology discusses and demonstrates how knowledge can be acquired. More precisely, Taylor et al. (2016) define research methodology as "the process, principles, and procedures by which we approach problems and seek answers". While the research methodology of a study clarifies its theoretical perspectives and logic, the research methods indicate specific strategies, procedures, and techniques of data analysis and interpretation (Jong, 2014). Similarly, Patel et al. (2019) argue that research methodology can be considered a systematic approach to solving the

research problems. In contrast, research methods usually refer to processes or techniques utilized by researchers in data collection for analysis to reveal new findings or generate a more robust understanding of a research topic (Patel et al., 2019).

From a methodological viewpoint, studies are divided into three categories: quantitative, qualitative and mixed research (Leavy 2017, Creswell 2013 and Williams 2007). Quantitative research has originally emerged for quantification of data which incorporates numerical or statistical tools to answer the research questions. Creswell (2003) highlights that quantitative research methodology supports the empiricist paradigm assumptions, and the research is not dependent on the researcher. Therefore, the reality is investigated objectively, using the relevant data. There are several research methods for conducting quantitative research. Williams (2007) mentions correlational, causal relationships, developmental design, observational studies, and survey research as the common quantitative research methods.

On the other hand, qualitative research is defined as an inquiry process that looks for an extensive and in-depth understanding of a social phenomenon within its natural setting (Ahmad et al., 2019). One of the main characteristics of qualitative research is that sufficient explanations of social phenomena depend on deeply recognising different perspectives, cultures, and 'world-views' of the research participants (Allan and Skinner 1991). As qualitative research highly depends on the real experiences of people as the significant elements of this methodology, it mainly looks for whys while studying social constructs through human beings' daily lives. There are different methods for conducting a qualitative study. However, case studies, phenomenology, grounded theory, ethnography and content analysis are among the main qualitative research methods (Rnjith 2021, Leedy and Ormrod 2015, and Clissett 2008).

Finally, a mixed methodology is the combination and extension of quantitative and qualitative research. Tashakkori and Creswell (2007) argue that mixed methodology is a type of research when the researcher collects and analyses the data, incorporates the research findings, and generates conclusions by utilizing both quantitative and qualitative approaches in one study. Additionally, Johnson et al. (2007) explain that mixed research is located between the two extremes of quantitative research and qualitative research while striving to benefit from those categories' viewpoints and simultaneously attempting to find a possible middle solution for research problems. In other words, the goal of this research methodology is to maximise the strengths and minimize the weaknesses of

quantitative and qualitative methodologies (Williams, 2007). Therefore, it can be concluded that mixed methodology enables scholars to accommodate the concerns about the multidimensional and complicated nature of phenomena from the research participants viewpoint and investigate the relationships between quantifiable variables in one study.

As mentioned in the introduction of this chapter, this thesis uses mixed methods to answer its proposed research questions. This thesis aims to quantify the impacts of different dimensions of diversification strategy on the financial performance of insurance companies in Iran. In doing so, this study uses both qualitative and quantitative data to answer its research questions. However, the researcher is independent of the research, i.e., what matters in this study is the data and the relationship between the variables, not the personal values of the participants or the investigator. Heigham and Croker (2009, p. 136) argue that in addition to data analysis, mixed methods can be applied to other stages of a study, such as data collection by collecting both qualitative and quantitative data. This argument is similar to how the researcher collected the relevant data for different diversification strategies and their impacts on firms' financial performance during the course of research. That is why mixed methods are justified as the research methodology for this thesis.

4.4. EMPIRICAL MODEL AND VARIABLES

4.4.1. EMPIRICAL MODEL

In order to investigate the relationship between the diversification strategies and their impacts on Iranian insurers' financial performance, which is the main goal of this thesis, Equation 4 is formulated as:

Equation 4: The general model of diversification-firms' financial performance relationship

$$\text{Financial Performance}_{it} = \alpha_0 + \beta_1 \text{Diversification}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{Type}_{it} + \beta_4 \text{Ownership Structure}_{it} + \beta_5 \text{Age}_{it} + \varepsilon_{it}$$

Where the financial performance of insurer *i* in year *t* is measured by ROA and ROE, diversification is the vector with various measures of diversification strategy (product, geographic, staff and technological) in insurance company *i* during year *t*. Size, type, ownership structure, and age are control variables for insurer *i* in year *t*. Finally, ε_{it} is the error term.

It should be mentioned that the above equation is used to measure the relationships between all dimensions of diversification and the financial performance of insurers. However, the PLS-SEM data analysis technique is used to investigate the relationship between technological diversification and firms' financial performance, considering the primary data collected for this dimension of diversification strategy. On the other hand, panel data econometrics is used to understand the relationship between the other three dimensions of diversification (i.e. staff, product and geographic diversification) and firms' profitability. The details of the models, calculations, and related tests for each diversification strategy dimension and firms' profitability measures are included in Chapters 5 and 6.

4.4.2. INDEPENDENT VARIABLES

4.4.2.1. TECHNOLOGICAL DIVERSIFICATION

Similar to this study, diversification literature has tried to differentiate technological diversification from the most famous dimension of diversification strategy, i.e., product diversification (what a firm manufactures or does) (Ceipek et al., 2019). Although many researchers have defined technological diversification so far, the definitions have almost been similar. At the corporate level, Cantwell and Vertova (2004) define technological diversification as the degree to which firms acquire capabilities in different technologies. In addition, technological diversification is introduced as a corporate strategy to produce products or services more efficiently in a specific market (García-Vega, 2006). In addition, technological diversification is a contextually dependent concept (Lin and Chang, 2015) that entails different implications for different industries and countries. Therefore, it is crucial to understand its specific definitions and implications in the context of Iran's insurance industry. Using semi-structured interviews with university lecturers and CEOs in the insurance context, the author develops the technological diversification measurement method in Iran's insurance industry.

4.4.2.2. STAFF DIVERSIFICATION

Diversity of staff has recently attracted more attention in firms, as effective management of diversified staff can maintain a positive work environment and, consequently, higher profitability for firms (Omotayo et al., 2020, Zhou and Rosini, 2015). Since staff diversification highlights the workforce composition in cultural and demographic characteristics (Di Tomaso et al., 2007), this study utilizes the CII annual reports to extract staff diversification data. According to the available data, the staff of Iranian insurers have been divided into different groups using three parameters: gender, work experience and level of education. Therefore, by these parameters, staff are divided into male or female (based on gender), above ten years or below ten years of work experience and master's degree and above or bachelor's degree and below for the level of education in this thesis.

4.4.2.3. GEOGRAPHIC DIVERSIFICATION

Geographic diversification and firms' performance relationship in general and firms profitability, in particular, have been studied extensively by many scholars. As a result, researchers used different definitions of geographic diversification in different contexts in their studies. For example, Levine et al. (2021) argue that GD is the dispersion of a firm's branches across a country, while Kim et al. (2015) argue that geographic diversification expands a business both domestically and internationally. On the other hand, Patel et al. (2018) claim that the presence of a firm in countries other than the home country is defined as geographic diversification. However, geographic diversification has also been defined in insurance research. Elango et al. (2008) define geographic diversification as the operation of an insurer across many geographic regions. In this thesis, to consider both insurance-related and market-related elements of geographical diversification, the geographic diversification variable is defined as the total number of agents and branches of a company in one year across the country (Iran).

4.4.2.4. PRODUCT DIVERSIFICATION

The relationship between product diversification and financial performance of firms is investigated by many scholars in different disciplines such as business and management, finance and economics. Bausch and Pils (2009) state that product diversification strategy

indicates which businesses a firm should operate in. Similarly, Van Kranenburg et al. (2004) believe that product diversification is meant to expand into new product markets that the company has not operated in yet. More specifically, Meador et al. (2000) define product diversification in the insurance context as operating in more lines of business and offering more diversified insurance products to the policyholders. In this study, in order to capture insurance-specific criteria for product diversification and based on the availability of data, the number of underwritten policies and the premiums collected in each line of business has been considered to measure product diversification.

4.4.3. DEPENDENT VARIABLES

Researchers use different measures for measuring firms' performance. At a general level, firms' performance can be divided into two categories: (1) firm's financial performance, which is measured by ROA, ROE, return on sales and stock return, and (2) firms' non-financial performance, which can be studied through management practices and export performance (Liargovas and Skandalis, 2010). In this research, as firms' performance is investigated by firms' financial performance, return on assets (ROA) and return on equity (ROE) are adopted as two of the most popular parameters in diversification-performance relationship studies in the insurance industry (Elango et al. 2008, Lee 2017, Hsieh et al. 2015). ROA demonstrates the percentage of a firm's income used to invest into the firm's assets and is an indicator of the firm's efficiency (Kalbuana et al., 2021). Furthermore, they add higher ROA assists managers to increase earnings to get higher bonuses. ROE is a popular ratio among investors and shareholders of firms as it connects the income statement (net profit or net loss) to the balance sheet (shareholders' equity) data and is a measure of the profitability of their investments (Ahsan, 2012). Therefore, based on the agency theory, as diversification strategy may have different impacts on firms' ROA and ROE (which is discussed in detail in Chapter 2), it is important to carefully interpret the findings of this thesis for different stakeholders of the firms, i.e., shareholders and managers. The definitions of these two financial performance measures are provided below:

1. Return on Asset (ROA): current year net income divided by the book value of total assets.

2. Return on Equity (ROE): current year net income divided by the book value of total equity.

4.4.4. CONTROL VARIABLES

There is extensive evidence in the literature for using firms'-specific control variables while investigating the diversification-financial performance relationship. Firm's age, the ownership structure of a firm, and firm's size are among the most common control variables used by previous scholars in different industries (Tsai et al. 2020, Liu 2020, Su and Tsang 2015, Patrick 2012, Gaur and Kumar 2009, Santalo and Becerra 2008, Zhao and Luo 2002, Palich et al. 2000, Hitt et al. 1997)[3]. Similarly, several researchers have used these control variables to study the relationship between diversification and firms' performance in the insurance industry (e.g., Lee 2017, Krivokapić et al. 2017, Berry-Stölzle et al. 2012, Elango et al. 2008, Liebenberg and Sommer 2008). However, in this thesis, in addition to the variables mentioned earlier (firm's age, ownership structure, and size), the type of insurance company, which is an insurance-specific parameter, is used to control for diversification-financial performance relationship. Based on the annual report of central insurance of Iran (2020), there are three types of commercial insurers in Iran's market: (1) direct insurers, (2) reinsurers and (3) protection and indemnity (P&I) clubs. While direct insurers sell regular insurance products (e.g., fire, health, liability and auto insurance) to their customers, P&I clubs exclusively provide maritime coverages for ship owners. In addition, reinsurers' operations are different from direct insurers and P&I clubs. Patrik (2006) defines reinsurance as an insurance contract where the reinsurer agrees to indemnify the ceding insurance company (also known as cedant) for a specific share of specific losses paid by the cedant insurance company. Therefore, since the core business of each of these three types of firms is different from others, the impact of firm's type on diversification-firms' financial performance relationship will be controlled in this

[3] The industries are selected from both service and manufacturing sectors including (but not limited to) tourism, computers, telecommunication and other electronic equipment manufacturing, software and information technology services, automobile, equipment manufacturing, steel and mining, chemistry, electrical machinery, garments, paper, printing, petroleum, and pharmaceutical industry. It should be noted that some of the studies have only mentioned that their data is selected from manufacturing firms, without identifying what exactly the related industries are.

study. Below, the brief definition of each of the firms' specific control variables is explained.

- Firm's age: The age of a firm is simply defined as the number of years that the firm has been operating since its establishment.

- Firm's size: The corresponding number of employees of a firm is considered as the firm's size in this thesis.

- Firm's ownership: Firms can be categorized as private, semi-private and public considering the ownership structure.

- Firm's type: Insurance companies can be divided into direct insurers, reinsurers and P&I clubs based on their core activity in the insurance industry.

4.5. PRIMARY AND SECONDARY DATA

Primary data is a type of data that a researcher collects for the first time to be sued in a study, whereas the secondary data has been already collected by other scholars or organizations for different studies or different purposes. In other words, primary data is related to the present, while secondary data relates to the past (Suparno and Kusumoriny, 2020). However, according to the models and variables used in this study, in order to investigate different relationships between diversification strategies (technological, product, geographic and staff) and firms financial performance (ROA and ROE), both primary and secondary data is used to address the research problem and achieve the thesis' overall aims and objectives.

4.5.1. PRIMARY AND SECONDARY DATA USED FOR MEASURING TECHNOLOGICAL DIVERSIFICATION

The measurement method and data for technological diversification of Iranian insurers are not available in any database or previous studies. Hence, in this thesis, a pilot study is conducted to understand what technological diversification means in insurance

companies and explore its different dimensions. To do so, semi-structured face to face individual interviews had been conducted among six experienced insurance firms' CEOs and university lecturers in risk, insurance and other related modules to collect their views on what is meant by technological diversification in the insurance industry. Each interview took 60 to 90 minutes, depending on the discussion and the number of indicators introduced by each participant. The interview questions can be found in Appendix 1. Table 4.4 summarises the interviewees' profiles. In order to maintain the anonymity of the participants, their names are replaced by numbers from 1 to 6.

Table 4.4: Iterviewees' profiles

Interviewee	Job Position	Education	Insurance-related work experience
1	CEO of an insurance company	PhD	27
2	CEO of an insurance company	MBA	21
3	University lecturer in risk, insurance and other related modules	PhD	21
4	University lecturer in risk, insurance and other related modules	MSc	25
5	University lecturer in risk, insurance and other related modules	PhD	14
6	University lecturer in risk, insurance and other related modules	PhD	24

Then, based on the interviews conducted among mentioned above interviewees, a questionnaire with 33 statements was designed to measure technological diversification among insurers (Appendix 2). Each item in the questionnaire could be answered by a 0 (strongly disagree) to 10 (strongly agree) Likert scale. Finally, after distributing questionnaires among top-level managers of the 31 insurance companies, a part of the

data needed for this study to address the relationship between technological diversification and firms' financial performance is collected. The reason for choosing 31 firms out of 33 insurers in Iran's market is that one of the firms is in the liquidation process, and its operation is limited to paying the previous claims. Therefore, it is excluded from the sample. Besides, another firm was just established before distributing the questionnaires among insurers, and there was not enough evidence of their technological and financial performance. Hence, this firm was not included in the research sample. Furthermore, in order to collect the data of the financial performance of Iranian insurers, a secondary data set released in 2018 by the regulatory body of the Iranian insurance market, i.e., central Insurance of Iran, is utilized, and the ROA and ROE data extracted from financial statements of each of the insurance companies operating in Iran's insurance market. More details about how the data is incorporated to measure technological diversification and its relationship with insurers' financial performance can be found in Chapter 5.

4.5.2. SECONDARY DATA USED FOR MEASURING PRODUCT, GEOGRAPHIC AND STAFF DIVERSIFICATION

A sample of 30 Iranian insurance companies (out of 33 listed insurance companies in Iran) over ten years (from 2011 to 2020) is used to examine the relationship between diversification strategy and firms' financial performance. Three firms are excluded from the total population of Iranian insurers as one of them is involved in the liquidation process, and the other two are very young; therefore, there is not enough longitudinal data to be used in panel regression models. However, this is an unbalanced dataset that includes the broad majority of the firms in the market.

The data is collected from the annual reports database of the central insurance of Iran (CII), which is confirmed and audited officially by the CII to ensure the quality of the data. Availability and having access to this database are of particular benefit to this study. It is almost impossible to collect this volume of data without a reliable database that records all the necessary information of the studied firms and makes it publicly available for a period of ten years. The requirements of reporting to the regulatory and statutory body of Iran's insurance market, the CII, are such that these reports provide not only standard financial information and financial ratios of all Iranian insurance companies but also include detailed information of different lines of business, including the number

of policies and written premiums. Besides, there is additional data about firm size, staff's gender, education and work experience, and the number of agents and branches that sell insurance products for each firm, which is valuable for research purposes.

4.6. SUMMARY OF THE PHILOSOPHICAL AND METHODOLOGICAL POSITIONS OF THIS THESIS

So far, this chapter has discussed and compared different philosophies (ontology, epistemology and axiology), methodologies and methods available for researchers in business and management, in addition to the data, sampling and variables used in this study. However, section 4.6 attempts to review and summarize the researchers' philosophical and methodological position in this study based on the previous discussions. The research onion model is followed in this section, initially introduced by Saunders et al. (2016) and used by many researchers (Haydam and Steenkamp 2020, Melnikovas 2018 and Sahay 2016). The research onion is a model that assists business and management researchers to organize their studies and expand appropriate research designs through a step by step process (Melnikovas 2018). As illustrated in Figure 4.6, the research onion has consisted of six major layers. Each layer and the researcher's position in the corresponding layer are summarised below:

1. Philosophy of the research which includes different philosophical positions in research such as positivism, critical realism, interpretivism, postmodernism and pragmatism. According to previous discussions in this chapter, the researcher is following positivist philosophy in this thesis.
2. Theory development approaches which include deduction, abduction and induction. As a positivist, the researcher used a deductive approach in this study.
3. The methodological choice that indicates which of the quantitative, qualitative or mixed methods is used in a study. This thesis adopts mixed methods in terms of methodology. More specifically, the study benefits from qualitative and quantitative data, while the data is analysed quantitatively.
4. Different research strategies can be applied in research, including experiment, survey, archival research, case study, ethnography, action research, grounded theory, narrative inquiry. The current thesis uses different strategies, including survey and case study.

5. The fifth layer is about time horizons or time frames where cross-sectional (short term) study deals with the data collection at a specific point of time, while longitudinal data is associated with the data collection over similar time periods (monthly, yearly, quarterly). Based on the different models that measure the diversification-firms' financial performance relationship, both cross-sectional and longitudinal data is collected in this thesis.
6. Finally, the last layer of the research onion model is about the techniques, tools and procedures for data collection and data analysis. In more detail, this layer focuses on using primary or secondary data, sampling method, questionnaire development, interviews and what data analysis techniques are applied to answer the research questions. As discussed earlier in this chapter, this research utilized both primary and secondary data collected through interviews, questionnaires and available databases. In addition, according to the types of data used in this thesis (primary and secondary data), the researcher applies different statistical techniques for data analysis. The multivariate analysis technique is used in Chapter 5 to measure the relationships between technological diversification strategies and firms' financial performance, and the related data is collected for one year. Moreover, panel data regression analysis is applied in Chapter 6 to investigate the relationships between product, geographic and staff diversification strategies and firms' financial performance. The panel data for Chapter 6 is collected for ten years (from 2011 to 2020).

The study's philosophical stance, theory development approach, methodological position, applied research strategies and the time horizon of the research (data) are highlighted in yellow in Figure 4.6.

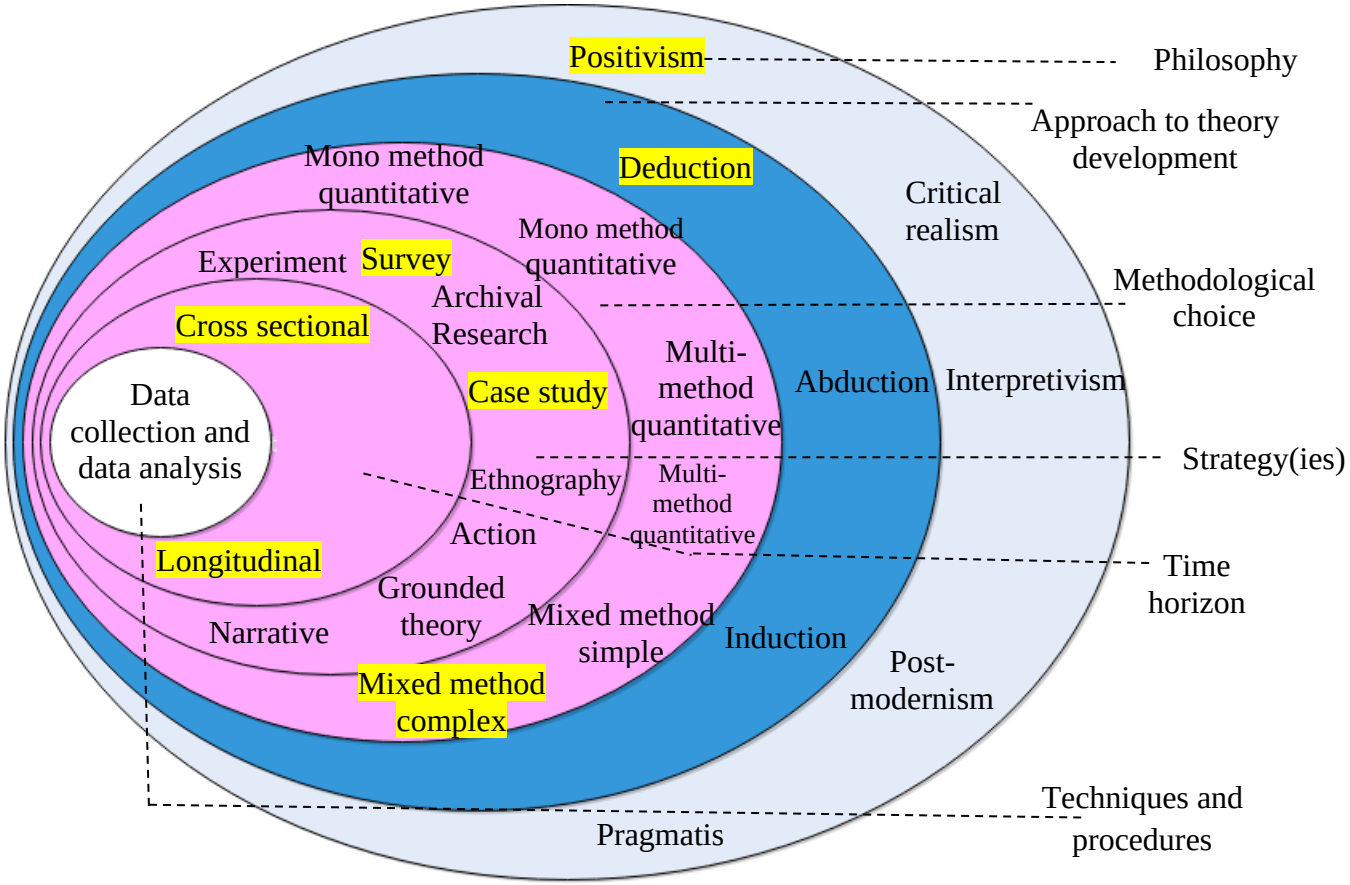

Figure 4.6: Positioning of this thesis using the research onion (Source: Saunders et al., 2016)

However, although selecting appropriate research methods, methodologies, and philosophies has been challenging for many researchers, it should be mentioned that there is no better or worse ontological, epistemological or methodological position without considering the specifications of the research problem, data, models and variables. Mukhles (2020) argues that no particular research strategy is better than the other research strategies, and hence, the choice of research strategy depends on research questions, research hypotheses, objectives of the research, and the chosen philosophy of the research. Sogunro (2002) explains that different research methodologies and methods have unsimilar but complementary roles in the research process and outcome. The central point here is to appreciate the nature and appropriateness of the aforementioned positions before conducting the research. Therefore, scholars should be unbiased towards any paradigms or methods and focus on the compatibility of such elements in their studies.

4.7. VALIDITY, RELIABILITY AND GENERALIZABILITY OF THE FINDINGS

Validity and reliability are among the most famous measures for evaluating the quality of research, i.e., the trustworthiness of a study and the rigour of research processes (Persson and Lindgren, 2005). By validity, it is usually meant the extent to which a study measures what it is planned to measure (Saunders et al., 2016). Therefore, it includes all necessary variables and parameters relevant for a particular test while describing and defining every important concept (Fraenkel et al., 2012). In this thesis, it has been attempted to reach validity by using appropriate measures for investigating diversification-firms' financial performance relationships, according to the literature and specifications of this study in the insurance context.

Reliability is related to how far a specific test, procedure or instrument provides similar or same results in different circumstances, considering nothing else is changed (Roberts and Priest, 2006). According to Creswell (2013), reliability is maintained if the scores of an instrument are stable and consistent in a study. Audited secondary data has been collected to enhance and ensure the reliability of this research, including Iranian insurers' financial statements extracted from the CII annual reports database. Additionally, for measuring technological diversification, a pilot study has been conducted to identify the elements of technological diversification in the insurance context first, then accordingly, a questionnaire is designed and distributed among all

Iranian insurance companies. More discussions about this thesis's reliability, validity, and measurements of these two concepts are provided in chapters 5 and 6.

In terms of the generalisability of the findings of this study, there are some limitations. As discussed in the review of the literature chapter, diversification strategy is a multi-dimensional phenomenon that is highly dependent on the context and time of any study. Hence, findings need to be interpreted cautiously, specifically in terms of generalisation to other countries, industries, or time periods. Nevertheless, this thesis provides valuable insights for both insurance practitioners and academics and can be used as a template for future studies in other contexts and countries.

4.8. ETHICAL CONSIDERATIONS OF THE RESEARCH

At a general level, ethics can be interpreted as a set of principles of proper conduct. In the research ethics domain, there are specific ethical principles that researchers are supposed to follow. Singh (2012) introduced those principles as honesty (honest reporting methods, procedures, data, and results), objectivity (avoiding bias in the design, data analysis, interpretation), avoiding careless errors and negligence, keeping good records of research, openness (being open to criticism), respect for intellectual property, confidentiality, and responsible publication.

Although the abovementioned principles can be generalized to be followed by researchers in different disciplines, O'Gorman and MacIntosh (2014) have highlighted some more specific ethical issues such as data privacy, harm to the participant, informed consent and deception for business and management researchers that need to be taken into consideration. However, the ethical issues involved in this thesis are minimal. *First,* the study mainly benefited from publicly available and reliable secondary data audited by independent auditing firms and confirmed legally by the CII. *Second,* for the primary data collected for this study, the data is not sensitive, participants are not vulnerable, and all care has been taken to ensure there is no harm to them. Participants have given informed consent indicating an agreement to take part in this research. In addition, there was no invasion of privacy in this research, while the anonymity of the participants has been maintained during the data collection, data analysis and reporting the relevant findings of this study.

