An empirical study on the impact of female leaders and intellectual capital on the financial performance of FTSE 350 companies

An Empirical Study on the Impact of Female Leaders and Intellectual Capital on the Financial Performance of FTSE 350 Companies

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Abstract

The aim of this research is to examine to what extent female leaders and intellectual capital (IC) affected the financial performance of FTSE 350 companies in the UK for the period 2010 to 2018 while controlling for firm-specific characteristics. To achieve the research aim and answer the research questions, three empirical models were developed based on a review of the existing literature in order to test the research hypotheses. The objective of the first empirical study is to examine the impact of female leaders on FTSE 350 companies' financial performance. The objective of the second empirical study is to investigate the impact of IC on FTSE 350 companies' financial performance, the purpose of the third empirical study is to investigate the impact of female leaders on FTSE 350 companies' intellectual capital.

The research used OLS multivariate regression models with a time lag. The data relating to female leader's characteristics, IC components and financial performance of FTSE 350 companies were collected from the database developed by Osiris.

The intellectual capital of FTSE 350 companies is measured through value added intellectual coefficient (VAIC) methodology.

The following are the key findings of the research. Firstly, there is no disparity between female and male leaders affecting financial performance. Secondly, female leaders present a positive impact on the financial performance (Tobin's Q and ROA) of specific industries, such as industrials, consumer staple and consumer discretionary. Thirdly, IC presents a positive impact on financial performance, such as ROA and P/E. On the other hand, female chairs demonstrate a positive impact on selected companies' intellectual capital throughout the years which proves that the higher position they achieve, the more positive impact they have on companies' performance.

The study contributes to the literature of board of directors, specifically female leaders and financial performance, by adding to the body of knowledge regarding the significant impact of female leaders on financial performance in specific industries, such as industrials, consumer staple and consumer discretionary. In fact, the industry factor might better explain why the results on the relationship between female leaders and firm performance vary. This can fortify the gender legislation around the world, which pressurise firms to increase female representation on boards.

Moreover, the current study enhances the existing literature regarding female leaders and intellectual capital by being the first study to report the positive impact of female leaders on the intellectual capital of FTSE 350 companies. IC is an important driver of value creation and competitive advantage for firms; however similar to the industry factor, this relationship is not well understood yet. Therefore, the findings of this study support the representation of female members on boards, as it is related to improved IC and, consequently, performance. As part of this process, the relationship between female leaders and the industry should not be neglected as the relationship remains significant.

This study provides useful and practical insights into how both managers and investors can help the female members better understand and interpret firms' intellectual capital. Before this study, most research focused on the relationships between female directors and firm performance without considering the role of industry or intellectual capital, which indeed are crucial.

Having said that, there are still more factors to be considered, such as culture, country, legal system, equality, inclusivity and other forms of diversity such as ethnic, race, sexual orientation and social class, which further research can investigate.

Dedications

To my beloved father General Hossein Javaherizadeh who is my inspiration and strength.

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List of Abbreviations

CE	Capital Employed
CEE	Capital Employed Efficiency
CG	Corporate Governance
FTSE	Financial Times Stock Exchange Group
HC	Human Capital
HCE	Human Capital Efficiency
IC	Intellectual Capital
KM	Knowledge Management
P/E	Price per Earning
ROA	Return on Assets
ROE	Return on Equity
SC	Structural Capital
SCE	Structural Capital Efficiency
VA	Value Added
VAIC	Value-added Intellectual Coefficient
CEO	Chief Executive Officer

"If you want something said, ask a man; if you want something done, ask a woman." – Former British Prime Minister Margaret Thatcher. Speech to National Union of Townswomen's Guilds Conference on May 20, 1965

Chapter 1: Introduction

1.1 Background of the Research

In the past decades, many organisations have experienced failures and have been hit by corporate scandals such as such as Enron, WorldCom, and the Lehman Brothers in the US, and Maxwell Communication, Mirror Groups, Polly Peck International and Bank of Credit and Commerce International in the UK (Hall-Smith, 2018). Consequently, governments around the world have attempted to improve corporate governance guidelines since corporate governance can affect the companies' financial performance. The UK government and the regulators of the UK capital market have been scrutinising and enhancing the governance codes for listed firms by publishing reform proposals, guidelines, and policies. Thus, the government appointed Lord Davies in August 2010 to conduct a review into removing obstacles to permit more females to achieve board level positions in organisations. As per Lord Davies recommendations which were published in February 2011, UK FTSE 100 companies should hire 25% females* on their boards by 2015. It also recommended that FTSE 350 companies should set their own challenging targets (Gov.UK, 2011).

As Dene and Amond. (2020) argue, female CEOs are more risk-averse to make investment decisions; thus, firms' earnings are more stable and prevent the companies' financial failure. Despite some studies which support the positive impact of female directors on firm financial performance, such as Pangestu et al. (2019), there are other studies that report different results, such as Carter et al. (2010), found that there is no significant impact of gender diversity on firm financial performance and Khan and Saeed (2021) claimed that female directors in Pakistan showed a negative impact on firm performance such as return on equity and assets turnover.

Moreover, as Boutchkova et al (2020) and Terjesen et al. (2009) stated, apart from other characteristics of the board, gender diversity is one of the topics that is always debated due to the complex relationship between firm performance and female directors and leaders. Furthermore, gender diversity affects board processes, culture, behaviours, and firm performance. Women[1] are generally considered to possess a unique cognitive style which is particularly needed to create harmony and better sources of information dissemination (Earley and Mosakowski, 2000). Hence, gender diversity can enhance the overall performance of the human capital resources of the firm. Broadbridge et al. (2006) and Kravitz (2003) have argued that gender-diverse boards are able to more quickly resolve complicated problems and have more efficient communication and listening skills in day-to-day operations (Peni, 2014). Females are more democratic (Dezso and Ross, 2012) and regarding social responsibility, they care more about the corporate social responsibility and moral issues of their businesses. (Triana et al, 2017)

Nevertheless, the impact of female directors on the performance of a firm can be negative or positive, depending on certain firm characteristics such as firm size and industry type, or problems related to tokenism (Simpson et al., 2010).
Apart from monitoring managers and firm performance, the board of directors provide advice and access to resources as well (Hung, 1998), since land labour and capital were the basic resources for a company in the traditional economic model to operate (Sullivan, 2000). Nowadays, for most companies, intellectual capital (intellectual capital, contains non-monetary assets such as employees, culture, policies, brand equity, patent and so forth (please see chapter two for full explanation), considered a strategic asset, is the most crucial source of value creation and competitive advantage. In the last two decades, research on IC has been one of the most prolific research areas in management literature.

The innovative capability of a firm is attached firmly to its stock of IC. Thus, firms are the distributed knowledge systems formulated from individuals who possess the knowledge. The previous studies in the field of IC confirm that IC efficiency is positively related to firm performance and market value (Anifowose et al., 2018). In other words, IC efficient management is crucial for firm value and competitive advantage in the knowledge-economy era. As stated by Dezsö and Ross (2012), board gender diversity improves firm human capital by offering valuable services, such as insights into strategic issues and providing positive feedback on consumers and business partners. Thus, it would be extremely beneficial for

[1] In this thesis the terms female and women are used interchangeably throughout to denote a member of the female sex

companies as well as researchers to understand the role of female directors in managing IC on the one hand and affecting performance on the other hand.

Some scholars have paid attention to the effects of female directors on performance (Jurkus et al. 2011, Adams and Ferreira, 2009 and Carter et al., 2010) and that of IC on a firm's performance (Pulic, 2004, Choi et al., 2013 and Chen et al., 2014). However, over the last decade, empirical evidence remains scarce on the impact of female directors on IC (Nadeem et al., 2019) and the actual contribution of IC to the dynamics of the value creation process and the relationship between IC and the firm financial performance.

Therefore, this thesis investigates two aspects that potentially affect the performance of FTSE 350 companies, namely female leaders and intellectual capital. Also, the study investigates the impact of female leaders on companies' intellectual capital to understand the deeper relationships among variables. There are two reasons for choosing these themes. Firstly, board diversity is the target of the UK governance codes: the board chairman in the Cadbury Report (1992) and board diversity in the Davies Report (2012). Secondly, both themes are in line with the UK governance codes update, from the agency theory to the resource dependence theory of the organisation. The Davies Report (2012) focuses on gender diversity in the UK boardroom, which is underpinned by the resource dependence theory (Hillman et al., 2000).

1.2 Problem Statement

Recently, the impact of female directors on performance, on the one hand, and the impact of intellectual capital on firm performance, on the other hand, have been a subject of growing interest for both academics and professionals. This shows that the impact of female leaders and intellectual capital on a firm's financial performance is still unclear within the context of UK large companies. Some studies report that businesses led by females underperform compared to the ones led by males. For example, Valdez and Fasci (1998) studied 1,000 female-led and 1,000 male-led small US accounting firms and discovered that there were noticeable differences with regard to the ratio of profit to gross revenue. In a different study, using firm-level data from the US Census Bureau, Fairlie and Robb (2009) discovered that, compared to firms led by men, firms led by women were less successful in terms of financial performance since women leaders/owners tended to have less human capital and financial capital (and their previous work experience was mostly limited to a family business) when beginning operations.

On the other hand, in the literature, the impact of female leaders on the intellectual capital of the companies has been neglected by scholars. It is highly beneficial to understand this relationship. Since IC contains some components, this research will show which IC component would be affected by female leaders in order to result in better financial performance.

Although some scholars stated that gender diversity can enhance the overall performance of the human capital resources of the firm, Broadbridge et al. (2006) and Kravitz (2003) have argued that gender-diverse boards are able to resolve complicated problems and have more efficient communication. Furthermore, Daily et al. (1999) argued that female representation on boards improves human capital within an organisation by offering valuable services, such as insights into strategic issues and providing positive feedback on consumers and business partners. Also, firms with more females on boards show a tendency to be more generous (Dunn, 2012). Since human capital is one of the components of intellectual capital, there is a need for investigation regarding all components of IC separately as well as holistically, which will be considered in this study.

1.3 Research Aim, Objectives, and Questions

The primary aim of this research is to investigate the extent to which intellectual capital and female leaders affected FTSE 350 companies' financial performance from 2010 to 2018. Also, the study examines the extent to which top female leaders such as CEO and Chair affected the intellectual capital of FTSE 350 companies

Research Objectives:

Based on the research aim, the following objectives have been formulated.

- To develop a conceptual framework to assess the impact of intellectual capital on firm performance.
- To develop a conceptual framework to assess the impact of female leaders on firm performance and intellectual capital.
- To enrich the existing literature regarding female leaders and intellectual capital
- To investigate the impact of intellectual capital on FTSE 350 companies' financial performance.

- To investigate the impact of female leaders on FTSE 350 companies’ intellectual capital.
- To investigate the impact of female leaders on FTSE 350 companies’ financial performance.

Research Questions

The following research questions have been formulated based on the research aim and objectives:

Research Question 1: Does Intellectual Capital have a significant impact on FTSE 350 companies’ financial performance (ROA, Tobin’s Q, ROE and P/E)?

Research Question 2: Do Female Leaders have a significant impact on FTSE 350 companies’ financial performance (ROA and Tobin’s Q)?

Research Question 3: Do Female Leaders have a significant impact on FTSE 350 companies’ intellectual capital?

1.4 Overview of Methodology

The study applied the quantitative research method in which secondary data, including a female director, IC and financial statement of FTSE 350 companies, have been collected from the Osiris database from 2010 to 2018 as panel data. Therefore, the examination of the casual relationship between intellectual capital, female leaders and firm performance was carried out using multivariant regression analysis. The reason is that when one dependent variable is suspected to be related to more than one independent variable, multivariate regression analysis is employed as the best analytical method (Hair et al., 2010). The impact of corporate governance or board of directors on firm performance has been investigated in previous studies by applying multivariate regression analysis (Huang et al., 2013). The FTSE 350 companies, which include the most powerful listed companies on both financial and economic grounds, is selected because they were utilised in prior research focusing on large companies (for example, big companies have been the main focus of USA).