Furthermore, as a part of Sheffield Hallam University research framework, all the theses (including this one) are scrutinized by the University's Ethics Committee to ensure that all required ethical standards are fulfilled. Finally, this thesis is free from conflicts of interest with any other party. As a result, the researcher does not witness any potential legal or ethical problems with this thesis.

4.9. SUMMARY OF THE CHAPTER

This chapter laid out a clear outline of how diversification strategy-firms' financial performance relationship is studied in this thesis. To do so, the primary purpose of this chapter was to discuss different philosophies of research, ontological, epistemological and methodological positions and locate the researcher's study properly in management and business research considering above mentioned concepts. In order to achieve this, the famous research onion model was utilized, and the corresponding choices of this study were highlighted in the research onion. Table 4.5 represents the summary of different positions of this study based on the research onion model. There is also an important discussion about the justification of different choices in the above-mentioned models and whether there is a better or worse choice for the ontological, epistemological or methodological position. More specifically, this chapter explained the data collection methods and processes for this thesis and continued with variable construction rationale and data analysis techniques suitable for studying how diversification affect firms' financial performance in the insurance context. Technological, staff, geographic and product diversification strategies were introduced as diversification's four main dimensions, and all of the indicators of each of these dimensions were discussed in this chapter. In addition, firms' financial performance and how they will be used in other chapters were clarified accordingly. Also, related control variables, how they were defined and why they were chosen formed other sections of this chapter. The validity, reliability, generalisability of this study were covered in this chapter, although further details about them can be found in Chapters 5, 6 and 7. Finally, the chapter ended with a discussion about ethical considerations of this research, how the researcher dealt with them and complied with related standards.

Table 4.5: Researcher's positions based on the research onion model

Philosophy of research	Theory development approach	Methodological choice	Research strategies	Time horizon	Type of data	Data analysis techniques
Positivism	Deduction	Mixed method complex	• Survey • Case study	• Cross-sectional • Longitudinal	• Primary data • Secondary data	• PLS-SEM analysis • Panel data regression analysis

CHAPTER 5: THE RELATIONSHIP BETWEEN TECHNOLOGICAL DIVERSIFICATION AND FIRMS' FINANCIAL PERFORMANCE IN IRAN'S INSURANCE INDUSTRY

5.1. INTRODUCTION

Nowadays, using innovative technologies can be considered a potential competitive advantage for any company (Feng et al. 2020, Haseeb et al. 2019, Chen and Chang 2012, Gupta et al. 2001). However, costs of acquiring new technologies, R&D and management costs can make business owners think more carefully about investing in new technologies (Kook et al. 2017, Quintana-Garcia and Benavides-Velasco 2008). In the existing literature, technological diversification (TD) as an important dimension of diversification strategy has been studied extensively by many scholars in different disciplines and contexts (Lee and Le 2021, Castellacci et al. 2020, Pan et al. 2018, Chen et al. 2013). However, the relationship between diversification and firms' financial performance is not only inconclusive so far (Lee and Le 2021, Lee et al. 2017, Chen and Chang 2012) but also shows contextual dependency (Kim et al., 2016 and Lin and Chang, 2015). To the best of the researcher's knowledge, since the insurance researchers have not explored this area, it would be necessary to investigate the relationship between technological diversification as one of the four dimensions of diversification strategy (Figure 5.1) and the financial performance of insurers in Iran.

As mentioned in Chapters 1 and 4, the data for the technological diversification of insurers is unavailable in the CII annual reports. Therefore, this chapter uses the primary data collected from CEOs and university lecturers in insurance to understand what is meant by technological diversification in the Iranian insurance industry. Accordingly, new measures of technological diversification are constructed, and the relationship between technological diversification and the financial performance of Iranian insurers is investigated. The related empirical results are reported, and this chapter discusses the implications of technological diversification for the studied firms.

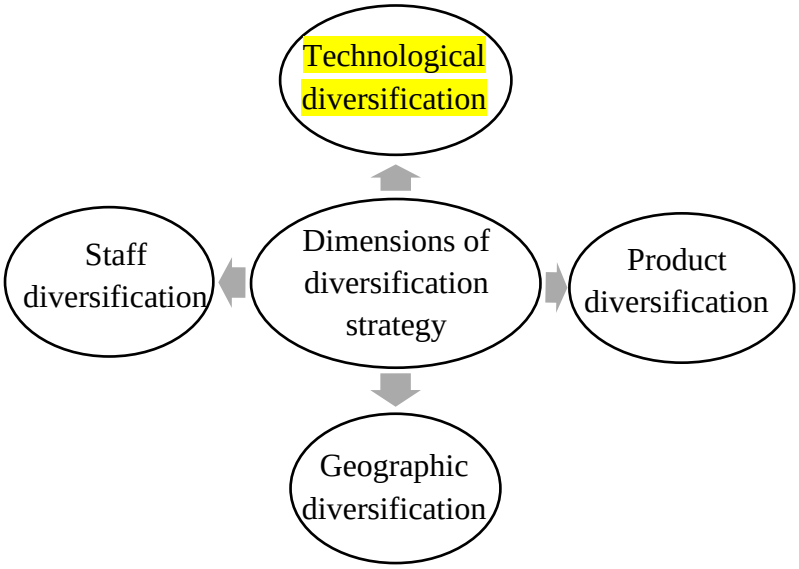

Figure 5.1: Technological diversification as one of the dimensions of the diversification strategy

5.2. DEFINITIONS

There are various definitions for technological diversification in the literature which are majorly similar to one another. Lin et al. (2006) and Kodama (1986) define technological diversification as the extent to which a company diversifies its technological capabilities in different technological areas relevantly or irrelevantly. Based on Breschi et al. (2003) definition, technological diversification is achieved when firms increase their innovative activities over more than a unique technology. Furthermore, expanding a firm's technology base into a wide range of technology fields (Leten et al., 2007) has been known as another definition of this dimension of diversification strategy. According to the above discussion, it is concluded that the definitions of technological diversification are similar. However, to understand the implications of technological diversification in the insurance industry, in this thesis, semi-structured face-to-face individual interviews were conducted among six experienced insurance firms' CEOs and insurance university lecturers to collect their views on what is meant by technological diversification among insurers.

As stated in the literature review in Chapter 3, firm performance can be measured in different ways and from different perspectives in various disciplines. However, measuring firm performance using financial ratios has been a traditional yet powerful parameter for decision-makers, including business analysts, creditors, investors, and financial managers (Delen et al., 2013). Return on asset (ROA) and return on equity

(ROE) are among the most practical financial ratios measuring FP (Pham and Tran 2020, Ghanbari et al. 2015, Banker et al. 2014, Berger et al. 2010, Elango et al. 2008 and Francis et al. 2008) and will be used in this chapter as well. Brief definitions of ROA and ROE are provided below:

Return on Asset (ROA): ROA is defined as current year net income divided by the book value of total assets.

Return on Equity (ROE): ROE is defined as current year net income divided by the book value of total equity.

5.3. THEORY AND HYPOTHESIS DEVELOPMENT

Undoubtedly, emerging technologies are transforming many industries worldwide, but does technological diversification help insurers financially? This chapter aims to answer this question. Stephan (2002) demonstrated that technological diversification is an industry-specific concept. For example, according to the same study, companies operating in the telecom and pharmaceutical industries are less diversified than those within the electronics, chemical or material industry. Besides, research on the relationship between technological diversification and firms' financial performance has produced inconsistent findings. While some of the researchers argue that this growth strategy can improve the financial performance of firms (e.g., Chiu et al., 2008), other scholars such as Marhold and Kang (2016) report that such a relationship is negative. In addition, there are some other complications with technological diversification and firms' financial performance relationship. For example, Lee et al. (2017) demonstrate that large firms may benefit financially from technological diversity, while small firms do not. In another study, Chen and Chang (2012) argue that related technological diversification (RTD) has a positive impact on firms' performance, while unrelated technological diversification (UTD) is negatively associated with that. In addition, Lee and Le (2021) and Pan et al. (2019) state that the financial performance of a firm and technological diversification relationship is non-linear and inverted U-shaped. Finally, Chen et al. (2013) show that there is a negative relationship between the mentioned above variables in terms of market value added (MVA) and Tobin's Q, but not for economic value added (EVA) and ROA. However, most of the studies about technological diversification and firms' financial performance relationships are conducted in technology-intensive industries such as IT,

automobile manufacturing, and mobile manufacturing industries (Xu and Zeng 2020, Kook et al. 2017, Gjesfjeld et al. 2017).

In the insurance industry, using new technologies has considerably welcomed investors and shareholders in recent years. Cappiello (2020) states that in recent years, investments in insurance start-ups known as InsureTech have increased drastically, from 130 million USD in 2011 to 2.7 billion USD in 2015. According to McKinsey (2019), InsurTech platforms' sales is forecasted to continue growing from 175 billion USD in 2016 to 235 billion USD by the end of 2021. More specifically, new technologies help insurance firms increase their revenue by absorbing new customers and selling more products (Mustafina et al. 2020, Akotey et al. 2013, Danzon and Pauly 2001). Besides, the application of modern technologies reduces the costs through effective claims management (Pisoni, 2020) and fraud detection in insurance firms (Morley et al., 2006). Similarly, Kogo and Kimencu (2018) argue that using technological capabilities (meant IT in their studies) improves the performance of insurance companies in Nairobi, Kenia. Accordingly, technological diversification is expected to lead Iranian insurers to higher income, lower costs, and better financial performance. Therefore, to answer the main research question partially and address the research objectives 1 and 2 of this thesis, which are discussed earlier in Chapter 1, the following hypothesis is proposed in this chapter:

Hypothesis 1 (H1): *Technological diversification is positively associated with the financial performance of firms in the insurance industry.*

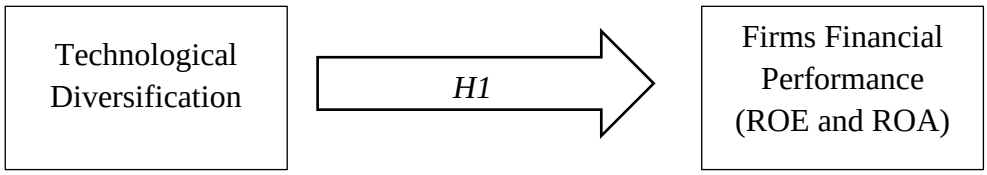

Figure 5.2: Theoretical model of technological diversification and firm performance relationship

5.4. DATA

As discussed earlier, this study is conducted in the insurance industry in Iran. However, the measurement method and data for technological diversification of Iranian insurers was not available. Therefore, both primary and secondary data has been used in this chapter. More specifically, the researcher conducted a pilot study first in order to

understand what is meant by technological diversification in insurance companies and explore its different dimensions. To do so, semi-structured face to face individual interviews had been conducted among six experienced insurance firms' CEOs and insurance university lecturers to have a clear understanding of what is meant by technological diversification by insurers (Appendix 1). There were many common indicators of technological divarication identified by the interviewees. For example, "investing and developing new underwriting and claims handling software solutions" is suggested by all of the interviewees as an indicator of technological diversification. Additionally, "risk modelling technologies that insurers need for their operations" are mentioned by 4 of the interviewees. Besides, "various technologies used by insurance firms in modern loss adjustment and risk management operations in different lines of business (such as health insurance, marine insurance, and engineering insurance)" are highlighted by five interviewees. Also four interviewees emphasized that "using digital platforms for advertisement" demonstrates technological diversification in the insurance industry. Moreover, "using insurance apps" was another popular indicator that mentioned by all six CEOs and university lecturers during the interviews. Finally, "R&D investment" is advocated by four of the interviewees as another indicator of technological diversification. Then, based on the above-mentioned interviews, a questionnaire with 33 statements was designed (Appendix 2). The questionnaire entails digital and non-digital technologies that insurance companies can use in their daily operations. Each item in the questionnaire could be answered by a 0 (strongly disagree) to 10 (strongly agree) Likert scale. Finally, after distributing questionnaires among top-level managers of the Iranian insurance companies, a part of the data needed for this chapter was collected.

For the data on firms' financial performance, a dataset of central insurance of Iran is used, which was released in 2018. Therefore, the data on ROE and ROA of insurers was extracted from the financial statements of 31 insurance companies operating in Iran's insurance sector. More details of the sampling and inclusion/exclusion of firms are discussed in Chapter 4.

5.5. EMPIRICAL MODEL AND VARIABLES

5.5.1. EMPIRICAL MODEL

In order to investigate the relationship between technological diversification strategy and its impact on Iranian insurers' financial performance, which is the aim of this chapter, Equation 5 is formulated as:

Equation 5: The model of technological diversification-firms' financial performance relationship

$$\text{Financial Performance}_i = \alpha_0 + \beta_1 \text{ Technological Diversification}_i + \beta_2 \text{ Size}_i + \beta_3 \text{ Type}_i + \beta_4 \text{ Ownership Structure}_i + \beta_5 \text{ Age}_i + \varepsilon_i$$

Where the financial performance of insurer *i* is measured by ROA and ROE, technological diversification is the vector that measures the degree to which insurance company *i* has diversified. Size, type, ownership structure, and age are control variables for insurer *i,* and finally, ε_i is the error term.

5.5.2. VARIABLES

There are three types of variables to test the hypothesis in this chapter: (1) the predictor/independent variable that is technological diversification; (2) the dependent variable, which is the financial performance of insurance firms measured by ROA and ROE; and (3) firms'- specific control variables including firm's size, firm's age, firm's ownership structure, and firm's type.

5.6. ESTIMATION METHOD

This study employs multivariate data analysis method to examine the relationship between technological diversification and firms' financial performance. In order to do this, confirmatory factor analysis (CFA) is used first to confirm the measurement of

technological diversification, followed by structural equation modelling method (SEM), specifically, partial least square SEM (PLS-SEM) technique, to investigate the relationship mentioned above and estimate the empirical model.

5.6.1. CONFIRMATORY FACTOR ANALYSIS

Factor analysis has become one of the most commonly used multivariate statistical tools in applied research since its introduction about a century ago (Yong and Pearce 2013, Shiker, 2012). The main function of factor analysis is to clarify the number and nature of latent variables or factors that account for the variation and covariation among a set of observed measures, commonly referred to as indicators (Brown, 2006). In addition, factor analysis is extensively used in evaluations of multiple-item testing instruments such as questionnaires (Papachristos, 2019). Child (2006) argues that exploratory factor analysis (EFA) aims to reveal complex patterns through exploration of the dataset and testing predictions, while confirmatory factor analysis (CFA) is aimed to confirm hypotheses by using the diagrams of path analysis to represent variables and factors. Baglin (2014) introduces EFA as a method for exploring the underlying pattern of relationships among multiple observed variables and assessing the dimensionality of questionnaire scales that measure underlying latent variables, and CFA follows it to confirm the hypotheses.

Similarly, according to Tashakkori and Teddlie (2009), an exploratory factor analysis followed by confirmatory factor analysis are usually conducted for data analysis collected from questionnaires. More precisely, Brown and Moore (2012) state that confirmatory factor analysis (CFA) is a kind of structural equation modelling that deals mainly with measurement models; i.e., the relationships between observed measures or indicators (such as test items, test scores, behavioural observation ratings) and the latent variables. Finally, Jackson et al. (2009) add that the CFA is mainly used for developing and refining measurement instruments and evaluating construct validity.

5.6.2. PLS-SEM METHOD

Sarstedt et al. (2020) argue that in order to have a better understanding and prediction, researchers study constructs (or latent variables) embedded in complex statistical models. These constructs are used to measure broad ideas or thoughts about abstract concepts that

researchers seek to investigate (Hair & Sarstedt, 2019). Sarstedt et al. (2020) add that for estimation of a cause and effect model with latent variables, structural equation modelling (SEM) is applied by scholars. As constructs are abstract concepts, researchers typically use multiple items to measure them. Following the literature, in this chapter, to examine the relationship between technological diversification and financial performance of insurance companies in Iran, structural equation modelling (SEM) analysis, specifically partial least square (PLS) method (PLS-SEM method), is adopted. Hair et al. (2019) argue that the PLS-SEM method helps researchers estimate complex models with numerous constructs, indicator variables and structural paths without imposing distributional assumptions on the researched data. They add that PLS-SEM is a causal-predictive technique of structural equation modelling, highlighting prediction in estimating statistical models structured for causal explanations. The method choice is also aligned with the literature in terms of the sample size. According to Hair et al. (2011), PLS-SEM works particularly well with small sample sizes. Therefore, this method seems appropriate for analysing the relationship between technological diversification and the financial performance of Iranian insurers, considering the small size of the sample.

5.7. EMPIRICAL RESULTS

5.7.1. CONFIRMATORY FACTOR ANALYSIS RESULTS

The summary of descriptive statistics, including means, standard deviations and standard error means for the questions explaining technological diversification in Iran's insurance industry, are presented in Table 5.1. In order to understand which of the statements are appropriate indicators of technological diversification for insurers, CFA had been calculated first (Figure 5.3). The relationship between the latent (technological diversification) and the observable variables (questions) is known as factor loading, which is demonstrated by λ. Although there is no consensus about what constitutes a "low" or "high" factor loading (Peterson, 2000), in this thesis, statements with factor loadings below 0.6 were dropped from the model as advocated by some researchers in the literature (Badri et Al., 2016 and Field, 2005). Consequently, the number of

statements used in the model shrank to 12 questions (Table 5.1), compared to the initial 33 questions used in the questionnaire [4].

Table 5.1: Summary of the remaining measurement items in the technological diversification-firms performance model

The underwriting software is comprehensive and efficient
The company has regular staff training programs for new technologies applied in the insurance industry
The company uses start-ups and/or insurance apps widely
Research and development is a must for the company
The company widely uses expert (not general) loss-adjusters
The company uses a call centre
The company widely uses novel methods of approaching new customers, such as pop-up ads on mobile phones, e-mails, etc.
The company is keen to create or write new insurance products
The company uses modern advertisement practices
The company widely uses specialized experts in different fields (e.g. engineering, medical science, etc.) for risk assessment and claim investigations
The company collects enough data and evidence while underwriting a policy to prevent fraud
The company widely uses big data analytics

[4] As represented in the Figure 5.3, statements 7, 9, 10, 11, 12, 16, 18, 21, 24, 25, 29, and 32 of the questionnaire have remained in the model. For further details about the questionnaire and the remaining questions, please see Appendix 2.

Table 5.2: Summary of the descriptive Statistics of technological diversification among Iranian insurers

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
t1	31	2.9394	3.14185	.54693
t2	31	4.2727	2.63715	.45907
t3	31	2.8788	3.00788	.52360
t4	31	5.5455	2.59917	.45246
t5	31	5.7273	3.20422	.55778
t6	31	4.8182	2.29748	.39994
t7	31	4.9848	2.32004	.40387
t8	31	3.7273	2.68413	.46725
t9	31	4.1515	2.51398	.43763
t10	31	4.0303	2.50605	.43625
t11	31	4.8788	3.11004	.54139
t12	31	7.0606	2.09074	.36395
t13	31	6.0606	2.47411	.43069
t14	31	2.8438	3.10161	.54829
t15	31	4.2424	3.37297	.58716
t16	31	5.9697	3.63563	.63288
t17	31	4.6364	3.22895	.56209
t18	31	4.4242	2.37211	.41293
t19	31	6.0606	2.53648	.44154
t20	31	5.2727	3.10516	.54054
t21	31	6.0303	3.08712	.53740
t22	31	6.0606	2.99937	.52212
t23	31	5.2424	2.80658	.48856
t24	31	4.6774	2.03940	.36629
t25	31	6.5000	2.25198	.41818
t26	31	1.8276	2.05407	.38143
t27	31	4.7759	3.30472	.61367
t28	31	2.7241	2.64435	.49104
t29	31	5.7241	2.40381	.44638
t30	31	2.4138	2.78410	.51700
t31	31	1.5517	1.99260	.37002
t32	31	4.9310	2.75073	.51080
t33	31	4.2069	2.67768	.49723

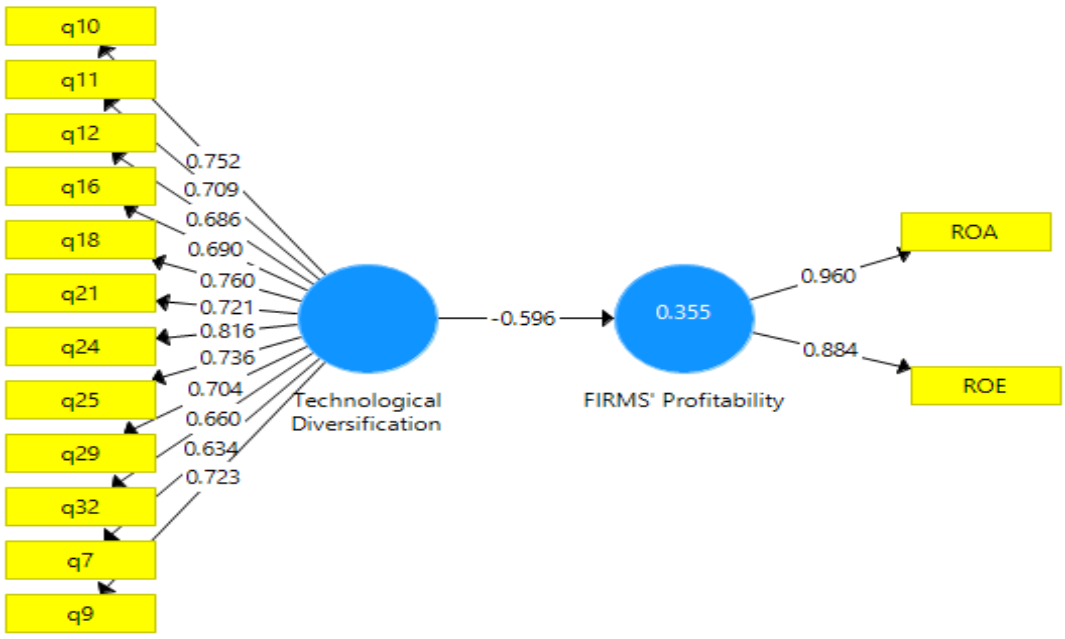

Figure 5.3: CFA analysis based on the standardized coefficients

Figure 5.4 represents CFA analysis based on the t-values. As the t-values of all the remaining statements are greater than 1.96, there is a meaningful relationship between the latent variable (technological diversification) and each of the 12 statements (summarized in Table 5.1). In other words, those statements are good indicators of technological diversification in Iran's insurance industry.

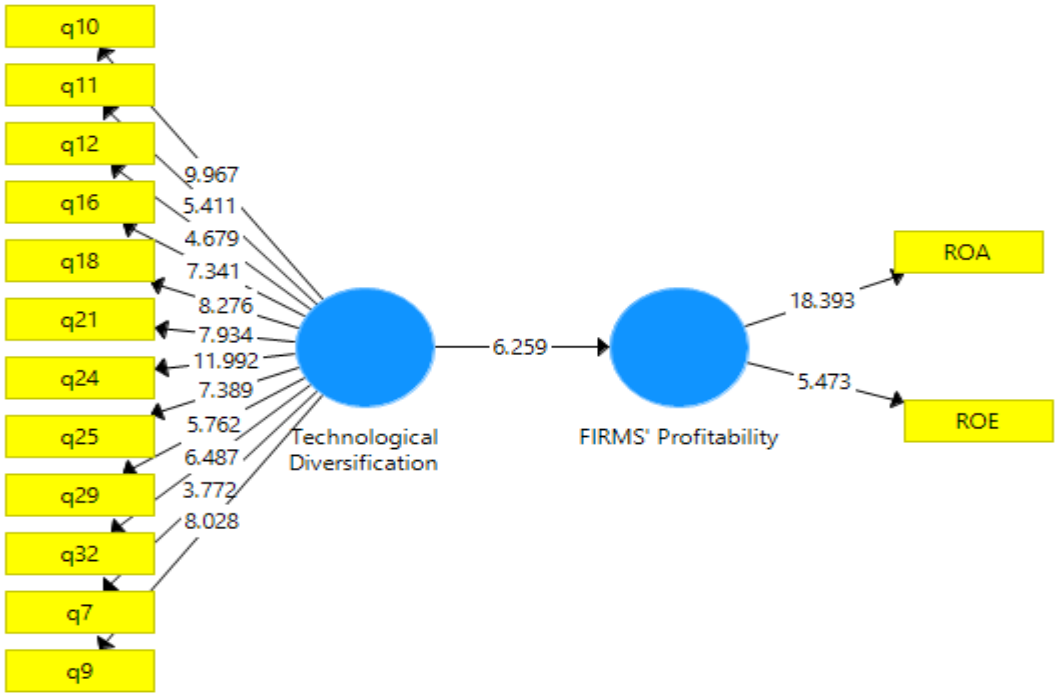

Figure 5.4: CFA analysis based on the t-values

In addition, to test for the predictability of the model, Stone Geisser's nonparametric test (Q^2 value) is used, which is aligned with the literature (Singh et al. 2021, Civelek 2018, Risher and Hair 2017). Q^2 value indicates how a model is capable of predicting. More specifically, Stone Geisser's criterion measures if a model is able to provide a prediction of the endogenous latent variable's indicators (Henseler et al., 2009). In doing so, cross-validated (CV) redundancy value is used. While a positive value for Q^2 is the indicator of high predictability of the model, a negative Q^2 value shows a poor estimation of the latent variable (GhalichKhani and Hakkak 2016, Parvar et al. 2013, Hensler et al. 2009). As demonstrated in Figure 5.5, the CV redundancy value is 0.174. Hence, the predictability of the model is good.

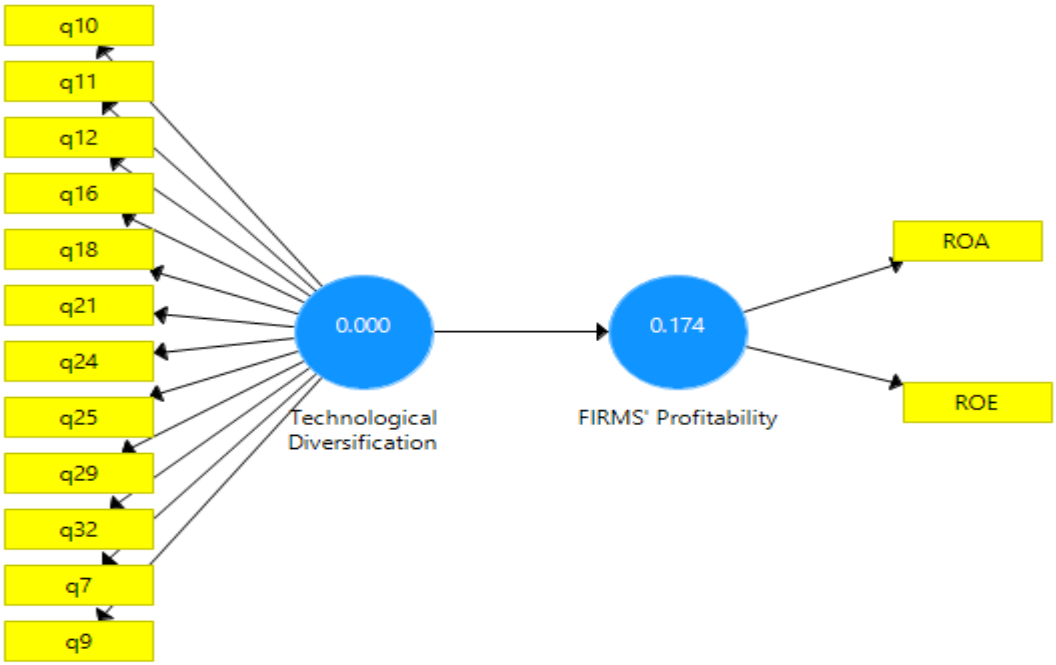

Figure 5.5: CFA analysis based on CV. Redundancy

Table 5.3 illustrates the summary of CFA analysis, and Table 5.4 illustrates standardized coefficients and t-values of the model, which confirm the good predictability of technological diversification measures in the model.

Table 5.3: CFA analysis summary

	Standardized Coefficients	**t-value**	**CV. Redundancy**
CFA	> 0.6	> 1.96	0.174

Table 5.4: Standardized coefficients and t-values of the model

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
ROA <- FIRMS' Profitability	0.96	12.625	0.000
ROE <- FIRMS' Profitability	0.884	3.675	0.000
q10 <- Technological Diversification	0.752	8.084	0.000
q11 <- Technological Diversification	0.709	4.996	0.000
q12 <- Technological Diversification	0.686	4.266	0.000
q16 <- Technological Diversification	0.69	6.021	0.000
q18 <- Technological Diversification	0.76	6.553	0.000
q21 <- Technological Diversification	0.721	6.300	0.000
q24 <- Technological Diversification	0.816	8.926	0.000
q25 <- Technological Diversification	0.736	5.333	0.000
q29 <- Technological Diversification	0.704	4.798	0.000
q32 <- Technological Diversification	0.66	4.819	0.000
q7 <- Technological Diversification	0.634	3.729	0.000
q9 <- Technological Diversification	0.723	5.949	0.000

5.7.2. RELIABILITY AND VALIDITY

The reliability and validity of the proposed model in this chapter are reported below in Tables 5.5 and 5.6. For the reliability analysis, Cronbach's alpha measure is used first. The items (statements) in a questionnaire should all measure the same concept; therefore, they should be correlated. A proper coefficient for assessing internal consistency or reliability is Cronbach's alpha (Bland and Altman, 1997). This coefficient is an appropriate measure of internal consistency or reliability to Likert scale items (Ercan et al., 2007). Rouf and Akhtaruddin (2018) argue that the reliability coefficient of Cronbach's alpha ranges between 0 and 1, while the values greater or equal to 0.80 represent good reliability. As illustrated in Table 5.5, the model's Cronbach's alpha coefficients are 0.835 and 0.915 for firms' profitability and technological diversification, respectively, indicating satisfactory fulfilment of this requirement.

Moreover, the composite reliability (CR) is measured as an alternative to Cronbach's alpha coefficient. The composite reliability ranges from 0 to 1, while values equal to or greater than 0.7 are considered satisfactory for the confirmatory factor analysis (Jayus et al., 2021). This value is calculated at 0.92 for firms' profitability and 0.927 for technological diversification in this thesis; therefore, the model benefits from composite reliability. Besides, rho_A is used as another reliability measure in CFA-SEM models (Abdelmoula et al., 2015). If the rho_A value exceeds 0.7, the model's reliability is

fulfilled (Purwanti, 2021). It is demonstrated that the corresponding rho_A value is 0.995 for firms' profitability and 0.927 for technological diversification in this study; therefore, the constructs are reliable.

Campbell and Fiske (1959) introduced convergent validity and discriminant validity as two elements for assessing the construct validity of a test. By convergent validity, it is meant the extent to which the same trait is measured by different methods, while discriminant validity focuses on the extent to which the traits are distinct (Zeller and Carmines, 2013). More specifically, in the confirmatory factor analysis method, convergent and discriminant validity examine the extent to which measures of a latent variable shared their variance and how they are different from others (Hill and Hughes, 2007). To account for the convergent validity, the Average Variance Extracted (AVE) value is calculated. According to Al-Okaily et al. (2020) and Sleimi and Emeagwali (2017), AVE values equal or higher than 0.5 are accepted statistically for convergent validity, which means the construct has the ability to explain at least half of the variance of related items. The AVE value in the proposed model is 0.851 for firms profitability and 0.514 for technological diversification, meaning that the convergent validity of the model is statistically acceptable.

On the other hand, Jakada et al. (2020), Al-Okaily et al. (2020), and Cheung and Wang (2017) suggest that to control for discriminant validity, the Fornell-Larcker criterion is one of the most widely used methods by researchers, which is the square root of the AVE. Discriminant validity means to what extent a latent variable can account for more variance in the observed variables associated with it than measurement error or similar external, unmeasured influences (Fornell and Larcker, 1981). If the square root of the average variance extraction rate (AVE value) is greater than the correlation coefficient between the variables, it indicates that there is a strong discriminant coefficient between the variables, and discriminant validity is achieved (Gu et al., 2019). The corresponding Fornell-Larcker value of the model is -0.596, as presented in Table 5.6, which is smaller than both AVEs of the model. Therefore, it is concluded that the model benefits from discriminant validity.

Table 5.5: Cronbach's alpha, rho_A, AVE, and composite reliability of the model

	Average Variance Extracted (AVE)	Composite Reliability (CR)	rho_A	Cronbach's Alpha
Firms' profitability	0.851	0.92	0.995	0.835
Technological diversification	0.514	0.927	0.927	0.915

Table 5.6: Fornell-Larcker criterion for discriminant validity

	Firms' profitability	Technological diversification
Firms' profitability	0.923	
Technological diversification	-0.596	0.717

5.7.3. HYPOTHESIS TESTING RESULTS

Since some of the studies showed inconsistent relationships between technological diversification and different measures of firms' financial performance (Lee 2017, Kim et al. 2016, Chen et al. 2013), two different models had been investigated in this section: first, the relationship between technological diversification and ROE; and second, the relationship between technological diversification and ROA.

Table 5.7 summarizes the SEM analysis for the first model, i.e., the relationship between technological diversification and ROE of the insurance firms in Iran. As illustrated below, the impact of the independent variable (technological diversification) on the dependent variable (ROE) is negative and insignificant (β = -0.517 and P-value = 0.061). Since the t-value is 1.876, which is less than 1.96, it is concluded that there is no significant relationship between the two variables.

Table 5.7: Summary of the relationship between technological diversification and ROE of insurers

	Original Sample (O)	T Statistics (|O/STDEV|)	P -values
Technological diversification -> ROE	-0.517	1.876	0.061

Similarly, Table 5.8 summarizes the SEM analysis for the second model, i.e., the relationship between technological diversification and ROA of insurance firms in Iran. As illustrated below, the impact of the independent variable (technological diversification) on the dependent variable (ROA) is negative and significant ($\beta = -0.662$ and P-value = 0.000). Besides, the t-value is calculated at 5.296, which is higher than 1.96. It can be concluded from this model that any unit increase (in percentage) in technological diversification leads to a 0.66 per cent decrease in firms' ROA.

Table 5.8: Summary of the relationship between technological diversification and ROA of insurers

	Original Sample (O)	T Statistics (|O/STDEV|)	P values
Technological diversification -> ROA	-0.662	5.296	0.000

Based on the discussions mentioned above, the relationship between technological diversification and ROE is insignificant, while the relationship between technological diversification and ROA is significant and negative. Therefore, it is concluded that the hypothesis (H1) is rejected, i.e., there is no positive relationship between technological diversification and the financial performance of Iranian insurance companies. Table 5.10 illustrates the summary of H1 rejection.

Table 5.9: Summary of the empirical results (H1)

Variables	ROE			ROA		
	Original Sample (O)	T Statistics (|O/STDEV|)	P Values	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Technological diversification	-0.517	1.876	0.061	-0.662	5.296	0.000
Firm's size	0.141	0.350	0.727	-0.165	0.566	0.572
Firm's age	0.046	0.131	0.896	0.223	0.891	0.373

In addition, by controlling for firms'-specific variables, it is concluded that the firm's age and firm's size do not impact firms' profitability in the models in this chapter. However, due to the small sample size, the impacts of the firm's ownership structure and firm's type could not be calculated in this chapter. Figures 5.6 and 5.7 demonstrate the relationships between technological diversification, ROE and ROA of Iranian insurance firms.

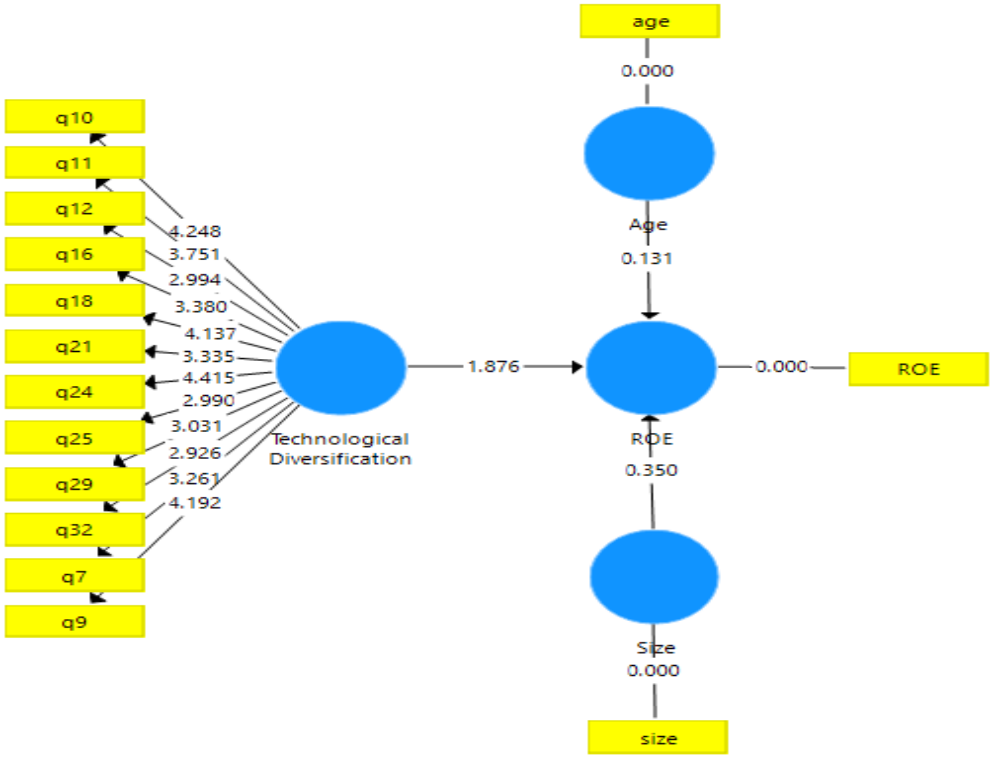

Figure 5.6: The CFA-SEM model of the relationship between technological diversification and ROE

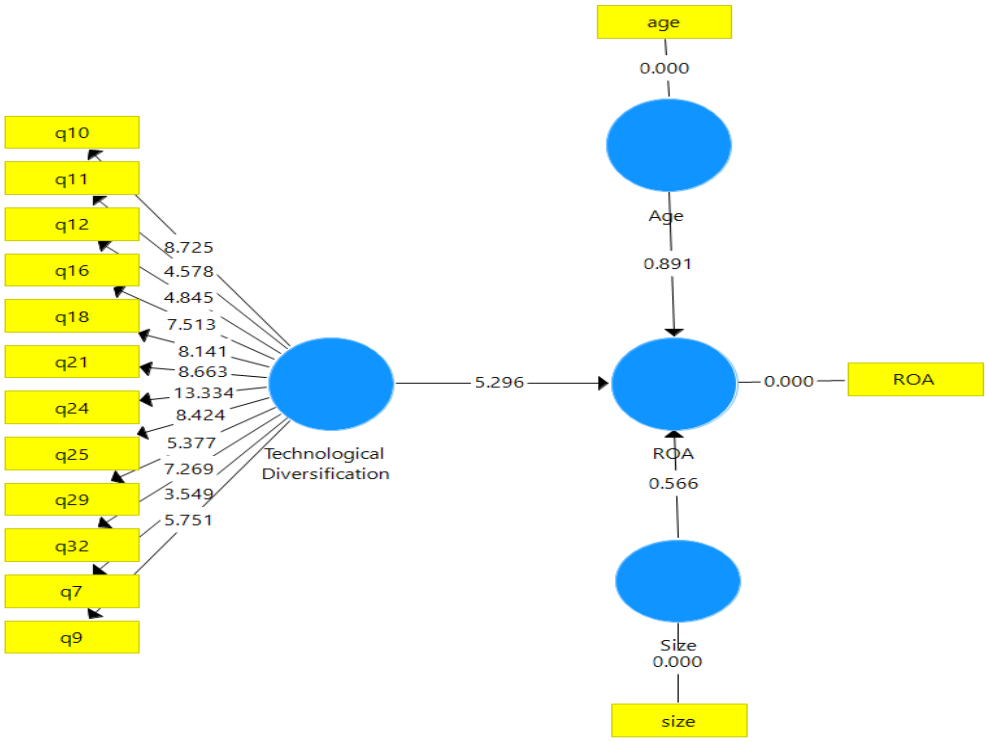

Figure 5.7: The CFA-SEM model of the relationship between technological diversification and ROA

5.7.4. GOODNESS OF FIT (GOF)

The goodness of fit (GoF) has been developed as an overall measure of the model fit for PLS-SEM. This index is developed to provide a measure for the overall prediction performance of a model (Esposito Vinzi et al., 2010, p 58). According to the definition (Henseler and Sarstedt 2013, and Tenenhaus et al. 2005), GoF is calculated as below:

Equation 6: Goodness of Fit (GoF)

$$GoF=\sqrt{\text{average (Commonality)} \times \text{average } (R^2)}$$

where the commonality is 0.272 and R^2 is 0.33 in this model, GoF equals to:

$$GoF= \sqrt{0.380 \times 0.355} = 0.367$$

Wetzels et al. (2009) argue that GoF values of 0.1, 0.25 and 0.36 are considered small, medium, and large, respectively. Therefore, the GoF of the model used in this chapter is considered to be high.

5.8. SUMMARY OF THE CHAPTER

This chapter attempted to identify if technological diversification contributes to the financial performance of insurers in Iran. To do so, the measurement for technological diversification was developed first. Consequently, the relationship between technological diversification and firm performance was investigated, using the data collected in 2019 from 31 Iranian insurance firms. Specifically, the empirical results prove the validity of the measurement of the technological diversification construct, which was developed based on the primary data collected from in-depth interviews in the context of the Iranian insurance sector. The empirical results indicate an insignificant relationship between technological diversification and firm financial performance in terms of ROE among insurance firms in Iran.

In contrast, technological diversification was found to decrease the ROA of Iranian insurers. Although collecting the primary data for the whole insurance industry of Iran was not a simple task, the size of data remains a limitation of the findings of this chapter. While the impacts of two firms'-specific control variables (size and age of the firms) have been reported by the researcher in this chapter, the impacts of the firm's type and firm's ownership structure could not be checked due to the small size of the sample. Therefore, the relatively small sample size of Iranian insurance companies is acknowledged, and the findings need to be used cautiously, specifically in terms of generalisation to other countries, industries, or longer time periods, although the findings provide useful insights for both insurance practitioners and academics.

Hence, future studies should attempt to expand the findings and models used in this chapter by collecting a larger sample of companies from larger insurance markets or repeating data collection for several years in a specific market and analysing the results considering proper control variables. Finally, designing a comparative study among two or more countries can make it much easier to decide about the generalisation of the impacts of technological diversification on the firms' financial performance. This will significantly contribute to the academics and practitioners interested in and operating in the insurance industry context.

CHAPTER 6: THE RELATIONSHIP BETWEEN STAFF, GEOGRAPHIC AND PRODUCT DIVERSIFICATION AND FIRMS' FINANCIAL PERFORMANCE IN IRAN'S INSURANCE INDUSTRY

6.1. INTRODUCTION

This chapter aims to examine the impacts of those complex and multifaceted diversification strategies on the financial performance of insurers. Despite its importance, the topic has been still unexplored in the insurance industry of Iran so far. Therefore, it is attempted to fill the literature gaps by investigating the impacts of the product, geographic and staff diversification as three dimensions of diversification strategy (Figure 6.1) on the financial performance of Iranian insurance companies. Unlike Chapter 5 that used primary data for technological diversification for one year, this chapter benefits from the secondary data of Iranian insurance over ten years (from 2011 to 2020) to examine the relationship between product, geographic and staff diversification strategies and firms' financial performance.

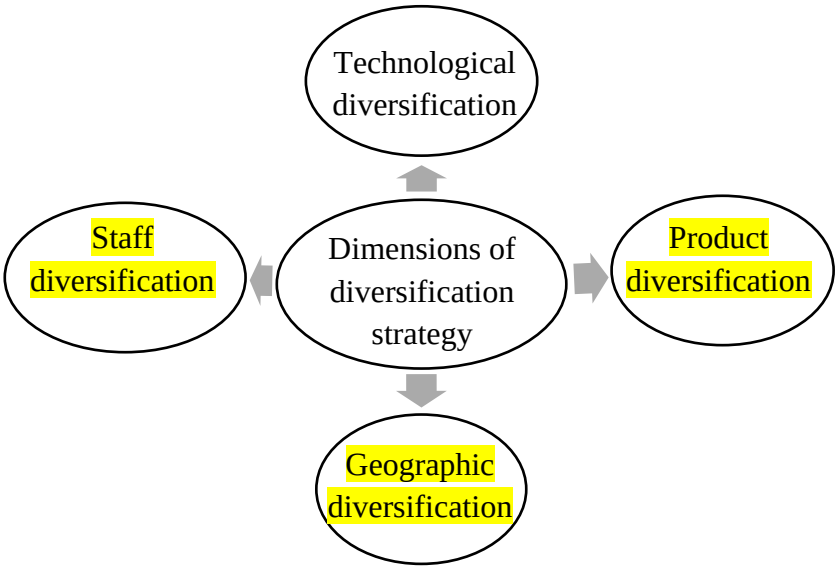

Figure 6.1: Three dimensions of diversification strategy: product, geographic and staff diversification

The chapter is organised as follows. Section 6.2 discusses the essential definitions of the independent, dependent and control variables used in this chapter. Section 6.3 is about the theory and hypothesis development. The data and sample of Chapter 6 are explained in section 6.4. Measurement methods of diversification and empirical models are covered in sections 6.5 and 6.6, respectively. Besides, the estimation method,

correlation and multicollinearity, and discussion of the research findings are discussed in sections 6.7 to 6.10. Finally, section 6.11 summarizes the chapter.

6.2. DEFINITIONS

6.2.1. DEFINITIONS OF DIVERSIFICATION STRATEGY DIMENSIONS

Diversification has been a strategic choice for firms that wish to expand for several decades, although not all firms follow this pattern of expansion (Le, 2019). In the academic research field, there have been extensive studies analysing the relationship between different aspects of diversification and firm performance in different industries of many countries (Phung and Mishra, 2016). The firms' diversification literature also reveals the existence of different diversification strategies among companies and suggests that diversification strategies exercised by corporations are both complex and multi-faceted (Cole and Karl 2016).

Whether an insurance company can benefit from a diversification strategy (for example, by offering a diversified product portfolio or diversified geographic locations for underwriting or claim settlement to its policyholders) is still an unanswered question (Le 2019, Krivokapic et al. 2017). There are many definitions of diversification since the concept was added to business and management discipline in the 1950s when the well-known American strategist Ansoff published the "Strategies for Diversification" article in "Harvard Business Review". According to Ansoff's definition (1957), diversification is a business strategy for developing new markets with new products. Penrose (1959) argues that diversification is an increase in the number and variety of final products in addition to vertical integration. Other scholars such as Gort (1962) state that diversification occurs when companies develop new markets different from the original markets. This definition overlap with Ansoff's definition.

However, scholars present narrowed down definitions of diversification in more recent studies. For instance, Su and Tsang (2015) believe that product diversification (PD) exists when companies have operations in several industries or product markets. Many scholars have discussed one of the other dimensions of diversification strategy, i.e., geographic diversification (GD). Subramaniam and Wasiuzzaman (2019) argue that geographic diversification is the diversification of a business across multiple locations to

increase profitability for the firm. Yildirim and Efthyvoulou (2018) divide geographic diversification into two categories: intra-regional GD that refers to diversification within a region where a firm is already operating, and inter-regional GD, which highlights diversification across the regions where are new to the firm. In addition to PD and GD, staff diversification (SD) is another dimension of diversification studied in this chapter. Staff (workforce) diversification is defined by Saxena (2014) as the differences among employees in terms of age, cultural background, physical abilities and disabilities, race, religion, gender, and sexual orientation. Bruna et al. (2021) studied the impact of gender diversification on corporate performance and considered gender as one of the staff diversification aspects. In another study, Cennamo and Gardner (2008) argue that a diverse workforce consists of employees with different cultures with unsimilar characteristics, aspirations, and expectations. Finally, Hofhuis et al. (2016) claim that individual differences of employees indicate workforce diversity.

6.2.2. DEFINITIONS OF FIRMS' FINANCIAL PERFORMANCE

As stated in Chapters 3 and 5, firm performance can be measured differently and from different perspectives in various disciplines. However, measuring firm performance using financial ratios is popular among scholars and practitioners (Delen et al., 2013). Return on asset (ROA) and return on equity (ROE) are among the most practical financial ratios measuring financial performance (Pham and Tran 2020, Krivokapic et al. 2017, Ghanbari et al. 2015, Banker et al. 2014, Berger et al. 2010, Elango et al. 2008 and Francis et al. 2008, Wang et al. 2007) and will be used in this chapter as well.

6.2.3. DEFINITIONS OF FIRMS'-SPECIFIC CONTROL VARIABLES

Considering the age, size, ownership structures, and types of insurers, different firms are operating in the insurance industry of Iran. Besides, age, size and ownership structure have been extensively used for measuring the relationship between diversification and financial performance of firms (Subramaniam and Wasiuzzaman 2019, Lee 2017, Krivokapic et al. 2017, Su and Tsang 2015, Foong and Idris 2012 and Elango et al. 2008). Moreover, as discussed in Chapters 2 and 4, the firm's type is added to this study to account for this insurance-specific control variable.

The age of a firm is simply defined as the number of years that the firm has been operating since its establishment. In Iran, the age of the oldest and the youngest Iranian insurance companies are 86 and 2 years, respectively.

Although there are different ways for measuring the size of a firm, it is usually represented by the number of employees (Rogers 2004, Ibhagui and Olokoyo 2018, Lin et al. 2021). As a result, for indicating the size of an insurer in this thesis, the corresponding number of employees of the same firm is considered.

To control for the ownership structure of firms, it should be highlighted that Iranian insurers are divided into public (governmental), private and semi-private firms. Among the 30 domestic Iranian insurers included in the sample, only one firm is governmental, three are semi-private, and the other 26 are privately owned (central insurance of Iran, 2020).

As discussed earlier in Chapter 3 of this thesis, commercial insurers are divided into three groups in the country, based on their core activities: (1) direct insurers, (2) reinsurers and (3) protection and indemnity (P&I) clubs. All those three types of insurance companies are currently operating in the market, including 26 direct insurance firms, two reinsurance firms and two protection and indemnity (P&I) clubs. Since the core business of each of the three categories is unique and unsimilar to others, the type of insurance company is used as another control variable in this study.

Table 6.1 provides definitions of the variables used in this chapter to measure the relationship between insurers' diversification and financial performance.

Table 6.1: Summary of variable's definitions

Variable	Definition
Product diversification	One minus the product Herfindahl Hirschman index
Geographic diversification	Total number of agents and branches that sell insurance products for a firm in one year
Staff diversification	Staff diversification $_{Gender}$: The number of staff based on gender, i.e., male or female in one company. Staff diversification $_{Experience}$: The number of staff with above ten years of work experience or less than ten years of work experience in one company. Staff diversification $_{Education}$: The number of staff with master's degree and above or bachelor's degree and below in one company.
Firm's size	The total number of employees who work for an insurer in one year [5].
Firm's age	The number of years that an insurance firm is operating in the market [6].
Firm' ownership structure	Public (governmental), private, and semi-private insurers.
Firm's type	Direct insurers, reinsurers, protection and indemnity (P&I) clubs
Financial performance	Return on Assets (ROA) and Return on Equity (ROE)

[5] For calculation purposes, LOG size is replaced in the models of this chapter. The reason will be discussed later in this chapter.