Despite the similarity in the nature of companies around the globe, the results are varied (see 3.3 for example). Therefore, UK top companies have been selected since there is limited research examining the impact of female leaders on their intellectual capital as well as performance in one of the most powerful financial centres of the world.

1.5 Potential Contribution of the Study

Understanding the impact of intellectual capital and female leaders on FTSE 350 companies' financial performance has both theoretical and practical importance.

1.5.1 Theoretical Contribution

This study further helps researchers to understand the direct relationship between female leaders and intellectual capital. Also, it provides a platform for the consideration of the impact of female leaders and intellectual capital on firm financial performance, since the research in this domain is scarce.

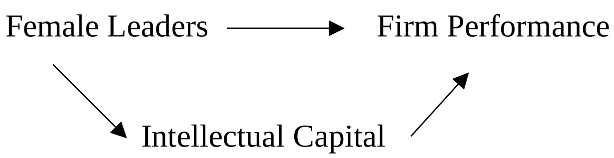
This research aims to enrich the existing literature on female leaders and intellectual capital in the finance and human resource management context. This study contributes to the existing literature on female leaders and IC, and the practice within the FTSE 350 UK companies. Also, this is one of the first studies conducted in the UK to examine the impact of female leaders on UK top companies' intellectual capital.

Additionally, the current thesis has methodological importance for the following reasons: The Value-Added Intellectual Coefficient (VAIC) methodology applied in this study to test the impact of IC has been calculated with different elements based on the availability of data which provide some insights for further researchers. This is lacking in previous studies.

The results of time lag which has been applied up to five years, would provide a deeper understanding of the relationships among variables. However, it is a standard way to make empirical results more robust and this has been utilised for the first time in this study.

Ultimately, the current study will determine and add to the knowledge regarding the positive and negative impact of top female positions ranging from directors, CEOs, Chairs to executives and non-executives on a firm's financial performance, which has not been explored enough to reach conclusive evidence regarding the UK top companies. The other potential contribution is considered as the impact of top female leaders on companies' intellectual capital and its components, which has been neglected so far in UK's top companies. Moreover, the impact of companies' intellectual capital and its components on financial performance in the UK context remains under-explored.

Following is an overview on the relationships among all variables of the study:



1.5.2 Practical Contribution

From a professional or managerial perspective, this study aims to provide managers, directors, decision-makers and leaders within the UK top companies' context with the practical contributions as follows.

Firstly, the empirical results allow managers and professionals to critically evaluate the impact of female leaders on FTSE 350 companies' intellectual capital and financial performance.

Additionally, the impact of the separate intellectual capital components on financial performance would provide clear outcomes and results, which make it needless to understand which component is more effective on performance and worth investment.
Secondly, gaining a vision of the most crucial factors directly or indirectly affecting the relationship between female leaders and intellectual capital and FTSE 350 companies' performance, which is crucial from an investment and return-on-investment perspective.

Thirdly, from a leadership and financial point of view, companies would be able to use the measurement of this study to critically analyse the contribution of each component of intellectual capital in order to have a more efficient investment in them (human capital efficiency, structural capital efficiency and capital employed efficiency).

The study also highlights what kind of firm-specific features (such as firm size and industry types) would be affected by top female leaders and which IC components would be influenced positively or negatively by female leadership within specific industries.

As the data for this study were collected from a database, it would be practical for companies to conduct these measurements on a regular basis and update their policies accordingly.

Apart from FTSE 350 companies that constitute the context of this research, the results of this study will assist other companies as well. The lesson that has been learnt from failed companies or those facing bankruptcy, could have been anticipated and prevented if they had not ignored their intellectual resources and investment in IC. Companies such as Blockbuster (Satell, 2014), Toys R US (Dahlhoff and Cohen, 2018), Carillion (The Guardian, 2020) and recently Thomas Cook (the Guardian, 2019) experienced financial difficulties, and the reasons behind this were never solely the external factors beyond the companies' control. Thomas Cook, with 187 years in business, was liquidated not only because of Brexit uncertainty and the internet revolution in holiday booking but also due to the lack of knowledge and skills of their leaders and employees and other factors which are beyond this study. Having said that, these catastrophes could be prevented if companies applied the results of the research and practice within their companies.
In summary, there are several important findings in this study regarding UK companies
(1) There is no evidence that female leaders can affect firm performance (details in Ch. 6).
(2) There is a positive and negative impact of female leaders on performance based on industry type (Ch. 6).
(3) There is a positive and negative impact of female leaders on the IC component (Ch. 7).
(4) There is a positive impact of IC and its components on firm financial performance (Ch. 5).
Therefore, according to the results, female leaders can have a positive impact on IC and firm performance depending on which industry they are performing (see chapter 8 for the summary of the results).

1.6 Thesis Structure

The thesis consists of eight chapters. The introductory chapter (Chapter 1) details the literature of two fundamental discussions here, namely intellectual capital and female leaders. Chapter 2 presents the literature review related to intellectual capital and performance. In this chapter, VAIC methodology, which has been applied to calculate all components of intellectual capital, is discussed.

Chapter 3 is dedicated to the literature on female leaders and performance.

Chapter 4 presents the research methods and conceptual framework of the study. Also, the data collection and sample of the study and the analysis procedure are discussed in this part.