[6] For calculation purposes, LOG (age + 1) is replaced in the models of this chapter. The reason will be discussed later in this chapter.

6.3. THEORY AND HYPOTHESIS DEVELOPMENT

The existing literature shows different and even contradictory results for the impacts of diversification strategy on the financial performance of firms. In addition, some scholars such as Datta et al. (1991) and Lin and Chang (2015) demonstrated that the diversification-financial performance relationship is a contextual dependant concept. Therefore, this section aims to formulate different hypotheses explaining the potential relationships between different aspects of diversification strategy and financial measures of firms' performance (ROA and ROE). Following the discussions provided in Chapter 2 of this thesis, Table 6.2 summarizes the diversification-firms financial performance relationships based on the results of previous studies. As illustrated, the existing literature demonstrates eight different perspectives about the financial impacts of diversification strategy.

Table 6.2: Summary of diversification-firms' financial performance relationships (Source: adapted from several studies)

Diversification-financial performance relationship	Related studies
A low level of diversification leads to better financial performance	Clark and Speaker (1994) Rogers (2001) Liebenberg and Sommer (2008) Shim (2011) Chen et al. (2013) Lee (2017) Mehmood et al. (2019)
A high level of diversification leads to better financial performance	Grant et al. (1988) Meador et al. (1997) Pandya and Roa (1998) Highland and Diltz (2002) Estes (2014) Krivokapic et al. (2017) Shen et al. (2018) Lee and Kim (2020)
Inconsistent and mixed relationships between diversification strategies and financial performance of a firm	Elango et al. (2008) Biener et al. (2016) Kagzi and Guha (2018) Mehmood et al. (2019)
U-shaped relationship between diversification strategy and firms' financial performance	Mathur et al. (2001) Capar and Kotabe (2003) Thomas (2006) Ma and Elango (2008) Zahavi and Lavie (2013)
Inverted U-shaped relationship between diversification strategy and firms' financial performance	Qian et al. (2010) Santarelli and Tran (2016) Ali et al. (2016) Kim et al. (2016) Alhassan and Biekpe (2018)
Diversification strategy has no significant impact on Firms' financial performance	Ravichandran et al. (2009) Iqbal et al. (2012) Chen et al. (2013) Raei et al. (2015) Capar et al. (2015) Cahyo et al. (2021)
Related diversification leads to better financial performance	Bettis (1981) Oyedijo (2012) Mehmood and Abdullah (2015) Oladimeji and Udosen (2019)
Unrelated diversification leads to better financial performance	Dubofsky and Varadarajan (1987) Hoskisson (1987) Chen and Yu (2012) Morris et al. (2017) Oladimeji and Udosen (2019)

In this section, based on the definitions, insurance-specific measures, and data availability, the relationships between product, geographic and staff diversification and firms' financial performance are hypothesised below.

6.3.1. THE RELATIONSHIP BETWEEN PRODUCT DIVERSIFICATION AND FIRMS' FINANCIAL PERFORMANCE

Using the data extracted from the annual reports of the central insurance of Iran, both the number of policies underwritten and premiums collected in each line of business are used to measure product diversification. The reason for measuring product diversification by these two measures is to account for the nature of insurance contracts in different lines of business. In some insurance lines, such as auto and travel insurance, while the number of individual policies underwritten by a firm can be high, the total premium collected is not too much due to the small sum insureds. On the other hand, in some other lines of business, such as engineering insurance, the number of policies is considerably lower than other more popular lines, while the total generated premium is high due to the value of each project (also called sum insured). Therefore, this thesis uses both measures to investigate how product diversification impacts insurers' financial performance in Iran.

- PD_{policy} = the number of policies underwritten in one line of business in one year divided by the total number of underwritten policies in all business lines in the same year.
- $PD_{premium}$ = the premiums collected in one line of business in one year divided by the total premium collected in all lines of business in the same year.

According to the Modern portfolio theory (MPT), insurance companies benefit financially from a diversified portfolio of risks or insurance products (Alzobi 2020, Lee 2020, Duijm and Beveren 2020, and Dong and Wong 2000). Other scholars have also reported a positive relationship between product diversification and firms' financial performance in the insurance context, in different territories (Ortynski 2019, Peng et al. 2017, Krivokapic et al. 2017, Cole and Karl 2016, Shi et al. 2016, Meador et al. 2000). Accordingly, it is expected that product diversification increases the profitability of Iranian insurers. Therefore, the following hypotheses are proposed in this thesis:

Hypothesis 2a (H2a): Product diversification policy is positively associated with the financial performance of firms in the insurance industry.

Hypothesis 2b (H2b): Product diversification premium is positively associated with the financial performance of firms in the insurance industry.

These two hypotheses help to partially answer the main research question of this thesis and address the research objectives 3 and 4 discussed earlier in Chapter 1.

6.3.2. THE RELATIONSHIP BETWEEN GEOGRAPHIC DIVERSIFICATION AND FIRMS' FINANCIAL PERFORMANCE

The total number of agents and branches in one year across the country (Iran) has been used to construct this variable. It is a good indicator for geographic dispersion, specifically for traditional markets like Iran, where most people still prefer traditional methods such as face to face or in-office purchases to modern methods such as online purchasing (Haghighi et al., 2016). For more clarification, it is worth mentioning that in 2018, total auto insurance premiums written online in Iran was less than 1% of the total premium collected in the same line of business (Vali Poori, 2019), while in the UK, the number for the same year was 58.7% (Statista, 2021).

- Geographic Diversification = Number of sales agents of a firm in one year + number of branches of a firm in the same year (total number of sales agents and branches that sell insurance products for a firm in one year)

Kaže (2010) highlights the significance of values and purchasing habits of consumers for their choice of a particular distribution channel in the insurance context. Haghighi et al. (2016) explain that creating a friendly face to face relationship with potential customers leads to positive purchasing decisions and increases sales in Iran. Their research show that traditional purchasing behaviour is still preferable for Iranians, compared to online shopping, which can be attributed to cultural values and preferences. Therefore, being physically present (as insurance firms' branches or sales agents) in different geographic areas is important for Iranian insurers. Similarly, other researchers such as Che et al. (2017) and Krivokapic et al. (2017) argue that there is a positive relationship between geographic diversification and firms' performance in different countries. Therefore, the hypothesis (H3) partially helps answer the main research

question of this thesis and addresses the research objectives 5 and 6 discussed earlier in Chapter 1.

Hypothesis 3 (H3): *Geographic diversification is positively associated with the financial performance of firms in the insurance industry.*

6.3.3. THE RELATIONSHIP BETWEEN STAFF DIVERSIFICATION AND FIRMS' FINANCIAL PERFORMANCE

The Central Insurance of Iran's annual report has categorized staff working in the insurance industry based on three parameters: gender, work experience in the insurance sector and education. Therefore, in this chapter, insurance firms' staff have been divided into male or female (gender), above ten years or below ten years of work experience and master's degree and above or bachelor's degree and below for education.

- Staff Diversification $_{Gender}$: Staff has been categorized based on their gender, i.e., male or female.
- Staff Diversification $_{Experience}$: Staff with above ten years of work experience or less than ten years of work experience.
- Staff Diversification $_{Education}$: Staff with master's degree and above or those who have bachelor's degree and below.

The existing literature suggests a positive relationship between staff diversification and firms' performance. For example, Triguero-Sanchez et al. (2018) state that diversified staff lead to higher performance in Spanish firms. In addition, Armstrong et al. (2010) show that staff diversity is positively associated with firms' performance in manufacturing and service firms in Irland. However, very few researchers have studied the relationship between staff diversification and firms' financial performance in the insurance industry. Similar to the findings of other industries, Nnadi and Chinedu (2019) argue that staff diversity is essential in improving deposit insurance companies' performance in Nigeria. Accordingly, it is expected that a positive relationship exists between staff diversification and the financial performance of Iranian insurance firms, and the following hypotheses are proposed:

Hypothesis 4a (H4a): *Staff diversification $_{Gender}$ is positively associated with the financial performance of firms in the insurance industry.*

Hypothesis 4b (H4b): *Staff diversification* $_{Experience}$ *is positively associated with the financial performance of firms in the insurance industry.*

Hypothesis 4c (H4c): *Staff diversification* $_{Education}$ *is positively associated with the financial performance of firms in the insurance industry.*

The above hypotheses (H4a, H4b and H4c) help the researcher partially answer this thesis's main research question and address the research objectives 7 and 8 discussed earlier in Chapter 1.

6.3.4. THE RELATIONSHIP BETWEEN PRODUCT, GEOGRAPHIC, AND STAFF DIVERSIFICATION AND FIRMS' FINANCIAL PERFORMANCE

Firms may wish to pursue a couple of diversification strategies simultaneously to increase their profitability. For example, Krivokapic et al. (2017) state that both product and geographic diversification strategies are positively associated with firms profitability. Therefore, according to the above discussions and hypotheses, this study proposes that the compound model of diversification strategies increases the profitability of diversifiers. This helps the researcher partially answer this thesis's main research question and addresses the research objectives 9 and 10 discussed earlier in Chapter 1. Hypothesis 5 is formulated as below:

Hypothesis 5 (H5): *Diversification* $_{Product,\ Geographic\ and\ Staff}$ *is positively associated with the financial performance of firms in the insurance industry.*

Accordingly, the theoretical models of product, geographic and staff diversification relationships with the financial performance of insurance companies in Iran are illustrated below, in Figure 6.2.

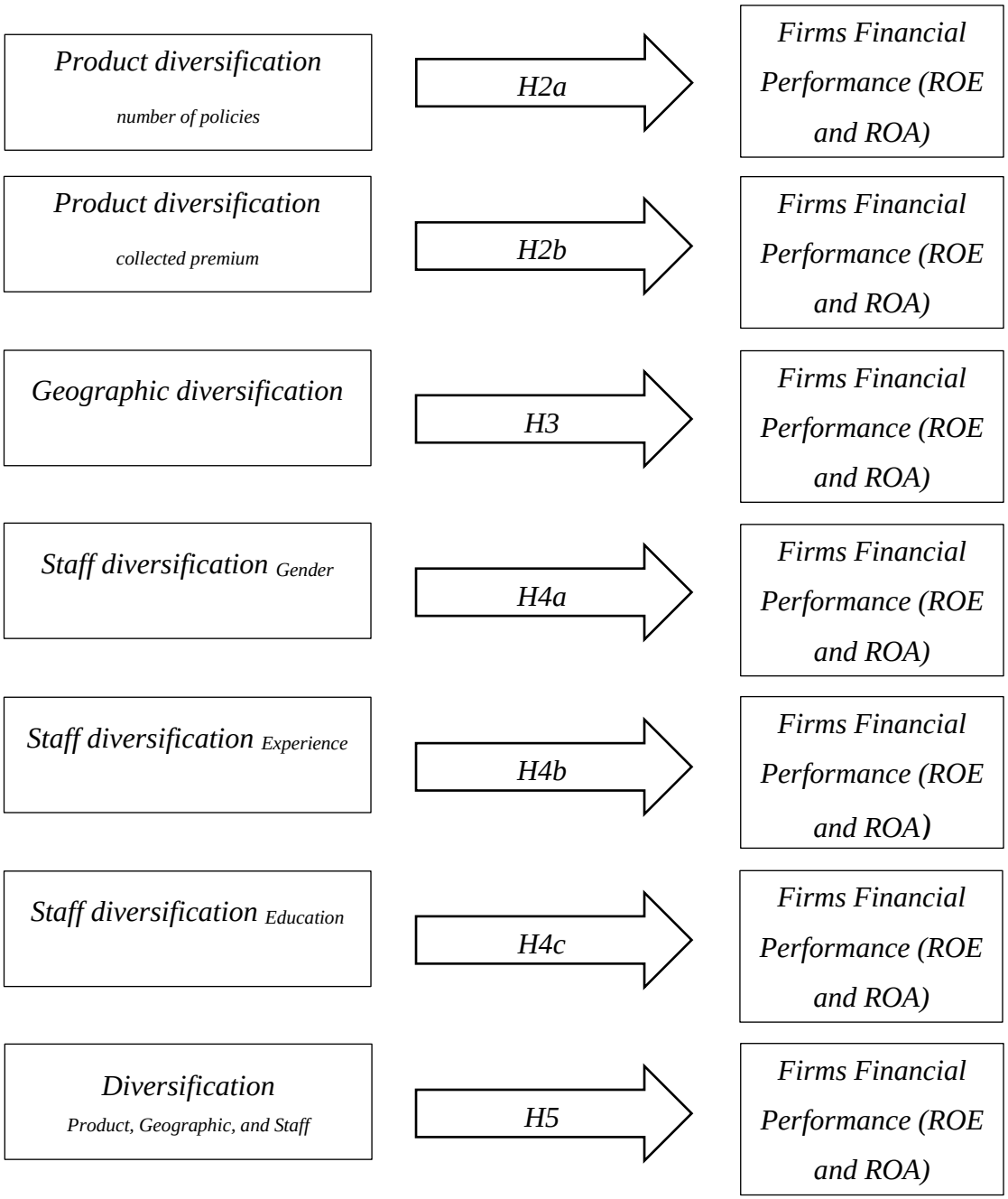

Figure 6.2: The theoretical models of the relationships between different dimensions of diversification strategy and financial performance of insurers in Iran

6.4. PANEL DATA AND THE RESEARCH SAMPLE

Many business and management researchers are interested in big datasets, including panel data, to conduct their studies. Panel data consists of observations repeated over a period of time on the same set of cross-sectional units. These units can be individuals, companies, or any other collection of units one can follow over time (Wooldridge 2009). Panel data sets have some advantages over conventional cross-sectional or time-series data. Hsiao (2014, p 3) argues that it usually provides a large number of data points for

scholars, increases the degrees of freedom and decreases the collinearity among explanatory variables. Therefore, it enhances the efficiency of econometrics estimates. Baltagi and Song (2006) argue that panel data encompasses longitudinal data analysis, focusing on individual histories. Biørn (2016) adds that the panel data allows conducting studies that cannot be handled individually by cross-section or time-series data.

Panel data is also widely popular in diversification-financial performance studies in many contexts (Bruna et al. 2021, Song et al. 2020, Zúñiga Vicente et al. 2019, Qian et al. 2008, Lu and Beamish 2004). Similarly, researchers in the insurance context used panel data to investigate diversification strategy and financial performance relationships (Yulianti and Nuryatno 2017, Lee 2017 and Shim 2011). In this chapter, the secondary panel data required for measuring product diversification, geographic diversification and staff diversification and their relationships with ROA and ROE of the insurance companies in Iran has been extracted from annual reports of the central insurance of Iran for a period of 10 years (from 2011 to 2020).

This chapter uses a sample of 30 Iranian insurance companies out of the 33 listed insurance companies in Iran in 2020 to investigate the relationships mentioned above. This is an unbalanced dataset with 300 observations, including the vast majority of the firms in the market. The data of three insurance companies are excluded from this study. Two of the companies are very young and did not provide adequate data for panel regression analysis. Moreover, another insurance company is excluded due to being involved in the liquidation process. Availability and having access to this dataset is of particular benefit to this study. The CII's annual reports are very detailed, and there is much information in the data. Those reports provide the standard financial information and financial ratios of all Iranian insurance companies, and the information of different lines of business, such as the number of policies and written premiums, are included in those reports. Besides, they entail additional data on the firm size, staff's gender, education and work experience, and the number of agents and branches selling insurance products for each firm.

6.5. MEASUREMENT OF FIRM DIVERSIFICATION

There are several different ways to measure the degree of diversification of a firm, a market, or an industry. Herfindahl Hirschman Index (also known as HHI), Jacquemin and Berry's entropy measures, and Rumelt's classification system are among the well-known methods used for diversification measurement (Lindgren and Persson 2005). However, Herfindahl–Hirschman Index is the most common method used for measuring the level of focus or diversification of firms (Hanson et al. 2019, Brezina et al. 2016, Sarmento and Nunes 2015, Djolov 2013) while using panel data. HHI has also been used to measure the relationship between diversification strategy and the firm's financial performance or profitability in the insurance context (Ng, M. K. 2020, Dauda 2018, Krivokapic et al. 2017, Cole and Karl 2016). As the Herfindahl Hirschman Index is a measure of concentration, one minus HHI demonstrates the diversification ratio (Kim et al. 2019, Rubio-Varas and Muñoz-Delgado 2019, Chikoto et al. 2016). Following the literature, in this chapter, for measuring the concentration ratio based on insurance products, the HHI index (product concentration ratio) is defined as below:

Equation 7: Product concentration ratio (based on underwritten premiums)

$$\text{HHI}_{\textit{product-premium}} = \sum_{j=1}^{N} \left(\frac{DPW_j}{\sum_{j=1}^{N} DPW_j} \right)_j^2$$

Equation 8: Product diversification Premium

$$\text{DIV}_{\textit{product-premium}} = 1 - \text{HHI}_{\textit{product-premium}}$$

Hence, the measure of product diversification $_{premium}$ may range only from zero to one.

Where:

DPWj is the monetary value of direct premium written (DPW) by an insurance company in product line *j* in a given year.

$\sum_{j=1}^{N} DPW_j$ is the monetary value of the direct premiums written by an insurance company in all lines of business in a given year.

And DIV *product-premium* is product diversification based on the written premium, which is equal to 1 minus concentration ratio (HHI).

Similarly:

Equation 9: Product concentration ratio (based on number of policies)

$$\text{HHI}_{\textit{product-policy}} = \sum_{j=1}^{N} \left(\frac{NPW_j}{\sum_{j=1}^{N} NPW_j} \right)_j^2$$

Equation 10: Product diversification Policy

$$\text{DIV}_{\textit{product-policy}} = 1 - \text{HHI}_{\textit{product-policy}}$$

Hence, the measure of product diversification *policy* may range only from zero to one.

Where:

NPWj is the number of insurance policies written (NPW) by an insurance company in product line *j* in a given year.

$\sum_{j=1}^{N} NPW_j$ is the number of insurance policies written (NPW) by an insurance company in all lines of business in a given year.

And DIV *product-policy* is product diversification based on the number of policies, which is equal to 1 minus concentration ratio (HHI).

However, for other dimensions of diversification that are studied in this chapter, i.e., geographic and staff diversification, the HHI index is not used. Instead, as for each variable, there is only one value associated with a given year (for example, the number of

agents and branches in an insurance company for a given year or the number of males in an insurance company for a given year), the corresponding values have been inserted into the model directly.

6.6. EMPIRICAL MODEL

Panel data regression is used in this chapter, and the general regression model is formulated as below:

Equation 11: Model of product, geographic and staff diversification-firms' financial performance relationship

$$\text{Financial Performance}_{it} = \alpha_0 + \beta_1 \text{Diversification}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{Type}_{it} + \beta_4 \text{-Ownership Structure}_{it} + \beta_5 \text{Age}_{it} + \varepsilon_{it}$$

Where the financial performance of insurer *i* in year *t* is measured by ROA and ROE, diversification is the vector with various measures of diversification strategy (product, geographic and staff) in insurance company *i* during year *t*. In addition, the size, type, ownership structure, and age are the firm's-specific control variables for the insurer *i* in the year *t*. Finally, ε_{it} is the error term.

6.7. ESTIMATION METHOD

Analysis of multiple levels data, including panel data, can employ a range of different methods. Pooled ordinary least square (pooled OLS) models can be adopted by researchers when different samples are selected for years or time periods of the panel data. On the other hand, using fixed-effects or random-effects models are popular while observing the same sample of individuals, cities, firms, etc., over a period of time (Wooldridge, 2010). Following the literature, to test which of the two models, i.e., pooled models or models with fixed or random effects, fits best in this chapter, the F-Limer test (Chow test) is used (Hosseini et al. 2017, Lee, 2008). If H_0 is rejected, the pooled model will not be used in the study.

$$\begin{cases} H_0: \alpha_i = \alpha \\ H_1: \alpha_i \neq \alpha \end{cases}$$

where:

H_0: Pooled Model and H_1: Fixed (or random) Effects Model

For investigating if pooled models are the best option for this study, the results of F-Limer tests are illustrated for each of the tested models in this study. For all of the models, the H_0 hypothesis is rejected, i.e., the pooled model is not applicable in this research. However, the F-Limer test is usually followed by the Hausman test to choose a fixed-effects model or random-effects model in a study (Bell et al. 2019, Hosseini et al. 2017). In this chapter, according to the size of data, the fixed effects model is adopted among the two models (fixed effects vs random-effects model). Based on the message shown in the EViews software solution, there need to be more cross-section data for running the random effect model (Figure 6.3), which is not feasible. As mentioned before, the data of all Iranian insurance companies have been collected for ten years, and there is no other firm to be added to the current database. This fact can be a potential limitation of this study, which will be discussed in more detail later in Chapter 7 of this thesis.

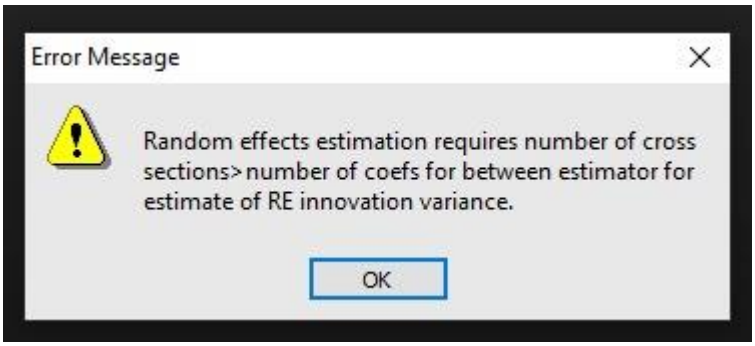

Figure 6.3: The EViews error for running the random-effects model

6.8. CORRELATION AND MULTICOLLINEARITY

Before continuing with the findings and results, it is essential to discuss the correlation coefficient and multicollinearity first. Schober et al. (2018) argue that a correlation indicates the association between two variables which can take two forms: (1) An increase in the value of one variable leads to an increase in the value of the other variable; or (2)

An increase in the value of one variable leads to a decrease in the value of the other variable. There are different methods for calculating the correlation coefficient between variables, including Pearson's correlation coefficient and Spearman's correlation coefficients and Kendal rank correlation coefficient (Xiao et al. 2016, Hauke and Kossowski 2011). However, if all variables are normally distributed, it is common to use Pearson's correlation coefficient; otherwise, the non-parametric Spearman's correlation coefficient will be used (Schober et al. 2018, Mukaka 2012). As demonstrated in Table 6.8, most of the variables in this chapter are not normally distributed. Therefore, Spearman's coefficient is used to detect correlation among variables in this section. The value of Spearman's correlation coefficient can vary from −1 to +1, where −1 shows a perfect negative correlation between the variables, +1 is the indicator of perfect positive correlation between the variables and 0 means there is no relationship between the chosen variables. Although different studies have used various interpretations of correlation coefficient values, Table 6.3 demonstrates a rule of thumb for interpreting correlation coefficient values.

Table 6.3: Interpretation of the value of a correlation coefficient (Mukaka 2012)

Value of the Correlation coefficient	Interpretation
0.90 to 1.00 (−0.90 to −1.00)	Very high positive (negative) correlation
0.70 to .90 (−0.70 to −.90)	High positive (negative) correlation
0.50 to .70 (−0.50 to −.70)	Moderate positive (negative) correlation
0.30 to .50 (−0.30 to −.50)	Low positive (negative) correlation
0.00 to .30 (0.00 to −.30)	negligible correlation

Table 6.4 summarises Spearman's correlation coefficients for the proposed model in this chapter. However, the type of insurance company and the ownership structure of an insurer are not included in this table, as both mentioned variables are discrete, not continuous variables which can take different values each (type of insurer: direct insurer, reinsurer or P&I clubs and Ownership structure of an insurer: public (governmental),

semi-private or private). In comparison, the correlation coefficients between some of the variables are negligible (for example, Diversification $_{education}$ and Diversification $_{experience}$), there are variables with low correlation coefficients (for example, Diversification $_{premium}$ and Diversification $_{geographic}$), moderate correlation coefficients (e.g., Diversification $_{policy}$ and Diversification $_{premium)}$ and finally very high correlation coefficients (e.g., Diversification $_{geographic}$ and size). In addition, positive and negative numbers in Table 6.4 represent both positive and negative relationships between variables.

Table 6.4: Spearman's correlation coefficients of the model

Variable	ID	1	2	3	4	5	6	7	8
Diversification education	1	1.000	0.151	-0.050	-0.281	-0.140	-0.147	-0.153	-0.348
Diversification experience	2	0.151	1.000	-0.149	0.130	0.053	-0.028	0.267	0.144
Diversification gender	3	-0.050	-0.149	1.000	-0.191	-0.072	-0.087	-0.121	-0.215
Diversification geographic	4	-0.281	0.130	-0.191	1.000	0.487	0.433	0.631	0.930
Diversification policy	5	-0.140	0.053	-0.072	0.487	1.000	0.550	0.151	0.379
Diversification premium	6	-0.147	-0.028	-0.087	0.433	0.550	1.000	0.231	0.380
AGE	7	-0.153	0.267	-0.121	0.631	0.151	0.231	1.000	0.682
SIZE	8	-0.348	0.144	-0.215	0.930	0.379	0.380	0.682	1.000

Paul (2006) argues that in regression models, multicollinearity may exist when two or more predictors are correlated. As a result, the standard error of the coefficients increases, and multicollinearity makes some variables statistically insignificant when they should be significant (Daoud, 2017). In the regression models, in order to detect the multicollinearity among independent variables, the variance inflation factor (VIF) test is devised following the literature (Salmerón et al. 2020, O'brien 2007). In order to calculate VIFs, each model generates an R-squared value representing the percentage of the variance in an individual independent variable which the set of predictors explains. Therefore, higher values of R-squared demonstrate higher levels of multicollinearity. The VIF values

for a predictor can be calculated by the formula below (Salmerón Gómez et al. 2020, Johnston et al. 2018):

Equation 12: Variance inflation factor

$$VIF_i = 1/ (1- R_i^2)$$

As there are correlations between some of the variables in the model, it might inflate the variance of predictor's coefficients. Therefore, VIF values are calculated and checked in this chapter. For this purpose, the firm's age and size are replaced by log(age + 1) and log(size), respectively. The VIF test results for the model are presented in Tables 6.5 and 6.6. Since different panel models are used in this study, VIF values are presented in two tables. Table 6.5 is provided for the models that calculate the relationship between financial performance (ROA or ROE) and only one dimension of diversification strategy (for example, geographic diversification or product diversification $_{premium}$). In contrast, Table 6.6 is provided for the compound models that analyse the ROA or ROE relationship with all dimensions of diversification in one equation.

Table 6.5: VIF values for models which measure only one dimension of the diversification strategy

Variable	Education		Experience		Gender		Geographic		Policy		Premium	
Type	ROA	ROE	ROA	ROE	ROA	ROE	ROA	ROE	ROA	ROE	ROA	ROE
DIVERSIFICATION	1.29	1.57	1.06	1.14	1.10	1.09	1.12	1.18	2.36	3.84	1.67	1.94
FIRM'S TYPE	1.53	1.98	1.50	1.86	1.82	1.50	1.39	1.47	2.37	3.31	1.81	2.06
FIRM'S OWNERSHIP	1.87	2.27	1.75	2.24	2.30	1.87	2.02	2.18	1.92	2.37	1.94	2.10
LOG(SIZE)	1.88	2.56	1.81	2.57	2.59	1.91	1.89	2.27	1.85	3.23	1.84	2.11
LOG(AGE+1)	1.94	2.51	1.59	1.93	1.94	1.63	1.85	2.03	1.76	2.43	1.79	1.95

Table 6.6: VIF values for compound models which measure all dimensions of the diversification strategy

Variable	ALL	
Type	ROA	ROE
DIV_EDUCATION	1.31	1.57
DIV_GENDER	1.25	1.16
DIV_EXPERIENCE	1.23	1.20
DIV_GEO	1.26	1.22
DIV_POLICY	3.19	3.14
DIV_PREMIUM	2.07	2.38
FIRM'S TYPE	3.23	3.18
FIRM'S OWNERSHIP	2.60	2.66
LOG(SIZE)	2.56	2.66
LOG(AGE+1)	2.26	2.55

There are different interpretations for VIF test results in the literature. For example, Daoud (2017) states that if VIF = 1, there is no collinearity; if $1 < VIF \leq 5$, there is moderate collinearity, and for VIF > 5, it can be interpreted as high collinearity. On the other hand, most scholars argue that VIF values above 10 are considered as high multicollinearity; values between 5 and 10 show moderate multicollinearity and values between 1 to 5 represent no collinearity (Dalkani et al. 2012, Asghari Zakaria et al. 2006, Hair et al. 1995). However, following the second group of researchers, the values illustrated in Table 6.7 have been used to interpret the model's VIF values. According to the VIF values calculated in Tables 6.5 and 6.6, no evidence of multicollinearity in the models is found, as all VIF values are located between 1 and 5 ($1 < VIF \leq 5$).

Table 6.7:Interpretation of VIF values (Source: adapted from several studies)

VIF values	Conclusion
$1 < VIF \leq 5$	No collinearity
$5 < VIF \leq 10$	Moderate collinearity
VIF > 10	High collinearity

6.9. EMPIRICAL RESULTS

6.9.1. DESCRIPTIVE STATISTICS

Descriptive statistics for the variables describing the relationship between firms' diversification strategy and financial performance are presented in Table 6.8. In addition, to test normal distributions (normality) of the variables in the models, the Kolmogorov Smirnov (KS) test is used, and the corresponding values are added to the table below. The Kolmogorov Smirnov test is a non-parametric test that uses the cumulative distribution to decide about the specific distribution of the data. This test is recognized to be an efficient measure for goodness of fit purpose (Aslam, 2019). As illustrated in Table 6.8, the normality has been rejected for most of the variables as the corresponding P values are less than 0.05, except ROE, age and diversification product-policy with P values of 0.549, 0.196 and 0.371, respectively.

Table 6.8: Summary of descriptive statistics

	ROA	ROE	AGE	SIZE	DIV PREMIUM	DIV GEO	DIV POLICY	DIV GENDER	DIV EXPERIENCE	DIV EDUCATION
Unit of Measurement	%	%	Number of years	Number of employees	%	%	%	%	%	%
Mean	4.57	16.89	15.14	646.43	0.65	1531	0.63	0.44	0.27	0.28
Median	3.41	17.10	10.00	380.50	0.73	779	0.68	0.46	0.30	0.29
Maximum	17.26	43.31	86.00	4614.00	0.87	31027	0.84	0.50	0.50	0.50
Minimum	-0.52	-5.76	0.00	5.00	0.00	1	0.00	0.00	0.00	0.00
Std. Dev.	4.34	12.55	18.84	911.96	0.21	3061	0.20	0.07	0.16	0.13
Skewness	1.37	0.25	2.31	2.84	-2.13	6	-2.44	-2.84	-0.29	-0.05
Kurtosis	4.50	2.60	7.57	11.39	6.76	44	8.22	14.75	1.78	1.77
KS test	0.116	0.045	0.065	0.140	0.133	0.132	0.057	0.154	0.084	0.094
Probability	0.001	0.549	0.196	0.000	0.000	0.000	0.371	0.000	0.026	0.009

6.9.2. HYPOTHESIS TESTING RESULTS

This section presents and interprets the results of 14 panel models used to measure different diversification-financial performance relationships. In addition, related tests such as F-Limer test (Chow test), Breusch-Pagan LM test, Durbin Watson statistic, R-squared, adjusted R-squared, F statistic, and Kolmogorov Smirnov (KS) test for residuals of all models are conducted, and their corresponding results and implications to this study are reported.

6.9.2.1. THE IMPACT OF STAFF DIVERSIFICATION ON FIRMS' FINANCIAL PERFORMANCE

As previously explained in this chapter, staff diversification is measured by education, gender and experience. On the other hand, firms' financial performance is measured by ROA and ROE. Therefore, in this section, considering all combinations of dependant and independent variables, six regression models will be used to discuss staff diversification and firms' performance relationships.

- **The impact of diversification $_{education}$ on ROA**

Given the calculated F-Limer statistic in Table 6.9, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.00 (smaller than 0.05, which is the type I error of the model). Therefore, the fixed-effect model is chosen to investigate the diversification education and ROA relationship.

Table 6.9: F-Limer test result for diversification $_{education}$ and ROA model

Redundant Fixed Effects Tests
Equation: EQ_ROA_EDUCATION
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	5.722207	(9,285)	0.0000

In Table 6.10, the corresponding values of the diversification $_{education}$ and ROA model are presented. As illustrated, the coefficients of intercept (constant) and diversification $_{education}$ are positive and meaningful (5.863599 and 12.66240, respectively), and their corresponding P values are smaller than 0.05 (0.0106 and 0.0000). It can be interpreted from this table that a one per cent increase in the independent variable (diversification $_{education}$) leads to a 5.863599 per cent increase in ROA of a typical firm. In addition, considering the control variables, the firms' type and size are negatively associated with ROA in this model, as their corresponding values are -4.171284 and -1.079665, respectively, while their P values are smaller than 0.05 (0.0057 and 0.0003). Therefore, it is concluded that the positive relationship between diversification education and ROA for reinsurers, P&I clubs and small insurers is more significant than bigger general insurers. This is justifiable, as based on Iran's insurance market structure, direct insurers are bigger than reinsurers and P&I clubs considering the firm size.

The Durbin Watson test is a statistic that tests the autocorrelation of the residuals obtained from a linear regression model (Chen 2016, Hepple 1998 and Kramer 1985). This potential problem (autocorrelation) may appear in applying a linear model to a time series while testing the independence of the model's residuals and may lead to the underestimation of the standard error (SE). According to the definition, Durbin Watson statistic is always between 0 and 4, where:

- Durbin Watson statistic = 2 means no autocorrelation.
- Durbin Watson statistic 0 to <2 means positive autocorrelation.
- Durbin Watson statistic >2 to 4 means negative autocorrelation.

However, Turner et al. (2020) argue that Durbin Watson values close to 2 indicate no autocorrelation. As demonstrated in Table 6.10 below, the Durbin Watson statistic for this model is 1.99, indicating there is no first-order autocorrelation among residuals of the model (i.e. consecutive residuals of the model are not correlated).

There are also some other statistics in this table. One of the goodness of fit (GoF) measures for the regression models is the R-squared value (Sotirchos et al. 2019 and Edwards et al. 2008). This value indicates the proportion of variance of the dependent variable that can be accounted for by the regression model (Karch, 2020). The calculated R-squared of this model is 0.325228, as illustrated in Table 6.10. As R-squared is

increased if more variables are added to the model (regardless of their contribution to a model's specifications), it is common to calculate another measure named adjusted R-squared that controls for both of the numbers of cases and the variables included in a regression model (Figueiredo et al. 2011). The adjusted R-squared value of this model is 0.29, which means this regression model can explain 29 per cent of the dependent variable. The other statistic reported in the below table is the F statistic. F statistic (F test) is used to evaluate the significance of a model, while its corresponding P-value demonstrates the probability level for a model. The common practice among scholars is to interpret a P-value lower than 0.05 as denoting the significance of a model (Hernandez 2021 and Eriksson et al. 2008). In this model, while the P-value of the F statistic is equal to zero (less than 0.05), the F statistic value is calculated at 9.811763, which means at least one of the coefficients is not equal to zero in this model, and the model is meaningful and statistically significant.

Table 6.10:The statistics of diversification $_{education}$ and ROA regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_EDUCATION	**5.863599**	**2.279665**	**2.572132**	**0.0106**
DIRECT_INSURER	-4.171284	1.498392	-2.783840	0.0057
GOVERNMENT	-0.144007	1.654890	-0.087019	0.9307
@LOG(SIZE)	-1.079665	0.292782	-3.687606	0.0003
@LOG(AGE+1)	0.200761	0.531125	0.377993	0.7057
C	12.66240	2.125546	5.957244	0.0000
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.325228	Mean dependent var		0.393312
Adjusted R-squared	0.292081	S.D. dependent var		1.292721
S.E. of regression	1.016527	Sum squared resid		294.4984
F-statistic	9.811763	Durbin-Watson stat		1.994823
Prob(F-statistic)	0.000000			

Typically, it is assumed that disturbances in panel data models are not dependent cross-sectionally (Pesaran, 2021). Cross-sectional dependency may exist in panel data models due to the presence of unobserved components, which turn to be part of the error term, and make it biased (De Hoyos and Sarafidis 2006). There are different methods for testing cross-sectional dependence and heteroscedasticity in panel-data models (Peng

2021). One of the most popular tests for measuring cross-sectional dependence and heteroskedasticity is the Breusch-Pagan Lagrange Multiplier test (Tahir et al. 2021 and Astaiza-Gomez, 2020), also known as the Breusch-Pagan LM test. The result of the Breusch-Pagan LM test in Table 6.11 reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.6816 and is greater than 0.05, which is the introduced threshold in the literature (Topaloglu et al. 2021, Abbas and Eksandy 2021).

Table 6.11: Breusch-Pagan LM test for diversification $_{education}$ and ROA regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROA_EDUCATION
Periods included: 10
Cross-sections included: 30
Total panel observations: 300
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	420.5695	435	0.6816

In regression analysis, it is assumed that the regression residuals are normally distributed. If the normality assumption in regression analysis is violated, it may lead researchers to inaccurate inferential statements (Jarque and Bera, 1980). To check for the normality of residuals, the result of the Kolmogorov Smirnov (KS) test is reported in Table 6.12. The model's findings reveal that residuals are normally distributed, as the P-value of the KS test is calculated at 0.358, which is greater than 0.05.

Table 6.12: The Kolmogorov Smirnov (KS) test for the residuals of diversification education and ROA regression model

KS test for residuals	ROA Education
KS stat	0.055
P Value	0.358

- **The impact of diversification $_{education}$ on ROE**

Given the calculated F-Limer statistic in Table 6.13, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0011 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate the diversification education and ROE relationship.

Table 6.13: F-Limer test result for diversification $_{education}$ and ROE model

Redundant Fixed Effects Tests
Equation: EQ_ROE_EDUCATION
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	3.196330	(9,285)	0.0011

In Table 6.14, the corresponding values of the diversification $_{education}$ and ROE model are presented. As illustrated, the intercept (constant) and diversification education coefficients are positive and meaningful (4.294988 and 20.32930, respectively), while the corresponding P values are 0.4931 and 0.0122. As the constant's P-value is more significant than 0.05, the constant value is considered zero in this model. It can be interpreted from this table that a one per cent increase in the independent variable (diversification $_{education}$) leads to a 20.32930 per cent increase in ROE of a typical firm. In addition, considering the control variables, the firms' age is positively associated with ROE in this model, as its corresponding value is 2.925743, while its P-values is smaller than 0.05 (0.0426). Therefore, it is concluded that the positive relationship between diversification $_{education}$ and ROE is more significant when the firm's age increases.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.997510, which indicates there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.102957, and the adjusted R-squared value of this model is 0.058892, which means this regression model can explain 5.8892 per cent of the dependent variable. Additionally, while the P-value of the F-statistic is 0.004552 (less than 0.05), the F-statistic value is calculated at 2.336473 in this model, which means at

least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.14: Statistics of diversification education and ROE regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_EDUCATION	**20.32930**	**8.060143**	**2.522201**	**0.0122**
DIRECT _INSURER	-3.721228	3.871520	-0.961180	0.3373
GOVERNMENT	-7.936499	4.150916	-1.911988	0.0569
@LOG(SIZE)	0.848271	0.906721	0.935538	0.3503
@LOG(AGE+1)	2.925743	1.436290	2.037013	0.0426
C	4.294988	6.259010	0.686209	0.4931
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.102957	Mean dependent var		0.887439
Adjusted R-squared	0.058892	S.D. dependent var		1.176968
S.E. of regression	1.024262	Sum squared resid		298.9973
F-statistic	2.336473	Durbin-Watson stat		1.997510
Prob(F-statistic)	0.004552			

The result of the Breusch-Pagan LM test, which is reported in Table 6.15, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.9155, which is greater than 0.05.

Table 6.15: The Breusch-Pagan LM test for diversification $_{\text{education}}$ and ROE regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted Residuals
Equation: EQ_ROE_EDUCATION
Periods included: 10
Cross-sections included: 30
Total panel observations: 300
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	395.0549	435	0.9155

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.16, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.894, which is greater than 0.05.

Table 6.16: Kolmogorov Smirnov (KS) test for the residuals of diversification $_{education}$ and ROE regression model

KS test for residuals	ROE Education
KS stat	0.033
P Value	0.894

- **The impact of diversification $_{gender}$ on ROA**

Given the calculated F-Limer statistic in Table 6.17, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0095 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate diversification $_{gender}$ and ROA relationship.

Table 6.17: The F-Limer test result for diversification $_{gender}$ and ROA model

Redundant Fixed Effects Tests
Equation: EQ_ROA_P_GENDER
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	2.485621	(9,285)	0.0095

In Table 6.18, the corresponding values of the diversification $_{gender}$ and ROA model are presented. As illustrated, the coefficients of intercept (constant) and diversification $_{gender}$ are positive and negative, respectively (21.39177 and -11.33625), while their corresponding P values are smaller than 0.05 (0.0000 and 0.0106). From this table, it is concluded that a one per cent increase in the independent variable (diversification $_{gender}$) leads to a -11.33625 per cent decrease in ROA Iranian insurers. In addition, considering the control variables, the firms' size and firm's type are negatively associated with ROA in this model, as their corresponding coefficients are -1.060762 and -5.428995, while their P values are smaller than 0.05 (0.0004 and 0.0003, respectively).

Therefore, it is concluded that the negative relationship between diversification gender and ROA is more significant for direct insurers and larger firms, while for reinsurers and P&I clubs and smaller firms, this is less significant. This is justifiable, as based on Iran's insurance market structure, direct insurers are bigger than reinsurers and P&I clubs considering the firm size variable defined in this model.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.995218, indicating there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.336062, and the adjusted R-squared value of this model is 0.303447, which means this regression model can explain 30.3447 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.000000 (less than 0.05), the F statistic value is calculated 10.30406 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.18: The statistics of diversification $_{gender}$ and ROA regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_GENDER	**-11.33625**	**4.404220**	**-2.573952**	**0.0106**
DIRECT _INSURER	-5.428995	1.495403	-3.630455	0.0003
GOVERNMENT	-0.861194	1.665220	-0.517165	0.6054
@LOG(SIZE)	-1.060762	0.294057	-3.607335	0.0004
@LOG(AGE+1)	-0.201033	0.487142	-0.412678	0.6802
C	21.39177	2.435744	8.782440	0.0000
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.336062	Mean dependent var		0.397668
Adjusted R-squared	0.303447	S.D. dependent var		1.325184
S.E. of regression	1.017950	Sum squared resid		295.3233
F-statistic	10.30406	Durbin-Watson stat		1.995218
Prob(F-statistic)	0.000000			

The result of the Breusch-Pagan LM test, which is reported in Table 6.19, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.7423, which is greater than 0.05.

Table 6.19: The Breusch-Pagan LM test for diversification gender and ROA regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted Residuals
Equation: EQ_ROA_P_GENDER
Periods included: 10
Cross-sections included: 30
Total panel observations: 300
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	393.0480	435	0.9262

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.20, indicates that residuals are normally distributed, as the P-value of the KS test is calculated 0.832, which is greater than 0.05.

Table 6.20: The Kolmogorov Smirnov (KS) test for the residuals of diversification gender and ROA regression model

KS test for residuals	ROA Gender
KS stat	0.036
P Value	0.832

- **The impact of diversification gender on ROE**

Given the calculated F-Limer statistic in Table 6.21, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0000 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate diversification gender and ROE relationship.

Table 6.21:The F-Limer test result for diversification gender and ROE model

Redundant Fixed Effects Tests
Equation: EQ_ROE_P_GENDER
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	4.855149	(9,285)	0.0000

In Table 6.22, the corresponding values of the diversification $_{gender}$ and ROE model are presented. As illustrated, the coefficients of intercept (constant) and diversification $_{gender}$ are positive and negative, respectively (29.56914 and -29.62747), while their corresponding P values are smaller than 0.05 (0.0000 and 0.0209). This table concludes that a one per cent increase in the independent variable (diversification $_{gender}$) leads to a 29.62747 per cent decrease in ROE Iranian insurers. In addition, considering the control variables, the firms' type and ownership structure are negatively associated with ROE in this model, as their corresponding coefficients are -8.812868 and -10.74790, while their P values are smaller than 0.05 (0.0189 and 0.0109, respectively). Therefore, it is concluded that for direct insurers and public (governmental) firms, the negative relationship between diversification $_{gender}$ and ROE is more significant, while for reinsurers, P&I clubs, private and semi-private firms, this is less significant. This can be attributed to the religious environment of public firms in Iran. As the Iranian government follows a religion-based political system and, more specifically, an Islamic one, public insurers are supposed to follow Islamic rules more strictly than their competitors, which are not publicly owned. As a result, recruiting more diversified staff considering their gender may create some religious, legal or ethical restrictions for employees that negatively affect firms' financial performance.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.996186, indicating there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.107788, and the adjusted R-squared value of this model is 0.063960, which means this regression model can explain 6.3960 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.002714 (less than 0.05), the F statistic value is calculated at 2.459336 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.22: The statistics of diversification gender and ROE regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_GENDER	**-29.62747**	**12.75607**	**-2.322618**	**0.0209**
DIRECT _INSURER	-8.812868	3.733910	-2.360225	0.0189
GOVERNMENT	-10.74790	4.193246	-2.563147	0.0109
@LOG(SIZE)	1.170101	0.909397	1.286677	0.1993
@LOG(AGE+1)	1.508767	1.241347	1.215427	0.2252
C	29.56914	6.672811	4.431287	0.0000
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.107788	Mean dependent var		0.869894
Adjusted R-squared	0.063960	S.D. dependent var		1.231891
S.E. of regression	1.023972	Sum squared resid		298.8280
F-statistic	2.459336	Durbin-Watson stat		1.996186
Prob(F-statistic)	0.002714			

The result of the Breusch-Pagan LM test, which is reported in Table 6.23, demonstrates that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.9262, which is greater than 0.05.

Table 6.23: The Breusch-Pagan LM test for diversification gender and ROE regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted Residuals
Equation: EQ_ROE_P_GENDER
Periods included: 10
Cross-sections included: 30
Total panel observations: 300
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	393.0480	435	0.9262

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.24, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.367, which is greater than 0.05.

Table 6.24: The Kolmogorov Smirnov (KS) test for the residuals of diversification $_{gender}$ and ROE regression model

KS test for residuals	ROE Gender
KS stat	0.055
P Value	0.367

- **The impact of diversification $_{experience}$ on ROA**

Given the calculated F-Limer statistic in Table 6.25, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0000 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate diversification $_{experience}$ and ROA relationship.

Table 6.25: F-Limer test result for diversification $_{experience}$ and ROA model

Redundant Fixed Effects Tests
Equation: EQ_ROA_P_EXPERIENCE
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	4.667317	(9,285)	0.0000

In Table 6.26, the corresponding values of the diversification $_{experience}$ and ROA model are presented. As illustrated, the coefficients of intercept (constant) and diversification $_{experience}$ are positive and negative, respectively (16.97017 and -2.053915), while their corresponding P values are smaller than 0.05 (0.0000 and 0.0467). From this table, it is concluded that a one per cent increase in the independent variable (diversification $_{experience}$) leads to a 2.053915 per cent decrease in ROA of Iranian insurers. In addition, considering the control variables, the firms' type and size are negatively associated with ROA in this model, as their corresponding coefficients are -5.402865 and -1.096110, while their P values are smaller than 0.05 (0.0005 and 0.0002, respectively). Therefore, it is concluded that the negative relationship between diversification experience and ROA is more significant for direct insurers and larger firms, while this is less significant for reinsurers, P&I clubs, and smaller firms. This is justifiable, as based on Iran's insurance structure, direct insurers are bigger than reinsurers and P&I clubs considering the firm size.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.999894, indicating there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.326058, and the adjusted R-squared value of this model is 0.292952, which means this regression model can explain 29.2952 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.000000 (less than 0.05), the F statistic value is calculated 9.848947 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.26: The statistics of diversification $_{experience}$ and ROA regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_EXPERIENCE	**-2.053915**	**1.027923**	**-1.998122**	**0.0467**
DIRECT _INSURER	-5.402865	1.531114	-3.528715	0.0005
GOVERNMENT	0.715513	1.652320	0.433035	0.6653
@LOG(SIZE)	-1.096110	0.290098	-3.778410	0.0002
@LOG(AGE+1)	-0.251226	0.490741	-0.511932	0.6091
C	16.97017	1.682111	10.08862	0.0000
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.326058	Mean dependent var		0.406343
Adjusted R-squared	0.292952	S.D. dependent var		1.292122
S.E. of regression	1.019146	Sum squared resid		296.0179
F-statistic	9.848947	Durbin-Watson stat		1.999894
Prob(F-statistic)	0.000000			

The result of the Breusch-Pagan LM test reported in Table 6.27 indicates that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.7710, which is greater than 0.05.

Table 6.27: The Breusch-Pagan LM test for diversification $_{experience}$ and ROA regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted Residuals
Equation: EQ_ROA_P_EXPERIENCE
Periods included: 10
Cross-sections included: 30
Total panel observations: 300
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	412.8272	435	0.7710

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.28, reveals that residuals are normally distributed as the P-value of the KS test is calculated 0.542, which is greater than 0.05.

Table 6.28: The Kolmogorov Smirnov (KS) test for the residuals of diversification $_{experience}$ and ROA regression model

KS test for residuals	ROA Experience
KS stat	0.048
P Value	0.542

- **The impact of diversification $_{experience}$ on ROE**

Given the calculated F-Limer statistic in Table 6.29, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0145 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate diversification $_{experience}$ and ROE relationship.

Table 6.29: The F-Limer test result for diversification $_{experience}$ and ROE model

Redundant Fixed Effects Tests
Equation: EQ_ROE_P_EXPERIENCE
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	2.345707	(9,285)	0.0145

In Table 6.30, the corresponding values of the diversification $_{experience}$ and ROE model are presented. As illustrated, the coefficients of intercept (constant) and diversification $_{experience}$ are positive and negative, respectively (17.50965 and -2.246030), while their corresponding P values are 0.0001 and 0.5747, respectively. From this table, it is concluded that there is no significant relationship between diversification $_{experience}$ and ROE of Iranian insurers. In addition, considering the control variables, the firms' type is negatively associated with ROE in this model, as its corresponding coefficient is -7.550049, while its P-value is smaller than 0.05 (0.0489).

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.992298, which indicates there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.090243, and the adjusted R-squared value of this model is 0.045553, which means this regression model can explain 4.5553 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.016489 (less than 0.05), the F statistic value is calculated 2.019321 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.30: The statistics of diversification experience and ROE regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_EXPERIENCE	-2.246030	3.998167	-0.561765	0.5747
DIRECT _INSURER	-7.550049	3.817585	-1.977703	0.0489
GOVERNMENT	-6.182649	4.182184	-1.478330	0.1404
@LOG(SIZE)	0.908500	0.919437	0.988105	0.3239
@LOG(AGE+1)	1.152534	1.256794	0.917043	0.3599
C	17.50965	4.330812	4.043041	0.0001
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.090243	Mean dependent var		0.852877
Adjusted R-squared	0.045553	S.D. dependent var		1.218230
S.E. of regression	1.024918	Sum squared resid		299.3803
F-statistic	2.019321	Durbin-Watson stat		1.992298
Prob(F-statistic)	0.016489			

The result of the Breusch-Pagan LM test, which is reported in Table 6.31, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.9002, which is greater than 0.05.