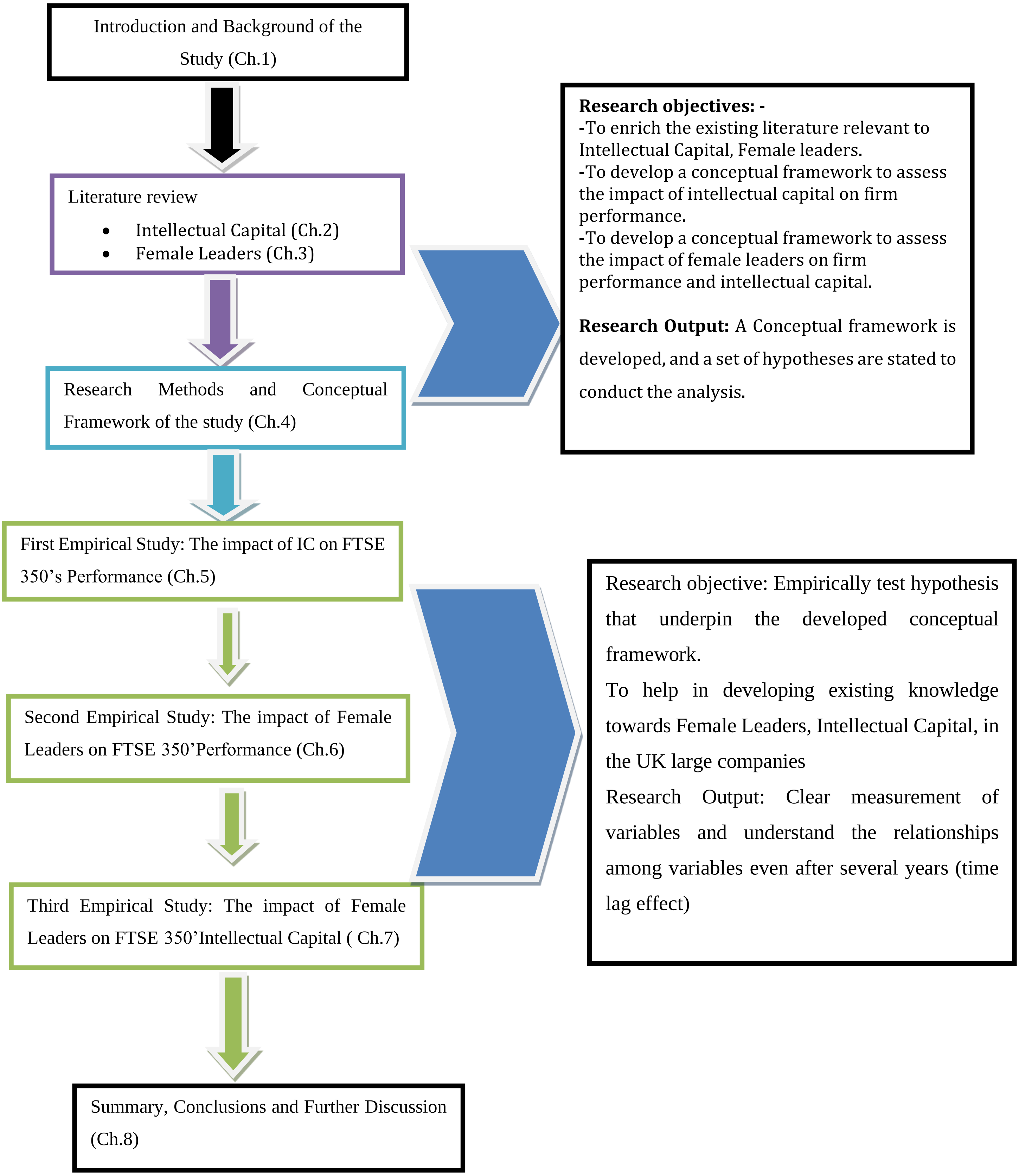
Chapter 5 discusses the first empirical model of this study which is the impact of the intellectual capital on FTSE 350 companies, hence the hypotheses formulated for this empirical have been presented following the first model of the conceptual framework. This chapter ends with all the results and analyses of the first empirical study.

Chapter 6 is dedicated to the second empirical model, which is the impact of the female leaders on FTSE 350 companies' financial performance. The hypotheses and conceptual framework for this model are presented in this chapter, followed by the presentation of the results and the discussion related to the second empirical model.

Chapter 7 presents the third empirical model, which is the impact of female leaders on FTSE 350 companies' intellectual capital. Similar to the previous chapter, the hypotheses and the conceptual framework related to this model are discussed here, followed by the results and discussion.

Chapter 8 is the summary of results which paints a picture of the whole study followed by a discussion of directions for further research.
The following diagram will demonstrate the structure and overview of the thesis.