Table 6.31: The Breusch-Pagan LM test for diversification experience and ROE regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted Residuals
Equation: EQ_ROE_P_EXPERIENCE
Periods included: 10
Cross-sections included: 30
Total panel observations: 300
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	397.6182	435	0.9002

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.32, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.846, which is greater than 0.05.

Table 6.32: The Kolmogorov Smirnov (KS) test for the residuals of diversification $_{experience}$ and ROE regression model

KS test for residuals	ROE Experience
KS stat	0.036
P-Value	0.846

The findings of this section demonstrate that the only element of staff diversification which increases both ROA and ROE of Iranian insurers is education. According to the CII annual report (2020), almost 76% of the insurance industry staff in Iran hold an undergraduate degree or below, while only 24% of the staff hold postgraduate degrees. Therefore, Iranian insurers are advised to recruit more educated employees to benefit financially. The results are aligned with the findings of Zakery and Afrazeh (2015). Analysing the data of insurance firms, they report that more educated staff leads insurers to higher efficiency, measured by ROE in their study.

Other elements of staff diversification used in this study, i.e., work experience and gender, negatively influenced firms' profitability. Based on the CII annual report (2020), about 60 per cent of staff in Iran's insurance industry have less than 10 years of work experience, while the rest of the staff have 10 years (or above) work experience. Therefore, the findings of this thesis suggest that higher work experience of staff decreases the ROA of insurers. The findings are different from the literature. For example, Mulchandani et al. (2018) argue that more experienced staff increase the profitability of life insurers in India. However, such a difference in findings is justifiable using institutional view theory. As stated in Chapter 2, cultural differences are among the institutional factors which cause different financial performance implications for diversifiers. Besides, the negative relationship between gender diversification and firms' financial performance (both ROA and ROE) can be justified by Iran's specific cultural, legal, and religious environment. As Iranian firms have to follow the theocratic government instructions (Islamic laws), gender diversity may create an unfavourable workplace environment in Iranian insurance companies through some religious or legal restrictions for employees while interacting with their colleagues. However, the literature's findings advocate gender diversity for better financial performance in other non-Muslim countries (i.e. Suciu et al. 2020, Badal and Harter 2014), which can be discussed through the lens of the institutional view of diversification.

6.9.2.2. THE IMPACT OF GEOGRAPHIC DIVERSIFICATION ON FIRMS' FINANCIAL PERFORMANCE

As previously explained in this chapter, geographic diversification is calculated as a unique measure. On the other hand, firms' financial performance is measured by ROA and ROE. Therefore, in this section, all combinations of dependant and independent variables, i.e., two regression models, will be used to discuss geographic diversification and firms' performance relationship. However, as reinsurance companies do not have any agents in Iran, the two reinsurance firms are excluded from the original sample in this section.

- **The impact of diversification $_{geographic}$ on ROA**

Given the calculated F-Limer statistic in Table 6.33, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0001 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate diversification $_{geographic}$ and ROA relationship.

Table 6.33: The F-Limer test result for diversification $_{geographic}$ and ROA model

Redundant Fixed Effects Tests
Equation: EQ_ROA_P_GEO
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	4.123829	(9,265)	0.0001

In Table 6.34, the corresponding values of the diversification $_{geographic}$ and ROA model are presented. As illustrated, the coefficients of intercept (constant) and diversification $_{geographic}$ are positive and meaningful (10.38710 and 0.000165), while their corresponding P values are smaller than 0.05 (0.0000 and 0.0393). From this table, it is concluded that a one per cent increase in the independent variable (diversification $_{geographic}$) leads to a small increase in ROA of Iranian insurers. In addition, considering the control variables, the firm's size is negatively associated with ROA in this model, as its corresponding coefficient is -1.159283, while its P-value is smaller than 0.05 (0.0001).

Therefore, it is concluded that the negative relationship between diversification geographic and ROA is more significant for larger firms, while this is less significant for smaller firms.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.974491, which indicates there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.228497, and the adjusted R-squared value of this model is 0.187739, which means this regression model can explain 18.7739 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.000000 (less than 0.05), the F statistic value is calculated 5.606108 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.34: The statistics of diversification geographic and ROA regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_GEO	**0.000165**	**7.98E-05**	**2.071003**	**0.0393**
DIRECT _INSURER	1.626336	1.583439	1.027091	0.3053
GOVERNMENT	0.201162	1.405322	0.143143	0.8863
@LOG(SIZE)	-1.159283	0.292093	-3.968889	0.0001
@LOG(AGE+1)	-0.456818	0.491986	-0.928519	0.3540
C	10.38710	1.684821	6.165106	0.0000
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.228497	Mean dependent var		0.516956
Adjusted R-squared	0.187739	S.D. dependent var		1.176876
S.E. of regression	1.026626	Sum squared resid		279.2997
F-statistic	5.606108	Durbin-Watson stat		1.974491
Prob(F-statistic)	0.000000			

The result of the Breusch-Pagan LM test, which is reported in Table 6.35, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.7898, which is greater than 0.05.

Table 6.35: The Breusch-Pagan LM test for diversification $_{geographic}$ and ROA regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROA_P_GEO
Periods included: 10
Cross-sections included: 28
Total panel observations: 280
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	355.6332	378	0.7898

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.36, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.584, which is greater than 0.05.

Table 6.36: The Kolmogorov Smirnov (KS) test for the residuals of diversification $_{geographic}$ and ROA regression model

KS test for residuals	ROA Geographic
KS stat	0.048
P Value	0.584

- **The impact of diversification $_{geographic}$ on ROE**

Given the calculated F-Limer statistic in Table 6.37, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0177 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate diversification $_{geographic}$ and ROE relationship.

Table 6.37: The F-Limer test result for diversification $_{geographic}$ and ROE model

Redundant Fixed Effects Tests
Equation: EQ_ROE_P_GEO
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	2.281457	(9,265)	0.0177

In Table 6.38, the corresponding values of the diversification $_{geographic}$ and ROE model are presented. As illustrated, the coefficients of intercept (constant) and diversification $_{geographic}$ are positive (19.26981 and 0.000423), while their corresponding P values are 0.0001 and 0.2166. From this table, it is concluded that there is no significant relationship between diversification $_{geographic}$ and ROE. In addition, considering the control variables, since the corresponding P values of size, age, type, and ownership structure of insurance companies are larger than 0.05, none of them has a meaningful impact on ROE in this model.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.992626, which indicates there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.087044, and the adjusted R-squared value of this model is 0.038812, which means this regression model can explain 3.8812 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.037942 (less than 0.05), the F statistic value is calculated at 1.804707 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.38: The statistics of diversification $_{geographic}$ and ROE regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_GEO	0.000423	0.000342	1.238489	0.2166
DIRECT _INSURER	-8.676637	4.766814	-1.820217	0.0699
GOVERNMENT	-6.790186	4.270164	-1.590147	0.1130
@LOG(SIZE)	0.562648	0.985033	0.571197	0.5684
@LOG(AGE+1)	1.237298	1.335260	0.926635	0.3550
C	19.26981	4.831672	3.988228	0.0001
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.087044	Mean dependent var		0.837046
Adjusted R-squared	0.038812	S.D. dependent var		1.197434
S.E. of regression	1.025859	Sum squared resid		278.8826
F-statistic	1.804707	Durbin-Watson stat		1.992626
Prob(F-statistic)	0.037942			

The result of the Breusch-Pagan LM test reported in Table 6.39 reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.9336, which is greater than 0.05.

Table 6.39: The Breusch-Pagan LM test for diversification $_{geographic}$ and ROE regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROE_P_GEO
Periods included: 10
Cross-sections included: 28
Total panel observations: 280
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	337.5345	378	0.9336

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.40, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.955, which is greater than 0.05.

Table 6.40: The Kolmogorov Smirnov (KS) test for the residuals of diversification $_{geographic}$ and ROE regression model

KS test for residuals	ROE Geographic
KS stat	0.031
P-Value	0.955

According to the findings in this section, geographic diversification is positively associated with the ROA of firms in the insurance industry. Generally, a higher ROA indicates that a firm is being managed more efficiently (Kalbuana et al., 2021). Therefore Iranian insurers are advised to diversify geographically to improve their financial performance. The findings are justifiable by purchasing behaviour of Iranian customers. Haghighi et al. (2016) argue that creating a face to face relationship with potential customers leads to positive purchasing decisions and increases sales in Iran. They add that most people still prefer traditional methods such as face to face or in-office purchases

to online methods. For more clarification, it should be mentioned that in 2018, total auto insurance premiums written online in Iran was less than 1% of the total premium collected in the same line of business (Vali Poori, 2019), while in the UK, the number for the same year was 58.7% (Statista, 2021). Therefore, being physically present (as insurance firms' branches or sales agents) in different geographic areas is important for Iranian insurers. Moreover, the result of this study confirms the findings of previous research on geographic diversification and insurers' financial performance relationship in other countries. For example, Che et al. (2017) and Krivokapic et al. (2017) state that there is a positive relationship between geographic diversification and insurance firms' performance in the US and Serbian and insurance industries, respectively.

6.9.2.3. THE IMPACT OF PRODUCT DIVERSIFICATION ON FIRMS' FINANCIAL PERFORMANCE

As previously explained in this chapter, product diversification is measured by the number of policies underwritten and also premiums collected in a line of business in one year. On the other hand, firms' financial performance is measured by ROA and ROE. Therefore, in this section, all combinations of dependant and independent variables, i.e., four regression models, will be used to discuss product diversification and firms' performance relationship. It should be noted that as reinsurance companies do not sell regular insurance products, the two reinsurance firms in the insurance industry of Iran are excluded from the original sample in this section.

- **The impact of product diversification $_{policy}$ on ROA**

Given the calculated F-Limer statistic in Table 6.41, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0003 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate product diversification $_{policy}$ and ROA relationship.

Table 6.41: The F-Limer test result for product diversification $_{policy}$ and ROA model

Redundant Fixed Effects Tests
Equation: EQ_ROA_P_POLICY
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	3.618302	(9,265)	0.0003

In Table 6.42, the corresponding values of the product diversification $_{policy}$ and ROA model are presented. As illustrated, the coefficients of intercept (constant) and product diversification $_{policy}$ are positive and negative, respectively (10.13163 and -2.877318), while their corresponding P values are 0.0000 and 0.2174. From this table, it is concluded that there is no significant relationship between product diversification $_{policy}$ and ROA. In addition, considering the control variables, the firm's size is negatively associated with ROA in this model, as its corresponding coefficient is -0.922409, while its P-value is smaller than 0.05 (0.0019). Therefore, it is concluded that larger firms' ROA is less than smaller firms' ROA in this model.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.991817, which indicates there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.228027, and the adjusted R-squared value of this model is 0.187243, which means this regression model can explain 18.7243 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.00000 (less than 0.05), the F statistic value is calculated 5.591150 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.42: The statistics of product diversification $_{policy}$ and ROA regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_POLICY	-2.877318	2.326922	-1.236534	0.2174
DIRECT _INSURER	2.637625	2.180874	1.209435	0.2276
GOVERNMENT	-0.050331	1.447019	-0.034783	0.9723
@LOG(SIZE)	-0.922409	0.294519	-3.131912	0.0019
@LOG(AGE+1)	-0.420228	0.498467	-0.843042	0.4000
C	10.13163	1.736780	5.833572	0.0000

Effects Specification
Period fixed (dummy variables)

Weighted Statistics			
R-squared	0.228027	Mean dependent var	0.493688
Adjusted R-squared	0.187243	S.D. dependent var	1.166963
S.E. of regression	1.024486	Sum squared resid	278.1365
F-statistic	5.591150	Durbin-Watson stat	1.991817
Prob(F-statistic)	0.000000		

The result of the Breusch-Pagan LM test, which is reported in Table 6.43, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.8930, which is greater than 0.05.

Table 6.43:The Breusch-Pagan LM test for product diversification $_{policy}$ and ROA regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROA_P_POLICY
Periods included: 10
Cross-sections included: 28
Total panel observations: 280
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	344.2163	378	0.8930

Finally, the Kolmogorov Smirnov (KS) test for residuals of this model reported in Table 6.44 reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.475, which is greater than 0.05.

Table 6.44: The Kolmogorov Smirnov (KS) test for the residuals of product diversification $_{policy}$ and ROA regression model

KS test for residuals	ROA product $_{policy}$
KS stat	0.052
P Value	0.475

- **The impact of product diversification $_{policy}$ on ROE**

Given the calculated F-Limer statistic in Table 6.45, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0077 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate product diversification $_{policy}$ and ROE relationship.

Table 6.45: The F-Limer test result for product diversification $_{policy}$ and ROE model

Redundant Fixed Effects Tests
Equation: EQ_ROE_P_POLICY
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	2.560341	(9,265)	0.0077

In Table 6.46, the corresponding values of the product diversification $_{policy}$ and ROE model are presented. As illustrated, the coefficients of intercept (constant) and product diversification $_{policy}$ are positive (19.71272 and 15.07789, respectively), while their corresponding P values are 0.0001 and 0.0499. From this table, it is concluded that product diversification $_{policy}$ and ROE are positively related, as a one per cent increase in the independent variable (product diversification $_{policy}$) leads to a 15.07789 per cent increase in ROE of Iranian insurers. In addition, considering the control variables, the firm's type is negatively associated with ROE in this model, as its corresponding coefficient is -18.68597, while its P-value is smaller than 0.05 (0.0047). Therefore, it is concluded that in this model, ROE for the direct insurers is less than reinsurers and P&I clubs.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.982347, which

indicates there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.100357, and the adjusted R-squared value of this model is 0.052829, which means this regression model can explain 5.2829 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.011644 (less than 0.05), the F statistic value is calculated at 2.111524 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.46: The statistics of product diversification $_{policy}$ and ROE regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_POLICY	**15.07789**	**7.654177**	**1.969891**	**0.0499**
DIRECT _INSURER	-18.68597	6.561936	-2.847630	0.0047
GOVERNMENT	-6.654641	4.303559	-1.546311	0.1232
@LOG(SIZE)	0.402536	0.995602	0.404315	0.6863
@LOG(AGE+1)	1.612007	1.347215	1.196548	0.2326
C	19.71272	4.860406	4.055777	0.0001
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.100357	Mean dependent var		0.806913
Adjusted R-squared	0.052829	S.D. dependent var		1.205619
S.E. of regression	1.020474	Sum squared resid		275.9625
F-statistic	2.111524	Durbin-Watson stat		1.982347
Prob(F-statistic)	0.011644			

The result of the Breusch-Pagan LM test, which is reported in Table 6.47, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.8645, which is greater than 0.05.

Table 6.47: The Breusch-Pagan LM test for product diversification $_{policy}$ and ROE regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROE_P_POLICY
Periods included: 10
Cross-sections included: 28
Total panel observations: 280
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	347.8977	378	0.8645

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.48, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.893, which is greater than 0.05.

Table 6.48: The Kolmogorov Smirnov (KS) test for the residuals of product diversification $_{policy}$ and ROE regression model

KS test for residuals	ROE product $_{policy}$
KS stat	0.034
P Value	0.893

- **The impact of product diversification $_{premium}$ on ROA**

Given the calculated F-Limer statistic in Table 6.49, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0228 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate product diversification $_{premium}$ and ROA relationship.

Table 6.49: The F-Limer test result for product diversification $_{premium}$ and ROA model

Redundant Fixed Effects Tests
Equation: EQ_ROA_P_PREMIUM
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	2.194758	(9,265)	0.0228

In Table 6.50, the corresponding values of the product diversification $_{premium}$ and ROA model are presented. As illustrated, the coefficients of intercept (constant) and product diversification $_{premium}$ are positive and negative (10.37701 and -1.174922, respectively), while their corresponding P values are 0.0000 and 0.4572. From this table, it is concluded that there is no significant relationship between product diversification $_{premium}$ and ROA. In addition, considering the control variables, the firm's size is negatively associated with ROA in this model, as its corresponding coefficient is -0.943548, while its P-value is smaller than 0.05 (0.0013). Therefore, it is concluded that larger firms' ROA is less than smaller firms' ROA in this model.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.928642, indicating there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.224246, and the adjusted R-squared value of this model is 0.183263, which means this regression model can explain 18.3263 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.00000 (less than 0.05), the F statistic value is calculated 5.471653 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.50: The statistics of product diversification premium and ROA regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_PREMIUM	-1.174922	1.578054	-0.744538	0.4572
DIRECT _INSURER	1.273166	1.875275	0.678922	0.4978
GOVERNMENT	0.006581	1.428424	0.004607	0.9963
@LOG(SIZE)	-0.943548	0.290837	-3.244249	0.0013
@LOG(AGE+1)	-0.384548	0.498740	-0.771040	0.4414
C	10.37701	1.711003	6.064871	0.0000

Effects Specification
Period fixed (dummy variables)

Weighted Statistics			
R-squared	0.224246	Mean dependent var	0.508268
Adjusted R-squared	0.183263	S.D. dependent var	1.157827
S.E. of regression	1.017740	Sum squared resid	274.4854
F-statistic	5.471653	Durbin-Watson stat	1.928642
Prob(F-statistic)	0.000000		

The result of the Breusch-Pagan LM test, which is reported in Table 6.51, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.7882, which is greater than 0.05.

Table 6.51: The Breusch-Pagan LM test for product diversification premium and ROA regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROA_P_PREMIUM
Periods included: 10
Cross-sections included: 28
Total panel observations: 280
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	355.7780	378	0.7882

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.52, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.429, which is greater than 0.05.

Table 6.52: The Kolmogorov Smirnov (KS) test for the residuals of product diversification $_{premium}$ and ROA regression model

KS test for residuals	ROA product $_{premium}$
KS stat	0.054
P Value	0.429

- **The impact of product diversification $_{premium}$ on ROE**

Given the calculated F-Limer statistic in Table 6.53, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0018 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate product diversification $_{premium}$ and ROE relationship.

Table 6.53: The F-Limer test result for product diversification $_{premium}$ and ROE model

Redundant Fixed Effects Tests
Equation: EQ_ROE_P_PREMIUM
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	3.040236	(9,265)	0.0018

In Table 6.54, the corresponding values of the product diversification $_{premium}$ and ROE model are presented. As illustrated, the coefficients of intercept (constant) and product diversification $_{premium}$ are positive and negative (16.28832 and -16.00851, respectively), while their corresponding P values are 0.0015 and 0.0048. From this table, it is concluded that product diversification $_{premium}$ and ROE are negatively related, as a one per cent increase in the independent variable (product diversification $_{premium}$) leads to a 16.00851 per cent decrease in ROE of Iranian insurers. In addition, considering the control variables, since the corresponding P values of size, age, type, and ownership structure of insurance companies are larger than 0.05, none of them has a meaningful impact on ROE in this model.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.981882, which indicates there is no first-order autocorrelation among residuals of the model. The

calculated R-squared of this model is 0.115523, and the adjusted R-squared value of this model is 0.068796, which means this regression model can explain 6.8796 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.002646 (less than 0.05), the F statistic value is calculated at 2.472284 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.54: The statistics of product diversification $_{\text{premium}}$ and ROE regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_PREMIUM	**-16.00851**	**5.627680**	**-2.844601**	**0.0048**
DIRECT _INSURER	0.591842	6.014563	0.098401	0.9217
GOVERNMENT	-7.535850	4.471418	-1.685338	0.0931
@LOG(SIZE)	1.385411	0.987994	1.402246	0.1620
@LOG(AGE+1)	1.643793	1.376781	1.193939	0.2336
C	16.28832	5.074735	3.209688	0.0015
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.115523	Mean dependent var		0.764977
Adjusted R-squared	0.068796	S.D. dependent var		1.206780
S.E. of regression	1.024116	Sum squared resid		277.9354
F-statistic	2.472284	Durbin-Watson stat		1.981882
Prob(F-statistic)	0.002646			

The result of the Breusch-Pagan LM test, which is reported in Table 6.55, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.9517, which is greater than 0.05.

Table 6.55: The Breusch-Pagan LM test for product diversification $_{premium}$ and ROE regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROE_P_PREMIUM
Periods included: 10
Cross-sections included: 28
Total panel observations: 280
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	333.5136	378	0.9517

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.56, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.874, which is greater than 0.05.

Table 6.56: The Kolmogorov Smirnov (KS) test for the residuals of product diversification $_{premium}$ and ROE regression model

KS test for residuals	ROE product $_{premium}$
KS stat	0.035
P-Value	0.874

As illustrated in this section, product diversification $_{policy}$ is positively associated with the ROE of insurance firms in Iran. Therefore, it is an interesting strategy for investors and shareholders of the firms, as higher ROE means higher profit for firms' investors (Bunea, Corbos and Popescu 2019, Ahsan 2012). On the other hand, the findings of this chapter demonstrate that product diversification $_{premium}$ is negatively associated with the financial performance of firms in the insurance industry. Consequently, it is suggested that Insurers should follow product diversification strategy only in terms of the number of insurance policies underwritten in each line of business that is beneficial to insurers. These results are justifiable by specific characteristics of the insurance business as well. Based on the law of large numbers, if the number of insureds is large enough, the actual loss per event will equal the expected loss per event (Smith and Kane, 1994). Hence, if the number of policyholders increases, the probability of insurers' failure decreases, as they have enough financial resources to cover the incurred losses. In

addition, individual insurance policies lead insurers to assess the risks more effectively, whereas, in group insurance (one insurance policy for a group of insureds with different risk characteristics), insurers are not able to calculate the risk of each of the insureds separately. This argument is aligned with the literature that states poor risk assessment practices lead to higher losses and lower profits in the insurance industry (Dar and Thaku 2015, Cummins et al., 2009).

6.9.2.4. THE IMPACT OF PRODUCT, GEOGRAPHIC AND STAFF DIVERSIFICATION ON FIRMS' FINANCIAL PERFORMANCE (COMPOUND MODEL)

As previously explained in Chapter 6, diversification strategy can be measured using different dimensions (staff, geographic and product diversification). On the other hand, firms' financial performance is measured by ROA and ROE. However, it is crucial to measure both individual and compound impacts of different dimensions of diversification on firms' financial performance. Bowen and Wiersema (2007) argue that the financial impacts of simultaneous implementation of different diversification strategies in one firm might differ from developing a single dimension of diversification in the same firm. Therefore, in this section, by combining all dimensions of diversification strategy, two models will be used to discuss diversification and firms' performance relationship. The first model measures the relationship between diversification staff, geographic and product and ROA of Iranian insurers, while the second model investigates the relationship between diversification staff, geographic and product and ROE of the insurance companies in Iran. It should be noted that two reinsurance companies are excluded from the original sample with 30 firms in this chapter, as they lack any agents and do not sell regular insurance policies in the studied industry.

- **The impact of diversification staff, geographic and product on ROA**

Given the calculated F-Limer statistic in Table 6.57, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0000 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate diversification staff, geographic and product and ROA relationship.

Table 6.57: The F-Limer test result for diversification staff, geographic and product and ROA model

Redundant Fixed Effects Tests
Equation: EQ_ROA_P_ALL
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	4.306857	(9,260)	0.0000

In Table 6.58, the corresponding values of the diversification staff, geographic and product and ROA model are presented. As illustrated, the coefficients of intercept (constant), diversification education, diversification gender, diversification experience, diversification geographic, diversification policy and diversification premium are reported. This table indicates that the relationship between diversification education and ROA is positive, while the relationship between diversification gender and diversification experience with ROA is negative. On the other hand, no significant relationship is found between diversification geographic, diversification policy and diversification premium with ROA in this model. In addition, considering the control variables, the firms' size is negatively associated with ROA in this model, as its corresponding coefficient is -0.837521, while its P-value is smaller than 0.05 (0.0058).

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.966096, which indicates there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.340545, and the adjusted R-squared value of this model equals 0.292355, which means this regression model can explain 29.2355 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.000000 (less than 0.05), the F statistic value is calculated 7.066590 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.58: The statistics of diversification staff, geographic and product and ROA regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_EDUCATION	**5.794695**	**2.418952**	**2.395540**	**0.0173**
DIV_GENDER	**-16.18028**	**4.226553**	**-3.828245**	**0.0002**
DIV_EXPERIENCE	**-2.390613**	**1.109469**	**-2.154736**	**0.0321**
DIV_GEO	9.97E-05	6.71E-05	1.487040	0.1382
DIV_POLICY	-1.862296	2.214107	-0.841105	0.4011
DIV_PREMIUM	-0.038342	1.482462	-0.025864	0.9794
DIRECT _INSURER	2.610892	1.981491	1.317640	0.1888
GOVERNMENT	-1.005114	1.306923	-0.769069	0.4426
@LOG(SIZE)	-0.837521	0.301175	-2.780844	0.0058
@LOG(AGE+1)	-0.258951	0.493986	-0.524207	0.6006
C	14.87396	2.747973	5.412703	0.0000

Effects Specification
Period fixed (dummy variables)

Weighted Statistics			
R-squared	0.340545	Mean dependent var	0.582281
Adjusted R-squared	0.292355	S.D. dependent var	1.239627
S.E. of regression	1.018982	Sum squared resid	269.9642
F-statistic	7.066590	Durbin-Watson stat	1.966096
Prob(F-statistic)	0.000000		

The result of the Breusch-Pagan LM test, which is reported in Table 6.59, indicates that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.7423, which is greater than 0.05.

Table 6.59: The Breusch-Pagan LM test for diversification staff, geographic and product and ROA regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROA_P_ALL
Periods included: 10
Cross-sections included: 28
Total panel observations: 280
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	356.2848	378	0.7826

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.60, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.493, which is greater than 0.05.

Table 6.60: The Kolmogorov Smirnov (KS) test for the residuals of diversification staff, geographic and product and ROA regression model

KS test for residuals	ROA ALL
KS stat	0.051
P Value	0.493

- **The impact of diversification staff, geographic and product on ROE**

Given the calculated F-Limer statistic in Table 6.61, the null hypothesis (using pooled OLS model) is rejected as the probability is 0.0005 (it is smaller than 0.05 that is the type I error of this model). Therefore, the fixed-effect model is chosen to investigate diversification staff, geographic and product and ROE relationship.

Table 6.61: The F-Limer test result for diversification staff, geographic and product and ROE model

Redundant Fixed Effects Tests
Equation: EQ_ROE_P_ALL
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	3.457199	(9,260)	0.0005

In Table 6.62, the corresponding values of the diversification $_{\text{staff, geographic and product}}$ and ROE model are presented. As illustrated, the coefficients of intercept (constant), diversification $_{\text{education}}$, diversification $_{\text{gender}}$, diversification $_{\text{experience}}$, diversification $_{\text{geographic}}$, diversification $_{\text{policy}}$ and diversification $_{\text{premium}}$ are reported. This table demonstrates that the relationship between diversification $_{\text{education}}$ and diversification $_{\text{policy}}$ with ROE is positive, while the relationship between diversification $_{\text{gender}}$ and diversification $_{\text{premium}}$ with ROE is negative. On the other hand, no significant relationship is found between diversification $_{\text{geographic}}$, diversification $_{\text{experience}}$ with ROE in this model. In addition, considering the control variables, the firms' age and ownership structure are positively and negatively associated with ROE in this model, i.e., older companies benefit from higher ROE. At the same time, governmental insurers' ROE is less than private and semi-private firms.

Other statistics reported for this model are Durbin Watson, R-squared, adjusted R-squared and F test. The Durbin Watson statistic for this model is 1.974355, indicating there is no first-order autocorrelation among residuals of the model. The calculated R-squared of this model is 0.157671, and the adjusted R-squared value of this model equals 0.096116, which means this regression model can explain 9.6116 per cent of the dependent variable. Additionally, while the P-value of the F statistic is 0.000489 (less than 0.05), the F statistic value is calculated at 2.561473 in this model, which means at least one of the coefficients is not equal to zero, and the model is meaningful and statistically significant.

Table 6.62: statistics of diversification staff, geographic and product and ROE regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIV_EDUCATION	**18.99533**	**8.659829**	**2.193499**	**0.0292**
DIV_GENDER	**-29.30587**	**13.53078**	**-2.165867**	**0.0312**
DIV_EXPERIENCE	-2.681827	4.279400	-0.626683	0.5314
DIV_GEO	0.000277	0.000316	0.877556	0.3810
DIV_POLICY	**17.65748**	**7.701909**	**2.292610**	**0.0227**
DIV_PREMIUM	**-16.49992**	**5.914348**	**-2.789812**	**0.0057**
DIRECT _INSURER	-6.552162	6.806346	-0.962655	0.3366
GOVERNMENT	-11.28596	4.583826	-2.462125	0.0145
@LOG(SIZE)	0.865524	1.033157	0.837746	0.4029
@LOG(AGE+1)	3.504578	1.494018	2.345740	0.0197
C	19.32439	8.799841	2.195993	0.0290

Effects Specification

Period fixed (dummy variables)

Weighted Statistics

R-squared	0.157671	Mean dependent var	0.873771
Adjusted R-squared	0.096116	S.D. dependent var	1.190229
S.E. of regression	1.031033	Sum squared resid	276.3875
F-statistic	2.561473	Durbin-Watson stat	1.974355
Prob(F-statistic)	0.000489		

The result of the Breusch-Pagan LM test, which is reported in Table 6.63, reveals that no cross-section dependence is detected in this model. The P-value of the Breusch-Pagan test is calculated at 0.9196, which is greater than 0.05.

Table 6.63: The Breusch-Pagan LM test for diversification staff, geographic and product and ROE regression model

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in weighted residuals
Equation: EQ_ROE
_P_ALL
Periods included: 10
Cross-sections included: 28
Total panel observations: 280
Note: non-zero cross-section means detected in data
Cross-section means were removed during the computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	340.1202	378	0.9196

Finally, the result of the Kolmogorov Smirnov (KS) test for residuals of this model, which is reported in Table 6.64, reveals that residuals are normally distributed, as the P-value of the KS test is calculated 0.911, which is greater than 0.05.

Table 6.64: The Kolmogorov Smirnov (KS) test for the residuals of diversification staff, geographic and product and ROE regression model

KS test for residuals	ROA ALL
KS stat	0.034
P Value	0.911

Table 6.65 summarizes the acceptance or rejection of the hypotheses proposed in this chapter.

Table 6.65: Summary of the hypotheses' acceptance or rejection

Hypothesis	ROA	ROE
Hypothesis 2a (H2a): *Product diversification $_{policy}$ is positively associated with the financial performance of firms in the insurance industry.*	Rejected	Accepted
Hypothesis 2b (H2b): *Product diversification $_{premium}$ is positively associated with the financial performance of firms in the insurance industry.*	Rejected	Rejected
Hypothesis 3 (H3): *Geographic diversification is positively associated with the financial performance of firms in the insurance industry.*	Accepted	Rejected
Hypothesis 4a (H4a): *Staff diversification $_{Gender}$ is positively associated with the financial performance of firms in the insurance industry.*	Rejected	Rejected
Hypothesis 4b (H4b): *Staff diversification $_{Experience}$ is positively associated with the financial performance of firms in the insurance industry.*	Rejected	Rejected
Hypothesis 4c (H4c): *Staff diversification $_{Education}$ is positively associated with the financial performance of firms in the insurance industry.*	Accepted	Accepted
Hypothesis 5 (H5): *Diversification $_{Product, Geographic\ and\ Staff}$ is positively associated with the financial performance of firms in the insurance industry.*	Rejected	Rejected

6.10. SUMMARY OF THE CHAPTER

This chapter studies the relationships between staff, geographic and product diversification strategies and the firms' financial performance. More specifically, it investigates if diversification contributes to insurers' financial performance in Iran. To do so, the secondary data of all Iranian insurance companies is collected from annual reports of Central Insurance of Iran (The insurance market's regulatory body in Iran) for a period of 10 years. This rich database provided valuable and reliable information about different dimensions of diversification strategy for both independent and dependent variables. Firstly, the researcher developed different measurement indexes for diversification, such as the HHI index. By categorising staff based on education, gender and experience, three measures are constructed for staff diversification. The total number of sales agents and branches is used for indication of geographic diversification of Iranian insurers. For constructing product diversification measures, the number of policies underwritten in a company, in a line of business, for one year and the total premiums collected in a company, in a line of business, for one year are introduced. Furthermore, popular control variables in diversification-performance studies such as firm's age, size, and ownership structure are incorporated into insurance-specific control variables (firm's type) to enable the researcher to understand the existing relationships clearly. Lastly, financial performance data extracted from financial statements of Iranian insurers is indicated by ROA and ROE in this chapter. The summary of the findings of this chapter is presented in table 6.66.

Table 6.66: Diversification and firms' financial performance relationship in Iran's insurance industry

Diversification Strategy		Firms' Financial Performance		Effective Control Variables
		ROA	ROE	
Staff Diversification	DIV education	Positively associated	Positively associated	Size: negative Type (direct insurer): negative Age: positive
	DIV gender	Negatively associated	Negatively associated	Size: negative Type (direct insurer): negative Ownership structure (governmental): negative
	DIV experience	Negatively associated	Insignificant relationship	Size: negative Type (direct insurer): negative
Geographic Diversification		Positively associated	Insignificant relationship	Size: negative
Product Diversification	DIV policy	Insignificant relationship	Positively associated	Size: negative Type (direct insurer): negative
	DIV premium	Insignificant relationship	Negatively associated	Size: negative
Diversification staff, geographic and product		DIV education: Positively associated DIV gender: Negatively associated DIV experience: Negatively associated DIV geographic: Insignificant relationship Product DIV policy: Insignificant relationship Product DIV premium: Insignificant relationship	DIV education: Positively associated DIV gender: Negatively associated DIV experience: Insignificant relationship DIV geographic: Insignificant relationship Product DIV policy: Positively associated Product DIV premium: Negatively associated	Size: negative Ownership structure (governmental): negative Age: positive

The empirical results of Chapter 6 indicate mixed findings of the relationship between different dimensions of diversification strategy and firms' financial performance. Preparing and standardizing the secondary data for the whole insurance industry of Iran was not an easy job to do. However, the details and size of data can still remain as the limitation of this thesis, since some of the information such as staff's cultural background, physical abilities and disabilities, race, religion was not included in the annual reports used in this study, while those details are among staff diversification definitions (Saxena, 2014). In addition, from the methodological point of view, some econometric models, such as the random-effects model, could not be applied to this study due to the size of the data. Moreover, the confirmed data of Iranian insurers was available for only ten years, while the results could be more reliable if the time period could longer. Therefore, the relatively small sample size of Iranian insurance companies and the limited time period is acknowledged, and the findings need to be used cautiously, specifically in terms of generalisation to other countries, industries, or time periods. However, the results provide valuable insights for both insurance practitioners and academics. Hence, future research should attempt to expand the findings and models used in this chapter by collecting a larger sample of companies from larger insurance markets or repeating data collection for a longer period of time in a specific market and analysing the results considering proper intermediating variables. Finally, designing a comparative study among two or more countries can make it much easier to decide about the generalisation of diversification and firms' financial performance relationship and significantly contribute to academics and practitioners interested in and operating in the insurance context.

CHAPTER 7: CONCLUSION

7.1. INTRODUCTION

This chapter summarises the research question and objectives of this thesis, literature gaps, key findings of the thesis, the research contributions to the theory and practice, highlights the managerial implications, limitations and suggestions for future studies. It should be noted that the review of the literature is summarized in this chapter to remind readers of the rationales for this study and how different findings are compared against the existing literature, and how they are aligned with the research question and objectives proposed in this study. Besides, by discussing the policy implications of this research, it is emphasized why Iran's insurance industry should carefully decide about the diversification strategies and why other countries or industries experiences should be cautiously considered. Similar to any other study, this thesis is not perfect. Hence, the limitations of this study are discussed and acknowledged. Accordingly, based on the limitations, the directions and opportunities for future studies are suggested.

7.2. SUMMARY OF THE RESEARCH QUESTION AND OBJECTIVES OF THE THESIS

This section summarises the research question and objectives of the thesis. Later, in Sections 7.4.1 and 7.4.2, the research findings are compared against the research question and objectives.

As discussed in Chapter 1, the main research question of this thesis is formulated as below:

Research question: Does diversification strategy increase firms' financial performance, specifically in the insurance industry of Iran?

Consequently, the following research objectives are introduced in this study to answer the proposed research question.

Research objective 1: To understand how technological diversification affects insurers' ROA.

Research objective 2: To understand how technological diversification affects insurers' ROE.

Research objective 3: To understand how product diversification affects insurers' ROA.

Research objective 4: To understand how product diversification affects insurers' ROE.

Research objective 5: To understand how geographic diversification affects insurers' ROA.

Research objective 6: To understand how geographic diversification affects insurers' ROE.

Research objective 7: To understand how staff diversification affects insurers' ROA.

Research objective 8: To understand how staff diversification affects insurers' ROE.

Research objective 9: To understand how product, geographic, and staff diversification (all together) affect insurers' ROA.

Research objective 10: To understand how product, geographic, and staff diversification (all together) affect insurers' ROE.

7.3. SUMMARY OF THE DIVERSIFICATION STRATEGY- FIRMS' FINANCIAL PERFORMANCE REVIEW OF LITERATURE

In the last couple of decades, there has been a growing body of literature investigating the relationship between various diversification strategies and firms' performance, particularly financial performance. However, there was no consensus on the findings, and previous studies showed mixed or even contradictory results. As a well-established area of research, there are many theories underpinning the diversification-firms' financial performance literature, which have been used mainly by scholars separately, leading to diverse conclusions. Besides, according to the findings of Le (2019), Dhir and Dhir (2015), Purkayastha (2013), Datta et al. (1991), and Hoskisson and Hitt (1990), complications of this research stream not only arise from the fact that diversification is a multi-dimensional concept in terms of definition and scope but also as it is highly dependent on the research contexts, disciplines, variables, methodologies and assumptions used by different researchers. On the other hand, time dependency of

diversification- firms' financial performance relationships are highlighted in the literature (Schommer et al. 2019, Benito Osorio et al. 2012, Neffke et al. 2011). Therefore, although the results of extant literature are valuable to be considered, they cannot be easily generalized to other contexts, countries, and the present time.

Before moving to the summary of the research findings, this section summarises diversification-firms' financial performance review of the literature to understand those findings better. Besides, the position of the study is highlighted against the literature in the following sections.

7.3.1. SUMMARY OF DIVERSIFICATION-FIRMS' FINANCIAL PERFORMANCE RELATIONSHIPS

As discussed earlier, the major aim of this thesis is to investigate the complex relationships between various forms of diversification strategies and firms' financial performance while controlling for some firm's-specific variables. By reviewing the literature, eight general conclusions have been extracted from the financial impacts of diversification strategy on firms. Table 7.1 summarizes those relationships and provides evidence from the literature for each category.

Based on the discussions in section 7.4, positive, negative and insignificant relationships between different diversification strategies and a firm's financial performance have been reported in the insurance industry of Iran. However, the findings of this thesis are different from the studies in the insurance context that reported either positive relationships between diversification and insurers' financial performance (Krivokapic et al. 2017) or negative ones (Shim 2011, Pavic and Pervan 2010, Liebenberg and Sommer 2008). These differences highlight the essence of conducting this study in the Iranian insurance industry.

Table 7.1: A summary of diversification-firms' financial performance relationships (Source: adapted from several studies)

Diversification-financial performance relationships	Related studies
A low level of diversification leads to better financial performance	Clark and Speaker (1994) Rogers (2001) Liebenberg and Sommer (2008) Lee (2017) Mehmood et al. (2019)
A high level of diversification leads to better financial performance	Grant et al. (1988) Meador et al. (1997) Highland and Diltz (2002) Estes (2014) Krivokapic et al. (2017) Lee and Kim (2020)
Inconsistent and mixed relationships between diversification strategies and financial performance of a firm	Elango et al. (2008) Biener et al. (2016) Kagzi and Guha (2018) Mehmood et al. (2019)
U-shaped relationship between diversification strategy and firms' financial performance	Mathur et al. (2001) Capar and Kotabe (2003) Ma and Elango (2008) Zahavi and Lavie (2013)
Inverted U-shaped relationship between diversification strategy and firms' financial performance	Qian et al. (2010) Santarelli and Tran (2016) Kim et al. (2016) Alhassan and Biekpe (2018)
Diversification strategy has no significant impact on Firms' financial performance	Ravichandran et al. (2009) Iqbal et al. (2012) Raei et al. (2015) Cahyo et al. (2021)
Related diversification leads to better financial performance	Bettis (1981) Oyedijo (2012) Mehmood and Abdullah (2015) Oladimeji and Udosen (2019)
Unrelated diversification leads to better financial performance	Dubofsky and Varadarajan (1987) Hoskisson (1987) Chen and Yu (2012) Morris et al. (2017)

7.3.2. SUMMARY OF THE DEFINITIONS OF DIVERSIFICATION

Different scholars used different definitions and dimensions of diversification strategies in the literature. However, they have adopted narrow definitions of diversification, which cannot address all dimensions of this competitive strategy. In contrast, this thesis attempted to approach this concept comprehensively. More specifically, diversification is

defined as any deviation from the firm's current boundaries in this study. In addition to this definition, other popular definitions of diversification strategy are presented in Table 7.2 below.

Table 7.2: A summary of selected diversification strategy definitions (Sources: adapted from several studies)

Year	Researcher(s)	Definition
1957	Ansoff	A business strategy for developing new markets with new products
1962	Gort	Heterogeneity of output
1974	Rumelt	The strategy of adding related or similar product or service lines to existing core business
1989	Ramanujam and Varadarajan	A means of spreading the base of a business to achieve improved growth and/or reduce overall risk
2013	Knecht	Capturing new markets and new industries, dealing with new customer segments, the introduction of new products, utilizing various types of organizational resources, and international expansions of firm operations
2021	The researcher's definition	Any deviation from the current boundaries of a firm

7.3.3. SUMMARY OF THE DIMENSIONS OF DIVERSIFICATION

Many researchers use different dimensions of diversification strategy in the extant literature. To account for comprehensiveness, this study benefits from different dimensions of the diversification strategy. Therefore, instead of focusing on one of the dimensions only, the researcher analysed the relationships between the four dimensions of this competitive strategy and the financial performance of Iranian insurance companies. The summary of diversification's dimensions, their brief definitions and some evidence of previous studies on each dimension are presented in Table 7.3.

Table 7.3: Dimensions of diversification strategy, their definitions and related studies (Sources: adapted from several studies)

Dimension of corporate diversification	Selected definition(s) of each dimension	Some of the related studies
Product diversification	Expansion into businesses that are similar to or different from the current business of the firm (Ramirez Aleson and Escuer, 2002)	Chang and Wang (2007) Foong and Idris (2012) Deligianni et al. (2017) Giarratana et al. (2021)
Geographic diversification	Diversification of a business across multiple locations (Subramaniam and Wasiuzzaman, 2019) which can be within a region (inter-regional) or across new regions (intra-regional) (Yildirim and Efthyvoulou, 2018)	Chang and Wang (2007) Schmid and Walter (2012) Krivokapic et al. (2017) Tsai et al. (2020) Tanui and Serebemuom (2021)
Staff diversification	It means workforce differences in terms of age, culture, education, employee status, marital status, gender, nationality, physical appearance, race, regional origin, religion, sexual orientation, and thinking style (Agrawal, 2012)	Ngo et al. (1998) Yusuf (2005) Mirza et al. (2012) Tanui et al. (2017) Triguero-Sanchez et al. (2018) Arday (2021)
Technological diversification	The extent to which a company diversifies its technological capabilities in relevant or irrelevant technological areas (Lin et al., 2006)	Silverman (1999) Leten et al. (2007) Chen and Yang (2013) Pan et al. (2019) Lee and Le (2021)

7.3.4. SUMMARY OF THE FIRMS' PERFORMANCE

Considering the current competitive business environment, measuring and improving firms' performance is one the most important goals of the firms. This topic has attracted many researchers (Taouab and Issor 2019, Gavrea et al., 2011). However, there are different indicators and models for measuring firm performance. For instance, Richard et al. (2009) divide firm performance measures mainly into subjective and objective measures. Examples of subjective measures include customer satisfaction, social

performance and environmental performance. In contrast, objective measures can be named as accounting measures (for example, ROA, ROE, and profit margin), financial market measures (for example, stock price, EPS and TSR) and finally, mixed accounting/financial market measures (for example, balanced scorecard, Tobin's Q, and EVA). In addition, other scholars have categorized firms' performance measures into financial and non-financial indicators (Pham 2020, Ahmad and Zabri 2016, Ahmed and Manab 2016, Fullerton and Wempe 2009, Skrinjar et al. 2008). As discussed in the review of the literature, some examples of financial measures include growth in turnover, EPS, ROI, ROS, Tobin's Q, MVA, ROA, and ROE (Ahmed and Manab 2016, Ellinger et al. 2002, Moore 2001, McGuire et el. 1988). In contrast, firms' non-financial performance examples can be stated as process improvements, customer satisfaction, capacity utilization, employee satisfaction, and product or service quality (Anwar and Shah 2021, Ahmed and Manab 2016, Ahmad and Zabri 2016). However, this study aimed to measure the performance of Iranian insurance firms by ROA and ROE. Therefore, this study uses objective/accounting measures to measure firm performance financially. Table 7.4 demonstrates firms' performance categories and the chosen indicators in this study.

Table 7.4: Different measures of firms' performance and the study's selected measures (Sources: adapted from several studies)

Firms' performance measures	Financial measures	Non-financial measures
Subjective measures	None	• Process improvement • Employee satisfaction • Product or service quality • Customer satisfaction • Social performance • Environmental performance
Objective measures	• Accounting measures (for example, ROA, ROE, and profit margin). In this study, the above category and, more specifically, ROA and ROE are selected to measure insurers' financial performance in Iran. • Financial market measures (for example, stock price, EPS and TSR) • Mixed accounting/financial market measures (for example, balanced scorecard, Tobin's Q, and EVA)	None

7.3.5. SUMMARY OF THE CONTROL (FIRM'S-SPECIFIC) VARIABLES

In addition to the variables discussed above, some other important variables are extensively used in the extant literature as control variables. Age, ownership structure, and size of the firms are among the most common control (firm's-specific) variables in diversification-firms' financial performance studies used in many contexts, including insurance (Lee 2017, Krivokapic et al. 2017, Saghi-Zedek 2016, Patrick 2012, Berry-Stolzle et al. 2012, Gaur and Kumar 2009, Elango et al. 2008, Liebenberg and Sommer 2008). Apart from these three variables (i.e., age, ownership structure, and size), this thesis used another control variable based on the core business of Insurance companies. The type of insurance company as an insurance-specific parameter is considered to

control for diversification-financial performance relationships. Iranian insurers are divided into direct insurers, reinsurers, and P&I clubs (The CII annual report, 2020). Therefore, this thesis controlled for these four variables while measuring the financial impacts of different diversification strategies on the performance of insurers.

7.3.6. SUMMARY OF THE THEORIES UNDERPINNING DIVERSIFICATION-FIRMS' FINANCIAL PERFORMANCE LITERATURE

Differences in theoretical viewpoints play a vital role in various findings on the relationships between diversification and firms' financial performance. In addition, Purkayastha et al. (2012) state that highlighting different theoretical perspectives about firms' incentives for following diversification strategies is crucial while studying the diversification-firms' financial performance relationship. Therefore, this study discussed and categorized different theories underpinning diversification-firms' financial performance literature. Table 7.5 summarizes the major theories which have been applied in diversification studies.

However, it is not possible to reach a solid conclusion about the benefits of a specific strategy based on one theoretical perspective solely (Palich et al. 2000, Seth, 1990). Therefore, to address this shortcoming of the previous studies that used only one theory of diversification while studying diversification-firm's financial performance relationship [7], this thesis is not bound to a specific theoretical viewpoint. Instead, the researcher benefited from different theories of diversification (for example, the resource-based view, the institutional-based view and the principal-agent theory of diversification) to understand the relationships between this competitive strategy and firms' financial performance in the insurance industry of Iran. Therefore, it is attempted to justify the findings of this research and provide recommendations for the policymakers and top managers in the insurance industry using all relevant theoretical perspectives. In this way,

[7] For example, the following researchers have investigated the diversification strategy using solely one of the theories underpinning the literature: Krivokapic et al. (2017) and Pavic and Pervan (2010) used the RBV theory; Singh et al. 2007 and Denis et al. (2007) focused on the agency view; Zouaoui and Zoghlami (2020) and Nguyen et al. (2012) applied the market power theory; Elango and Dhandapani (2020) and Lee et al. (2008) emphasized on the institutional-based theory; and finally, Lee and Byrne (1998) focused on the MPT.

the thesis maintains both comprehensiveness and impartiality by combining the existing theories instead of advocating only one of them.

Table 7.5: Summary of the theoretical perspectives of the diversification strategy (Source: adapted from several studies)

Theoretical perspective	Definition
Modern Portfolio Theory (MPT)	Never put all your eggs in one basket.
Institution-based theory	As the institutional frameworks that govern developing economies are different from developed countries, the success of diversification strategy depends on the home countries' economic, legal, and institutional conditions.
Resource-based view (RBV) theory	Firms can choose particular types of diversification strategies if their current pool of resources and capabilities are sufficient.
Agency view (principal-agent) theory	The principal delegates authority for controlling and decision-making in specific operations to another person named the agent. The agency problems appear due to opportunistic behaviours, as agents' decisions not only influence their own welfare but also affect principal welfare.
Market power theory	It is mainly based on anti-competitive impacts resulting from different strategies, including diversification strategy. According to this theory, diversification strategy improves firms' financial performance.

7.4. SUMMARY OF THE FINDINGS ON THE RELATIONSHIPS BETWEEN DIVERSIFICATION STRATEGIES AND FINANCIAL PERFORMANCE OF IRANIAN INSURERS

In this thesis, the diversification-firms' financial performance relationships are studied in two separate chapters. The reason is the differences in the methods and types of data used in these chapters. Chapter 5 discussed how technological diversification affects insurance companies' financial performance in Iran, whereas Chapter 6 demonstrated how staff, geographic and product diversification strategies are associated with an insurer's financial performance.

7.4.1. SUMMARY OF THE FINDINGS ON TECHNOLOGICAL DIVERSIFICATION-INSURERS' FINANCIAL PERFORMANCE RELATIONSHIP (CHAPTER 5)

The hypothesis developed for Chapter 5 is formulated as Hypothesis 1 (H1): *Technological diversification is positively associated with the financial performance of firms in the insurance industry.* As the primary data of this chapter is collected for only one year, and to account for the sample size, the structural equation modelling (SEM) analysis is used. The empirical results demonstrate that hypothesis (H1) is rejected. Therefore, this study claims that there is no positive relationship between technological diversification and the financial performance of Iranian insurance companies.

More specifically, the relationship between technological diversification and the ROE of Iranian insurers is not significant. However, interestingly, technological diversification is significantly and negatively associated with insurance firms' ROA. The findings of this chapter are aligned with the literature. The results of previous studies on the relationship between technological diversification and firms' financial performance are mixed. There is evidence of positive, negative and insignificant relationships between technological diversification and firms' financial performance in the literature (Ceipek et al. 2019). The findings of Chapter 5 align with the research objectives 1 and 2 of this study (summarized earlier in this chapter), as they demonstrated how technological diversification affects insurers' financial performance.

7.4.2. SUMMARY OF THE FINDINGS ON STAFF, PRODUCT AND GEOGRAPHIC DIVERSIFICATION-INSURERS' FINANCIAL PERFORMANCE RELATIONSHIPS (CHAPTER 6)

Before discussing the findings of the thesis on the staff, product and geographic diversification-insurers' financial performance relationships, it is helpful to review how each of the diversification dimensions is defined in the thesis. Table 7.6 summarizes how product, geographic and staff diversification are interpreted in this study.