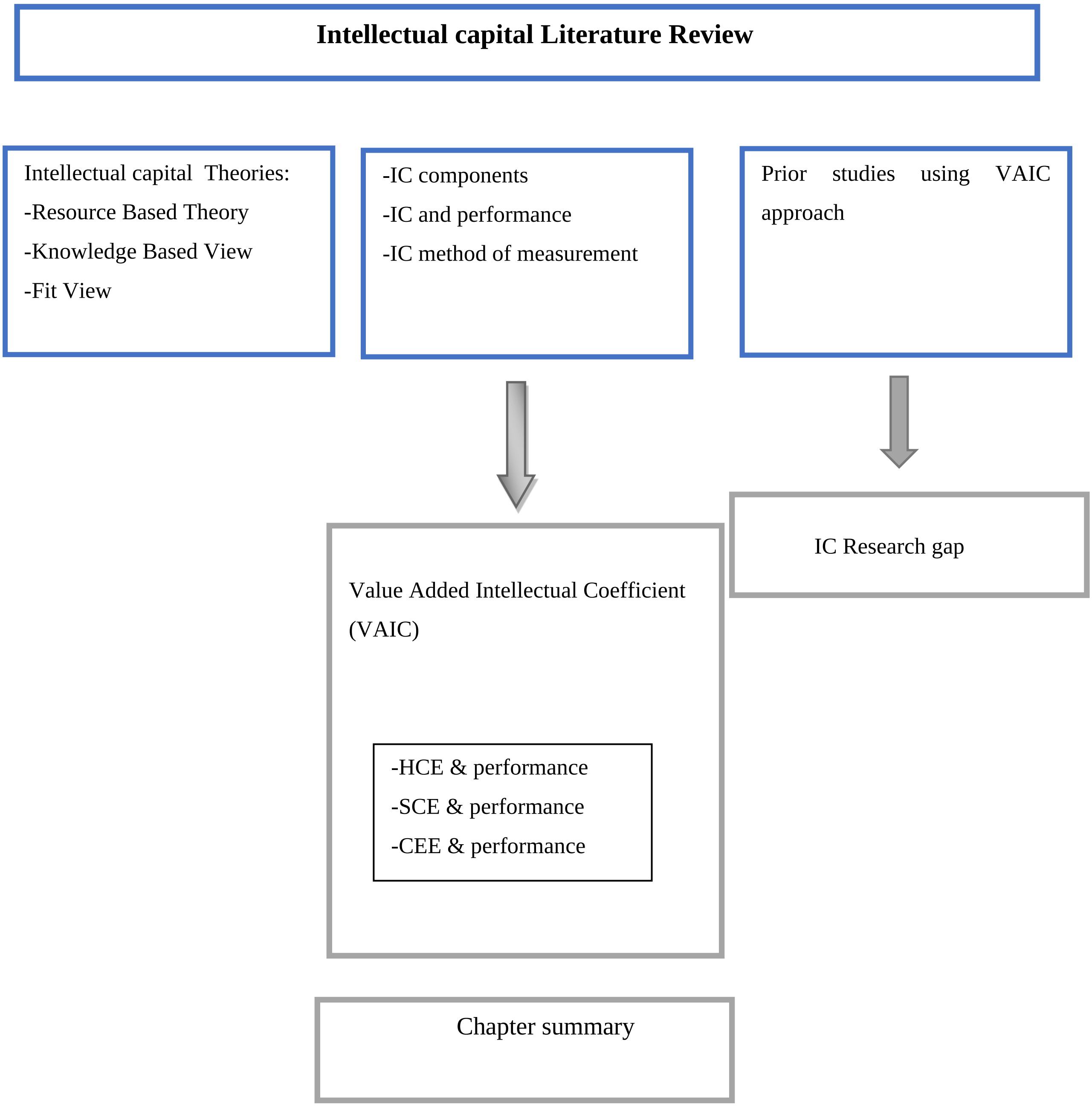
Structure and Overview of the Thesis



2 Chapter 2 Literature Review: Intellectual Capital

2.1 Introduction

Intellectual capital (IC), in the era of knowledge-based economy, is seen as a vital strategic resource that enables firms to initiate and maintain their competitive advantage in a dynamic business setting. Extensive investments have been made in IC improvement and continuation, as more organisations find that IC is very important (Roos et al., 2007). Having said that, scholars equally hold dissimilar opinions. This is a consequence of the fact that, while considerable experimental and theoretical works have deliberated on the influences of IC on performance, no consensus has been found yet on how the elements of IC are linked with firm performance. All elements of IC, such as relational capital, structural capital and human capital, have been revealed in some experimental research to serve as help in improving the performance of a firm (Wang et al., 2016), whereas it is debated by the rest that only a fraction of IC elements are positively linked with firm performance (Ling, 2013). Therefore, this chapter has been designed to provide more insights into IC literature by reviewing the previous research and theories regarding the impact of IC on firm performance. IC components and definitions from different points of view will be discussed. Also, the impact of IC components based on the Value-Added Intellectual Coefficient (VAIC) method, which has been selected for this study, will also be presented as a research gap. Finally, a chapter summary will be presented. The structure of this chapter is presented in the following diagram.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2.2 Intellectual Capital

There is no universally accepted definition of IC. Regardless, numerous definitions of IC have been recommended. These definitions have core notions, such as that IC is based on knowledge captured in an identifiable and functional form in firms.

It was stated by Stewart and Ruckdeschel (1998) that every business depends progressively on old-fashioned experience and knowledge. To sum up, this knowledge is IC, and it can be classified as all the things in the firm that are known by everyone to be capable of giving the firm a competitive advantage in the market. IC was depicted by Sveiby (1997) as the experience, knowledge, knowledge resources and employee intellect accumulated in an organisation's database system, culture, processes and philosophy. According to Hall (1992), "intangible assets are value drivers that transform productive resources into value-added assets."

The bottom line of these definitions is that IC has a value-creating ability. Various potentials of IC have been highlighted in the literature. The potentials of IC found in the literature that are most commonly referred to are profit generation, value creation and knowledge for a competitive edge. The next section addresses them in more detail.

Hudson (1993) posited that "intellectual capital is the combination of genetic inheritance, education, experience and attitudes about life and business," while IC was viewed by Klein and Prusak (1994) as packaged useful knowledge. It was similarly stated by Guthrie and Petty (2000) that knowledge management is about the supervision of the intellectual capital controlled by a firm. De Pablos (2003) likewise posited that "Knowledge-based resources that contribute to the sustained competitive advantage of the firm form intellectual capital". Therefore, IC is "the possession of knowledge and experience, professional knowledge and skills, good relationships, and technological capacities, which when applied will give organisations competitive advantage" (CIMA, 2001).

Moreover, the last two decades have seen several authors who have been prominent in influencing the perceptions of core competence. It is under debate by them whether the foundation for offering unique services and products to customers and devising a business strategy is a core competence. Core competence is frequently recognised in the form of intellectual capital or other intangible assets, which include brand name, culture or marketing knowledge as opposed to tangible assets like equipment and plant. Due to the works of prominent social thinkers like Handy (1989), companies have begun to acknowledge their employees as their most important assets. The ultimate intangibles of a company, i.e., knowledge, skill, and information, are being managed and evaluated in remarkable ways by business pioneers. For instance, according to Riggins, 2019, there are 10 reasons for corporate collapse, namely ineffective board, poor communication, complexity, risk blindness, unhealthy company culture, technological disruption, not enough working capital, and an information glass ceiling. All these factors are considered part of the IC and core competence of a company. That is why it is important to manage IC effectively and efficiently. Intellectual capital is a unique type of human capital that is formalised, codified, influenced, and captured to yield a higher value asset.

Different meanings of IC (such as the sum of hidden assets that are not totally covered by the balance sheet, the knowledge that can modify and make crude materials more advantageous or the maximum amount of knowledge an organisation can make use of in the course of conducting business to acquire a competitive advantage) have been proposed and reviewed in the literature (Youndt et al., 2004). Adopted from the Knowledge-Based View (KBV), IC is theoretically interesting yet exceedingly difficult to conceptualise for identification purposes (Wang et al., 2014). Regardless of the differences in detailed definitions, there is agreement that, as a concrete and unique resource, IC greatly assists an organisation's value creation and extraction using the knowledge embedded in organisational staff, relationships and infrastructure. IC, for the purpose of this research, will be characterised as the complete measure of knowledge that will be influenced in order to obtain an organisation's sustainable competitive advantage (Wang et al., 2014).

Earlier research has offered several concepts for a greater understanding of IC and equally to make it more suitable for firm-level operation. It was argued by Edvinsson and Malone (1997) that IC is primarily made up of two elements, which are structural capital and human capital, which can further be broken into two subcategories – customer capital and organisational capital. IC was classified by Bontis (1998) into customer capital, structural capital and human capital. According to Wang et al. (2014), structural capital, relational capital and human capital are the three main components of IC that have been generally acknowledged.

Incorporated in employees, human capital represents the totality of the competence, skills, innovativeness, knowledge, commitment, wisdom, attitudes and know-how of the employees, which signify the organisation's individual knowledge stock to achieve certain objectives (Campbell et al., 2012). On the other hand, structural capital represents the indispensable intangible assets that the employees are not able to carry along with them when they leave work or exit the organisation. In addition, it could also imply the significant strategic assets of organisational culture, organisational capabilities, procedures, routines, patents, trademarks, copyrights, software, hardware, information systems, databases, company images and so on. Finally, relational capital has to do with the learning capabilities and knowledge that exist in associations involving an organisation and its external stakeholders. This is important for organisations, considering how it assists in building value in organisations by linking external stakeholders to internal intellectual resources (Kong and Farrell, 2010).

The characteristics of business relationships such as communication, trust, relationship-specific investments, relational norms, opportunistic behaviour or commitment have been widely discussed by earlier researchers. Configurations, however, refer to the interaction between the various characteristics of business relationships and, thus, provide an encompassing outlook in agreement with Gestalt theory. Therefore, the major issue for a configurational outlook is not the existence of individual features of business relationships, nor their extent of development (for instance, the degree of trust between partners in a business relationship), but instead, the interaction between various business relationships features in order to create a collection of conditions (Zaefarian et al., 2017).

Furthermore, as Tse and Rodgers (2014) state, the behavioural, cultural and institutional influence on capital structure means that the capital structure can be affected by behavioural factors. As Bertrand and Schoar (2003) mention, CEOs who possess aggressive financial behaviour will utilise higher leverage than their conservative peers. Likewise, some other behaviour, such as optimism and bias in managers can cause a problem in the case of borrowing money or following a standard pecking order (Hackbarth, 2008). The following section presents theories to support how intellectual capital would affect firm performance.

2.2.1 Resource-Based Theory

The resource-based theory of the firm (Douma & Schreuder, 1998) propounded at the end of the 20th century is considered significant in the literature. It argues for competitiveness theory besides resource-based theory and the theory of dynamic capabilities and knowledge-based theory. The focal point of these theories is the internal determinants of a firm's economic performance. In other words, the resource-based theory emphasises that the success of a firm commences with the success of an adequate selection of resources and their combinations.

However, as the theory of dynamic capabilities states, not only is the efficient usage of resources a necessity for the firm's success, but also that certain capabilities in production, procurement, sales, research and development, and so forth are required. Therefore, the capacity to use resources through an information-based and firm-specific organisational process is a firm's capability that can be developed through complex interactions between the firm's resources. Teece et al. (1997) define dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments". Thus, dynamic capabilities present a firm's capacity to achieve distinctive and innovative forms of competitive advantage considering market positions and path dependencies (Radjenović and Krstić, 2017).

According to Leonard-Barton (1992), competitive advantage has been created by distinguishing knowledge within the company, which is based on the knowledge-based view which classifies the knowledge set into four dimensions: knowledge and skills of employees, technical systems, managerial systems and values and norms associated with the various types of embodied and embedded knowledge (Leonard-Barton, 1992).

In order to add value to the organisations, they must create new organisational knowledge embodied in the skills and competencies of the employees. Therefore, successful firms are constantly creating new knowledge and transferring it through an organisation that is helping in the learning process of imitation and future production quantity, as well as product and process innovations. On that account, the role of intellectual capital and understanding its characteristics in creating competitive advantage is extremely crucial (Zott, 2003).

For achieving superior competitive advantage, IC is one of the principles that a company must create, which depend on long-lasting capability and capacity to utilise its resources. Knowledge barriers like intellectual property rights, to a greater extent, protect companies from their valuable resources being imitated. Knowledge-based resources are in the form of specific skills, such as technical, creative, coordinative and collaborative skills, which are developed in individuals. These skills can be transferred and shared at the company level and be utilised as knowledge-based resources which have, primarily, been created by a company's human capital (Radjenović and Krstić, 2017).

As a matter of fact, by investing in IC, the knowledge of the firm is increasing, the technology is improving, and the firm can improve its products/services and relationships with key stakeholders. This achievement creates value for the company through a combination of tangible and intangible resources. In the contemporary economy, a company should recognise the potential in the market and find a way to use intangible resources to achieve success and survival in the market. The foundation of developed economies lies in their competitiveness on knowledge, information, commercial innovations and intellectual capital strategies, rather than physical resources and low-cost labour.

Furthermore, intellectual capital (knowledge, competencies, etc.) supports organisational culture, efficient business structural processes and a better working atmosphere. Intellectual resources, especially intellectual property, are able to protect income from erosion owing to eventual misuse from other enterprises. A portfolio of intellectual property can be a tool for managing business negotiations during sales, joint ventures, mergers and so forth. Consequently, it would affect future revenues. Intellectual resources contribute to revenue increases and cost reductions, thus leading to the increase of income and indirectly to the efficiency and profitability of an enterprise (Radjenović and Krstić, 2017).