Table 7.6: Summary of the definitions of product, geographic and staff diversification in the thesis

Dimensions	Definitions
Product diversification	PD_{policy} = The number of policies underwritten in one line of business in one year divided by the total number of underwritten policies in all business lines in the same year. $PD_{premium}$ = The premium collected in one line of business in one year divided by the total premium collected in all lines of business in the same year.
Geographic diversification	The total number of agents and branches that sell insurance products for a firm in one year
Staff diversification	Staff diversification $_{Gender}$: The number of staff based on their genders, i.e., male or female in a firm in one year. Staff diversification $_{Experience}$: The number of staff with above ten years of work experience or less than ten years of work experience in a firm in one year. Staff diversification $_{Education}$: The number of staff with master's degree and above or bachelor's degree and below in a firm in one year.

As demonstrated in Table 7.6, product diversification is measured in two ways in this study: the number of policies in a line of business and the total premiums collected in a line of business. The number of policies in a specific line of business is chosen to control for individual policies which have a single insured vs group policies that are more common in group life, casualty, health and medical insurance lines where a single policy for a corporation or a family can cover a relatively large number of insureds under one insurance policy. In addition, using the "premium" measure mainly accounts for macro and micro policies, i.e., individual insureds with small premiums or the policies issued for corporations with higher premiums. Based on the data collected from 30 insurance companies listed in Iran for ten years (2011 to 2020), different hypotheses were tested, which are mentioned below.

Hypothesis 2a (H2a): *Product diversification $_{policy}$ is positively associated with the financial performance of firms in the insurance industry.*

Hypothesis 2b (H2b): *Product diversification $_{premium}$ is positively associated with the financial performance of firms in the insurance industry.*

Hypothesis 3 (H3): *Geographic diversification is positively associated with the financial performance of firms in the insurance industry.*

Hypothesis 4a (H4a): *Staff diversification* $_{Gender}$ *is positively associated with the financial performance of firms in the insurance industry.*

Hypothesis 4b (H4b): *Staff diversification* $_{Experience}$ *is positively associated with the financial performance of firms in the insurance industry.*

Hypothesis 4c (H4c): *Staff diversification* $_{Education}$ *is positively associated with the financial performance of firms in the insurance industry.*

Hypothesis 5 (H5): *Diversification* $_{Product,\ Geographic\ and\ Staff}$ *is positively associated with the financial performance of firms in the insurance industry.*

The findings are mixed in this section of the study. As illustrated in Table 7.7, which combined the findings of the relationships between three dimensions of diversification strategy (staff, geographic and product) and financial performance of Iranian insurers (ROA and ROE), positive, negative and insignificant relationships have been found among Iranian insurance companies. The findings of Chapter 6 align with the research question and objectives 3 to 10 of this study (summarized earlier in this chapter), as they clarified how individually and collectively product, geographic, and staff diversification affect insurers' financial performance. More specifically, H2a and H2b are associated with research objectives 3 and 4 of the study, as they are all about the impacts of product diversification on firms' financial performance. H3 and research objectives 5 and 6 are related to the impacts of geographic diversification on insurers' financial performance. H4a, H4b, H4c, research objectives 7 and 8 discuss the relationship between staff diversification and firms' profitability. Finally, H5 and research objectives 9 and 10 explain the compound impacts of the product, geographic and staff diversification (all together) on the financial performance of Iranian insurers.

Table 7.7: The summary of the relationships between different dimensions of diversification strategies and financial performance of Iranian insures (Source: Chapters 5 and 6 of this thesis)

Diversification Strategy		Firms' Financial Performance		Effective Control Variables
		ROA	ROE	
Staff Diversification	DIV $_{education}$	Positively associated	Positively associated	Size: negative type (direct insurer): negative age: positive
	DIV $_{gender}$	Negatively associated	Negatively associated	Size: negative type (direct insurer): negative Ownership structure (governmental): negative
	DIV $_{experience}$	Negatively associated	Insignificant relationship	Size: negative type (direct insurer): negative
Geographic Diversification		Positively associated	Insignificant relationship	Size: negative
Product Diversification	DIV $_{policy}$	Insignificant relationship	Positively associated	Size: negative type (direct insurer): negative
	DIV $_{premium}$	Insignificant relationship	Negatively associated	Size: negative
Diversification $_{staff, geographic\ and\ product}$		DIV $_{education}$: Positively associated DIV $_{gender}$: Negatively associated DIV $_{experience}$: Negatively associated DIV $_{geographic}$: Insignificant relationship Product DIV $_{policy}$: Insignificant relationship Product DIV $_{premium}$: Insignificant relationship	DIV $_{education}$: Positively associated DIV $_{gender}$: Negatively associated DIV $_{experience}$: Insignificant relationship DIV $_{geographic}$: Insignificant relationship Product DIV $_{policy}$: Positively associated Product DIV $_{premium}$: Negatively associated	Size: negative Ownership structure (governmental): negative age: positive

For staff diversification, it is concluded from this table that while diversification $_{education}$ is positively associated with both ROA and ROE of the studied insurance companies, diversification $_{gender}$ is negatively related to corresponding firms' financial performance measures. Besides, diversification $_{experience}$ is negatively related to ROA of insurers, while the relationship between this aspect of staff diversification and ROE is insignificant. It should be mentioned that both size and type of insurance firms (direct insurers) negatively affect staff diversification-firms' financial performance relationship. Also, governmental ownership exacerbates the gender diversification-firms financial performance relationship. On the other hand, the insurer's age positively impacts the above relationship.

Geographic diversification showed a positive impact on ROA, while its relationship with ROA was insignificant. Therefore, the finding confirms that geographically diversified insurers outperform geographically focused insurers, considering ROA. Additionally, the size of the insurance company negatively affected the geographic diversification-firms' financial performance relationship.

As illustrated in the above table, the financial impacts of product diversification on Iranian insurers were also measured. Diversification $_{policy}$ and diversification $_{premium}$ showed an insignificant relationship with ROA. However, while diversification $_{policy}$ had a positive relationship with ROE, the relationship between diversification $_{premium}$ and ROE was negative. Therefore, it can be concluded that insurers with a higher number of policies issued in one line of business outperform their rivals in terms of ROA, while diversified insurers considering the number of insurance policies have a lower ROA relatively. Furthermore, while the insurers' size and type (direct insurer) negatively affected the diversification $_{policy}$-financial performance relationship, only the size of the firms impacted the diversification $_{premium}$-financial performance relationship.

The last model measured the compound impacts of the product, geographic and staff diversification on insurers' financial performance. The findings confirm that the impacts of staff diversification, including diversification $_{education}$, diversification $_{gender}$, and diversification $_{experience}$ on ROA and ROE in the compound model, are similar to the single dimension model discussed earlier. Accordingly, diversification $_{education}$ is positively associated with both ROA and ROE of insurance firms, diversification $_{gender}$ is negatively related to both ROA and ROE, and while diversification $_{experience}$ is negatively related to ROA of insurers, the relationship between diversification $_{experience}$ and ROE is

insignificant. In addition, the compound model of diversification-firm performance relationship indicated insignificant relationships between geographic diversification, ROA and ROE. Furthermore, the results of product diversification-insurers' financial performance in the compound model were similar to the single dimension model, i.e., diversification $_{policy}$ and diversification $_{experience}$ showed an insignificant relationship with ROA, diversification $_{policy}$ had a positive relationship with ROE, and the relationship between diversification $_{premium}$ and ROE was negative. Finally, in this model, the insurance firms' size and government ownership negatively affect staff diversification-firms' financial performance relationship, whereas, in companies with higher age, the relationship is strengthened.

It is concluded from the findings that single dimension models and compound models showed almost similar behaviours in response to the financial performance of firms. As discussed above, the only dimension of diversification strategy which showed different patterns in single dimension vs compound models with insurance firms' ROA was geographic diversification. This is also justifiable through the resource-based view of diversification. Bowen and Wiersema (2007) argue that from the perspective of RBV theory, based on the existing resources in a firm, the financial impacts of simultaneous implementation of different diversification strategies in one firm might be different from developing a single dimension of diversification in that firm. They showed in their study that the financial impacts of product and geographic diversification individually on firms' performance are different from the simultaneous adaption of both strategies. Therefore, insurance companies should carefully select different diversification strategies, as they might have unsimilar financial implications while pursued individually or collectively.

7.5. CONTRIBUTIONS TO THE THEORY AND PRACTICE

Among the existing competitive strategies for firms' growth, this study showed that diversification has mixed impacts on firms' financial performance, which is aligned with some of the studies in different contexts, including the insurance industry (Ugwu et al. 2021, Peng et al. 2017, Lee et al. 2017, Ravichandran et al. 2009, Thomas 2006, Goll and Sambharya 1995). The findings of this research contribute to both diversification strategy literature and practice.

7.5.1. CONTRIBUTIONS TO THE DIVERSIFICATION-FIRM PERFORMANCE LITERATURE

This study contributes to the literature on diversification strategy by developing specific models to measure the impacts of staff, geographic and product and technological diversification strategies on the financial performance of insurance firms. It also adds to the literature on the diversification-performance nexus by bringing fresh insight into the multiple dimensions of diversification strategies and their financial impacts on firms' performance. The contributions are summarized below:

First, this thesis is the first study investigating diversification-firms' performance relationship using all aforementioned dimensions, i.e., staff, geographic, product and technological diversification. Other studies mostly focused only on a single dimension of diversification strategy (as presented in Table 2.2). None of the previous studies in different contexts, including insurance, combined the four dimensions in one research and interpreted the impacts on firms' performance.

Second, this thesis provides new insights into diversification strategy in the insurance industry and, specifically, the Iranian context by providing comprehensive findings. Although diversification decisions are among the daily operations of insurers, it has been studied limitedly by insurance researchers (e.g., Peng et al. 2017, Krivokapic et al. 2017, and Cole and Karl 2016). In addition, based on the institutional view theory of diversification, the findings of the limited studies about the impacts of diversification on the financial performance of insurers in the literature are specific to the studied countries, which are not necessarily generalisable to other institutionally different countries.

Third, this thesis studied the insurance industry of Iran as a whole and investigated all types of insurance firms (including general insurers, life insurers, P&I clubs and reinsurers) and all product lines, while the vast majority of studies on the subject only investigate health insurers or property-casualty lines of business (for example, Alzoubi 2020, Shi et al. 2016, Biener et al. 2016, Shi et al. 2015, Berry-Stolzle et al. 2012, Shim 2011, Elango et al. 2008, Liebenberg and Sommer 2008). Therefore, this research did not narrow down the insurance business to a small segment. By doing this, the thesis tried to address some of the inconsistencies in previous studies' findings in the insurance context.

Fourth, this thesis shows that multiple theoretical lenses are applied to explain the impacts of diversification strategies on the firms' financial performance. It is not

possible to reach a solid conclusion about the benefits of a specific strategy based on one theoretical perspective solely (Palich et al. 2000, Seth, 1990). As discussed in section 7.2.6, although most of the studies in diversification literature bound themselves to one theoretical viewpoint (for example, resource-based view theory, institutional-based view theory, or principal-agent theory of diversification), this study uses all existing theories to categorize the previous findings of the related studies and also justify the findings of the thesis, accordingly.

Fifth, this research develops a new measurement method for technological diversification in the insurance industry. While most of the previous research focused on technology-intensive industries in technological diversification-firms' performance studies such as IT, automobile manufacturing, and mobile manufacturing industries (Xu and Zeng 2020, Kook et al. 2017, Gjesfjeld et al. 2017), there was no clear definition of technological diversification in insurance. Moreover, most of the existing literature focused on information extracted from firms' patents for technological diversification measurement (Lee and Le 2021, Corrocher and Ozman 2020, Lee et al. 2017, Chen et al. 2013), whereas this thesis explained what is meant by technological diversification in the insurance industry, based on the research results obtained through interviews with experts in insurance for the first time. Even though some earlier studies on technological diversification (such as those mentioned above) were partially helpful to advance understanding technological diversification-firms' financial performance relationship, no previous research attempted to investigate this relationship in the global or Iran's insurance industry.

Sixth, this thesis develops the measurement method of product diversification specifically for insurance firms. While previous studies in the insurance context mostly used the number of business lines or premiums collected to measure product diversification (Peng and Lian 2020, Lee 2020, Duijm and Beveren 2020, Krivokapic et al. 2017, Peng et al. 2017, Shim 2011, Elango et al. 2008, Liebenberg and Sommer 2008), this thesis adds a new measure to the literature (number of insurance policies underwritten in each line of business) for investigating product diversification of insurance firms.

Seventh, this is the first study in the insurance context that measures both individual and compound impacts of diversification strategy on firms' financial performance. Bowen and Wiersema (2007) criticize the diversification-performance literature due to focusing on individual models only and ignoring the compound impacts

of following different diversification strategies at the same time on the financial performance of firms. Therefore, to address this literature's gap, the thesis measured both individual and compound models to investigate the research topic.

7.5.2. CONTRIBUTIONS TO PRACTICE

The findings of this thesis provide valuable insights for both policymakers and managers of the insurance industry (specifically in Iran) on how different diversification strategies can impact insurers' financial performance, as follows.

First, this thesis suggests that insurers in Iran should not diversify across all dimensions of diversification strategy. Specifically, the research findings recommend that insurance companies should not undertake technological diversification, staff diversification in terms of gender and work experience (DIV $_{Gender}$ and DIV experience) and product diversification in terms of the total premium collected (DIV $_{premium}$). According to the resource-based view theory of diversification, adopting diversification strategies entails costs for organisations (in addition to its potential benefits); therefore, managers should make diversification decisions cautiously. Moreover, from the principal-agent (agency) view theory of diversification, shareholders of insurance companies should prevent managers from taking unnecessary diversification decisions by increasing the supervision and auditing over the top-level managers or sharing them in the ownership as recommended by the literature (Boshkoska 2015, Agrawal and Knoeber 1996).

Instead, this research suggests that Iranian insurers should undertake staff diversification in terms of education (DIV $_{education}$), geographic diversification and product diversification in terms of the number of underwritten policies (DIV $_{policy}$). The benefits of such diversification strategies should be communicated with the staff in insurance firms, and key decision-makers should encourage them to pursue the above-mentioned diversification patterns.

Second, insurance firms should be aware that technology has a broader meaning than traditional IT tools such as computers or simple underwriting software solutions in the insurance industry. The introduction of new medical technologies for health and life insurance such as wearable technology (McCrea and Farrell, 2018), different technologies used in a workspace, big data analytics and Internet of Things (IoT) (Farrell and Raphael,

2018) are among new technological trends for insurers. Therefore, insurance firms should consider the essence, costs, and benefits of using such new technologies more in-depth.

Third, Iranian insurance firms are advised that a high degree of technological diversification leads to inferior financial performance. Therefore, business owners and key decision-makers may need to consider considerable investments in acquiring new technologies for insurance firms. This is aligned with the agency theory point of view. In other words, the shareholders of Iranian insurance companies should control technology investments to ensure that technological diversification is not imposed on them due to management's opportunistic behaviours. As illustrated in Table 7.7, there is a negative relationship between technological diversification and Iranian insurers' financial performance (in terms of ROA). However, as there are some limitations in measuring diversification-firm's financial performance in the present study, which will be discussed in section 7.5 of this chapter, further research can clarify this topic with more details.

Fourth, this study recommends that Iranian insurance firms proceed with their current underwriting and claim handling software solutions. As discussed in Chapter 3, to maintain access to insurance companies' data, the CII obliged all Iranian insurers to use one unique software package for their underwriting and claim settlement operations. However, based on the findings of this thesis, as technological diversification (including using new software solutions) decreases insurers' profitability (specifically ROA) in Iran, such regulation seems financially beneficial to Iranian insurers.

Fifth, this thesis advises the regulatory body of the insurance industry in Iran about the implications of product diversification. Specifically, the CII should revise its current policies regarding product diversification. The CII annual report (2020) indicates that most of the direct insurance companies in Iran (27 out of 31 insurers) have been licenced as general insurers. This approach obliges general insurers to diversify across a wide range of insurance products in the market. Such tendency is reinforced by the existing laws and regulations, which binds general insurers to generate a minimum amount of insurance premiums in different lines of business to maintain a balanced portfolio, meaning that the CII requires firms to follow diversification based on premium. However, based on the findings of this thesis presented in Table 7.8, product diversification $_{\text{premium}}$ is negatively associated with firms' performance. Therefore, the CII should not push all insurance firms to implement a product diversification strategy.

Sixth, this thesis advises the CII to revise the licencing regulations, considering the product lines diversification. Currently, there are only two life insurance companies in Iran's market that are quite young (less than five years of age) and small in terms of market share, whereas one of the critical measures of insurance industry development in any economy is the share of life insurance in the overall insurance premiums portfolio. However, apart from the economic factors such as GDP per capita, this ratio is generally lower than the global average among Muslim countries, including Iran, due to the cultural and religious beliefs (Zerriaa and Noubbigh 2016, Zurich Re 2015, Hashempoor 2013, Feyen et al. 2011). Therefore, the central insurance of Iran should design policies that promote the insurance culture among the population to maintain both profitability of Iranian insurers and the development of the market. For example, the CII can provide appropriate incentives (e.g., financial, technical and actuarial support) for life insurers to motivate and enable them for expanding their activities in selling life insurance policies.

Seventh, this thesis advises the CII to revise its policies regarding the geographic licencing of insurance firms to allow all firms to operate in both mainland and economic free zones. From the geographic diversification point of view, presently, the central insurance of Iran has licenced 27 firms to operate in the mainland and six insurance companies to operate in economic free zones. As an insurance practitioner who had worked in both above-mentioned companies, the researcher witnessed that those companies authorized to work only in economic free zones have endeavoured to penetrate the mainland market, although there have been legal penalties for such actions. According to the findings of this research, geographic diversification as a single strategy is positively associated with the ROA of the insurers in the studied market. So that, the central insurance of Iran should revise its licencing policies in terms of geographic diversification in order to maintain justice and fair business principles. Such a policy change leads insurers to benefit from one of the few profitable dimensions of diversification strategy without discrimination.

In summary, Tables 7.8 and 7.9 show different financial implications for insurers choosing each diversification dimension. At a general level, insurers should consider that not all product, geographic, technological and staff diversification strategies lead to superior financial performance.

Table 7.8: Summary of the unfavourable diversification strategies for Iranian insurers' financial performance (Source: chapters 5 and 6 of this thesis)

Unfavourable diversification Strategies for firms' financial performance		Firms' Financial Performance measure (ROA, ROE, or both)	Effective Control Variables
Technological diversification		ROA	None
Product diversification		ROA and ROE	None
Staff diversification	DIV $_{gender}$	ROA and ROE	Size: negative type (direct insurer): negative Ownership structure (governmental): negative
	DIV $_{experience}$	ROA	Size: negative type (direct insurer): negative
Product diversification	DIV $_{premium}$	ROE	Size: negative

Table 7.9: Summary of the favourable diversification strategies for Iranian insurers' financial performance (Source: chapters 5 and 6 of this thesis)

Favourable diversification Strategies for firms' financial performance		Firms' Financial Performance measure (ROA, ROE, or both)	Effective Control Variables
Staff diversification	DIV $_{education}$	ROA and ROE	Size: negative type (direct insurer): negative age: positive
Geographic Diversification		ROA	Size: negative
Product diversification	DIV $_{policy}$	ROE	Size: negative type (direct insurer): negative

7.6. LIMITATIONS OF THE STUDY

Although this thesis provides valuable contributions to the literature and practice, it contains some limitations. The details and size of the dataset is the main limitation of this research which have been discussed below:

First, this study did not use a comprehensive set of measures for staff diversification. It only used education, gender, and work experience as the related indicators for measuring staff diversification. Meanwhile, in the existing literature, other measures such as staff's cultural background, physical abilities and disabilities, race and religion, have been used to measure staff diversification (Saxena, 2014) which were not included in the annual reports used in this study. Therefore, future studies can collect more detailed data on staff diversification to understand its impacts on firms' financial performance.

Second, this thesis did not use longitudinal data to measure technological diversification. Instead, it only used the primary data collected from Iranian insurers for one year. In order to generalize the results, other researchers can collect the data for a longer period to get a better insight into the technological diversification-firms' financial performance relationship.

Third, this thesis did not consider the impact of Covid-19 on the technological diversification strategies of insurance firms. While the primary data used in this study had been collected before the emergence of the Covid-19 pandemic, many companies have changed the way they do business to minimize the negative impacts of the disease by using new technologies. However, Covid-19 may affect the business models that insurance companies run their business, such as the more intensive use of technologies. Some of the recent studies (Sajjad 2021, Ciciotti 2020 and Priyono et al. 2020) highlighted the importance of technological diversification for business continuity in the pandemic era. More specifically, Bhambere et al. (2021) and Volosovych et al. (2021) studied the applications of new technologies in the insurance industry during the Covid-19 pandemic. The impact of technological diversification on firms' performance relied on the primary data collected before the breakout of the Covid-19. Hence, the results from this part of the thesis may not be applicable in the amid of the Covid-19 pandemic. Besides, individuals are learning to use new technologies to fulfil their needs in their daily lives. Therefore, future studies can investigate technological diversification impacts on

the insurance companies' financial performance, considering the Covid-19 implications that have emerged recently.

Fourth, this study did not use other alternative regression techniques such as the random-effects model due to the size of the data. Moreover, the valid data of Iranian insurers was available for only ten years, while the results could be more robust and reliable if the time period could exceed ten years. Hence, the relatively small sample size of Iranian insurance companies and the limited data collection period are acknowledged. Accordingly, the findings need to be interpreted cautiously, specifically for generalisation to other countries, industries, or time periods.

7.7. FUTURE RESEARCH DIRECTION

Below, there are some opportunities for future studies in diversification-firms' financial performance relationship.

First, future research can add a new dimension of diversification into the literature in the insurance context. Diversification of insureds is another dimension that this thesis could not study due to the unavailability of data. In the business of insurance, insureds' demographic characteristics (e.g., age, gender, education, occupation) can impact insurers' decisions to accept the risks with different premiums or even reject them (Banthin and Holahan 2020, Arozullah et al. 2004, Schoen and DesRoches 2000). For example, the insured's age is one of the critical factors in risk assessment procedures in life, health and medical insurance policies. Additionally, the insured's occupation can lead insurers to take different decisions. In some lines of insurance business, such as liability and casualty insurance, the degree of occupational hazards can motivate insurers to underwrite some risks easily while rejecting some others. Therefore, further studies can measure the impacts of insured diversification on the financial performance of Insurers.

Second, future research can conduct a comparative study among two or more countries to make the findings more generalisable to other countries which are institutionally similar to or different from Iran. Conducting a comparative study using the statistics of another country with similar institutional characteristics (e.g., a middle east-Muslim country) can consolidate the findings of this thesis. Besides, comparing Iran with a developed economy can highlight how differences in the institutions of developing and

developed countries can influence the effectiveness of diversification strategies for insurance firms. Such a study significantly contributes to academics and practitioners interested in and operating in the insurance context to compare the results of different countries.

7.8. SUMMARY OF THE CHAPTER

This chapter summarizes the findings of this thesis to show how it has contributed to the insurance practitioners and scholars by studying the relationship between diversification strategy and the financial performance of Iranian insurers. Furthermore, the limitations of the thesis and opportunities for future studies have been outlined in this chapter.

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APPENDIX 1: TECHNOLOGICAL DIVERSIFICATION INTERVIEW QUESTIONS

1. How do you define technological diversification in insurance?

2. What are its indicators?

APPENDIX 2: TECHNOLOGICAL DIVERSIFICATION QUESTIONNAIRE

1	My company measures risk exposure by software (Risk exposure ranks risks according to their probability of occurrence multiplied by the potential loss)	
2	My company uses risk prediction modelling and risk analysis	
3	My company is using a universal underwriting software	
4	My company is using technology to have a standard working environment including space, light, etc. to increase efficiency	
5	My company uses the capacity of its sister companies or investors (e.g. banks) to sell insurance products	
6	My company is using modern technologies in its properties	
7	My company's underwriting software is comprehensive and efficient	
8	My company has a unique platform for data sharing between other Iranian insurance companies	
9	My company has regular staff training programs for new technologies applied in insurance	
10	My company uses start-ups and/or insurance applications widely	
11	Research and development is a must for my company	
12	My company widely uses expert (not general) loss adjusters for claim handling	
13	My company uses multiple sources for data keeping	
14	My company uses “pay as you drive” or “pay based on how you drive” in car insurance	
15	My company requires “zip code” as a mandatory field to prevent risk accumulation in a particular geographical area	
16	My company uses a call centre	
17	My company uses virtual classes/meetings nation-wide	
18	My company widely uses novel methods of approaching new customers, such as pop-up ads on mobile phones, e-mails, etc.	
19	My company's website is frequently updated	
20	My company is forced to look after new technologies in insurance by competitive rules or regulations	
21	My company is keen to create or write new insurance products	
22	My company is willing to enter into other businesses (such as stock exchange market, banks, real estate) to make more profit	
23	My company widely uses IT as a tool for underwriting as well as claim handling	
24	My company uses modern approaches for advertising (such as in-app ads, web-based ads, etc.)	

25	My company widely uses specialized experts in different fields (e.g. engineering, medical science, etc.) for risk assessment and claim investigations	
26	My company is prevented from using new technologies in insurance	
27	My company is willing to customize its own unique software	
28	My company uses blockchains approach for data keeping	
29	My company collects enough data and evidence while underwriting a policy to prevent fraud	
30	My company widely uses IoT (internet of things) in our insurance industry (e.g. in biometrics, weather sensors, car sensors, etc.)	
31	My company widely applies artificial intelligence (i.e. interactive robots or machines) for underwriting or paying claims	
32	My company widely uses big data analytics in our actuary calculations	
33	My company is willing to outsource some activities such as human resources, finance and agents to contractors through an automated strategy	