2.2.2 Knowledge Based View and Intellectual capital

Under the discipline of Knowledge Management (KM), which fixates mostly on depicting, dispensing and successfully making use of knowledge, strategy can be considered as the general parameter to garner and influence knowledge for various business aims (Inkinen. 2016). Knowledge-Based View (KBV) sees knowledge as the major source of competitive advantage. Consequently, the channels by which firms access and make use of their knowledge for creating value becomes a tool for advancing performance. An appropriate KM strategy creates a common insight concerning the location of a firm's knowledge, the means to articulate knowledge capabilities in creating value and also the means for the integration of activities for effective strategy implementation; thus, an appropriate KM is critical to the success of a firm (Oluikpe, 2012).

The term "knowledge" in the definition of both IC and KM strategy may lead to confusing one with the other; they are not the same, despite the fact that they are actually related. KM strategy functions as a channel to knowledge instead of knowledge itself (Ling, 2013). KM strategy, in other words, is the process, whereas the knowledge infrastructure is IC. IC highlights the valuation of knowledge storage in a firm that is fundamentally dissimilar to the guidelines around acquiring and using knowledge, which is the target of KM strategy. Instead of being treated as the same, they should be regarded as two opposite sides of one coin. IC and KM strategies, as suggested by scholars, are closely linked with one another (Ling, 2013). An organisation, while in the course of implementing some specified KM strategy, should look to grow its IC portfolio to offer a synergy of adept and skilled employees, good relationships with stakeholders and efficient infrastructure. On the one hand, KM strategy can perform to a greater extent when it is fitted by its IC, while the implementation of KM strategy, on the other hand, will strengthen IC. Greater performance desired in the organisation will be brought about by the coordination and matching of KM strategy and IC. On the other hand, a mismatch or even contradiction between KM strategy and IC would cause organisations to suffer. As a consequence, KM strategy implementation or IC advancement would become inefficient, and the expected returns may not be assured (Wang et al., 2016).

With regard to globalisation and increased competition, customer satisfaction has been the focal point in ensuring survival and competitiveness (Afiouni, 2007). Successful companies also tend to manage “individual technocratic entrepreneurs” (i.e., those who are flexible in trying new processes/approaches or innovative solutions, taking risks, exploring new ideas, and developing new products and services) better than their competitors do (Kavida and Sivakoumar, 2010). Therefore, considering globalisation, intellectual capital has become a new solution to understand the competitive edge of business in knowledge-intensive and rapidly changing business environments. The role of knowledge management, however, is to provide access to sources of knowledge rather than to knowledge itself. In other words, intellectual capital management is conducting an organisation’s knowledge capabilities. Knowledge management, in contrast, is concerned with the ability of an organisation to transform knowledge into added value (Stahle and Hong, 2002). In a sense, knowledge management strategy is the process (the means), while intellectual capital is the output (the end). Intellectual capital management and knowledge management may thus be treated as two sides of the same coin, although they are not the same (Ling, 2013). Thus, most scholars agree that knowledge management provides structure to manage intellectual capital (Shih et al., 2010).

The value-creating potential of IC has been emphasised by different authors. Hall (1992), for example, posited that “intangible assets are value drivers that transform productive resources into value-added assets”. Brooking (1996) also categorised IC into infrastructure assets, human-oriented assets, intellectual property (IP) assets and market assets, such that when pooled together with other productive resources of an organisation, it would ultimately amount to an increase a firm’s productivity as well as value creation (Edvinsson and Malone, 1997).

The idea is that “intellectual capital is the collection of intangible resources and their flows where an intangible resource is any factor that contributes to the value-generating processes of the company (Bontis et al., 1999).

The view that “IC may properly be viewed as the holistic or meta-level capability of an enterprise to co-ordinate, orchestrate, and deploy its knowledge resources towards creating value in pursuit of its future vision” was propounded by Rastogi (2003).

The profit generation potential of intangibles has, on the other hand, been outlined by several researchers. IC was deemed to be the “knowledge-based equity of a company” by Brennan and Connell (2000), and as a result, “IC is knowledge that can be converted into profit.” Another line of reasoning states that IC assets or intangibles are non-physical claims which are subject to potential profits. For example, Lev (2001) utilised the terms: intellectual capital, intangibles, and knowledge assets to essentially refer to a similar thing: “a non-physical claim to future benefits.”

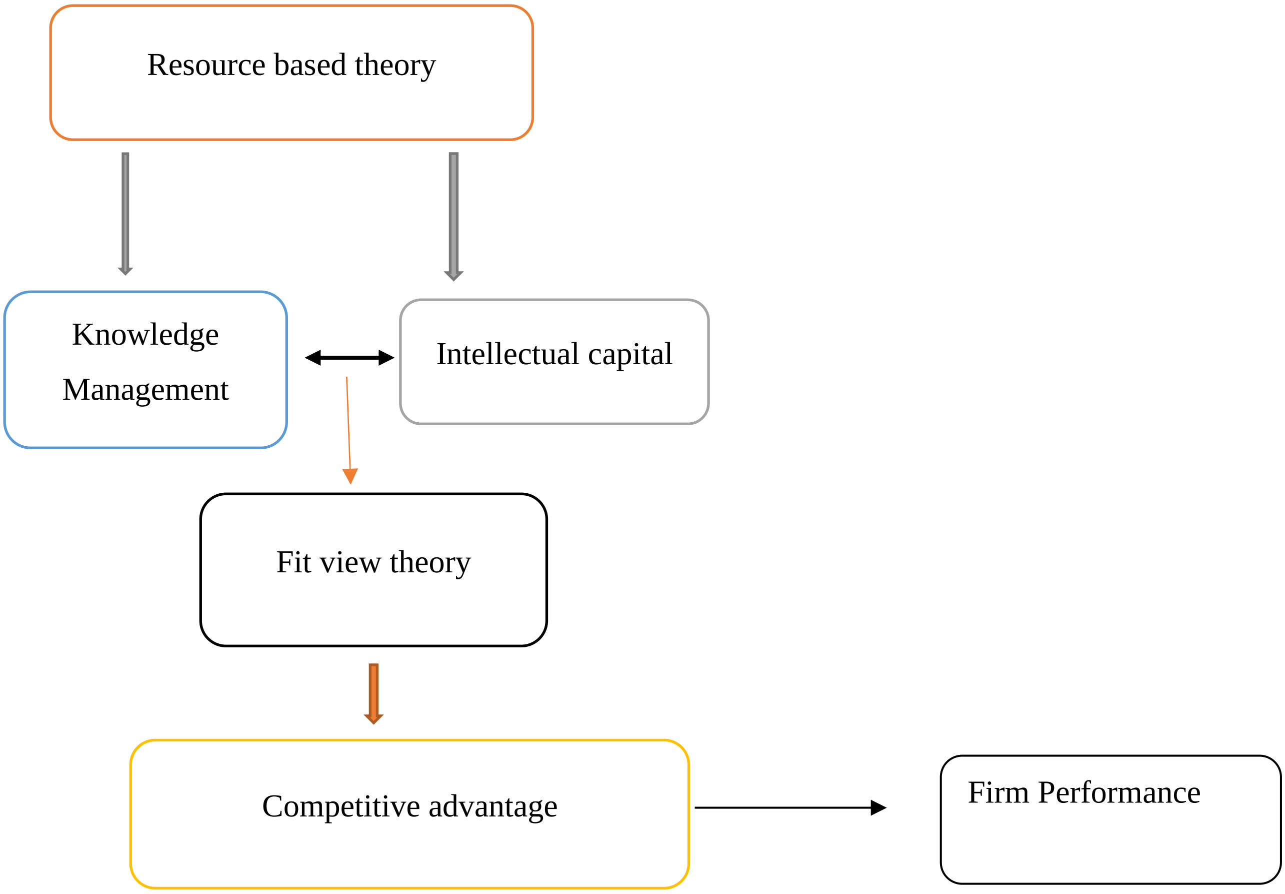
2.2.3 The Fit View Theory and intellectual capital

Following a good number of the fit studies in strategic management, assessment and conceptualisation of fit as profile deviation is done, which implies the extent of disparity when evaluating the structure of a focal variable with its "ideal" profile. Fit makes reference to the corresponding degree of numerous, co-dependent and mutually reinforcing elements of an organisation. Adopting a comprehensive outlook concerning relationships between multidimensional phenomena, an examination can be done using fit to determine whether performance improvement is acquired by the similarity between the benchmarks and a real situation (Zaefarian et al., 2013). Fit has been defined in earlier literature and measured in numerous ways, including moderation and co-variation (Olson et al., 2005), every one of which provides a statistical method for testing.

An "ideal" profile is explicitly a set of organisational features that suit other(s) most and, therefore, leads to better results (Chen and Huang, 2012). Such a standpoint enables us to define an "ideal" IC profile that fits KM strategy as a set of elements of IC that are organised in such a way as to promote the execution of a specified KM strategy and thus result in a great performance. An evaluation of the extent to which a firm’s IC profile differs from that of the “ideal” one, which gives an indication of the fit of IC and KM strategy. Fit can further be established for the firm’s IC and certain KM strategies based on how little variation there is between a firm’s IC profile and the “ideal” profile. Based on such a fit evaluation, the difference between the “ideal” and “actual” profile of IC can be acknowledged, and therefore an assessment of its effect on performance can be carried out (Chen and Huang, 2012).

"Ideal" profiles based on theory require thorough and adequate research to deduce the score of dimensions of the variable of interest. Nonetheless, in KM and IC strategy literature, the theories that are already in place are not resilient enough to assess the fit involving KM and IC strategy by assembling such an "ideal" IC profile. An “ideal” profile can be created either empirically or theoretically (Vorhies and Morgan, 2003); an alternative option that involves evaluating the empirically derived “ideal” profile with the fit was engaged. The present research shows how the "ideal" IC profiles of every KM strategy type were standardised in line with a sample of the best performers (Vorhies and Morgan, 2003). The following diagram presents the relationships between the mentioned theories and IC.

Figure 1: Schematic relationships between the theories and IC.



Source: Author

The above diagram demonstrates the relationships between the after-mentioned theories and competitive advantage, which lead to firm performance. In essence, the resource-based theory emphasises that the success of a firm commences with the success of an adequate selection of resources and their combinations. In order to create a competitive advantage that adds value to the organisations and affect performance, they must create new organisational knowledge embodied in the skills and competencies of the employees, Since Knowledge-Based View sees knowledge as the major source of competitive advantage, successful firms are constantly creating new knowledge and transferring it through an organisation, which helps in the learning process of imitation and future production quantity, as well as product and process innovations. This explains the role of intellectual capital (knowledge, competencies etc.) in company success, which supports organisational culture, efficient business structural processes and a better working atmosphere. (Radjenović and Krstić, 2017). In fact, IC highlights the valuation of knowledge storage in a firm that is fundamentally dissimilar from the guidelines around acquiring and using knowledge, which is the target of KM strategy. The fit view would help the organisation to select the right assets (i.e., “ideal fit”) for enhancing performance. An "ideal" profile is explicitly a set of organisational features that suit other(s) most and, therefore, leads to better results (Chen and Huang, 2012). Such a standpoint enables us to define an "ideal" IC profile that fits KM strategy as a set of elements of IC that are organised in such a way as to promote the execution of a specified KM strategy, resulting in a great performance.

2.3 Intellectual Capital Components

It has been established by a good number of researchers that IC was not a one-dimensional construct but existed at different levels (internal-, external-organisation and individual). Structural IC, for example, is hidden inside the company (at the organisational level), while human IC can be regarded as the people an organisation employed (at an individual level).

Some instances of human capital, such as decision-making capabilities, problem-solving skills, know-how as well as learning and structural capital, i.e., trade secrets, licenses, patents, trademarks and copyrights, were recommended by Robinson and Kleiner (1996). They additionally stated that firms that possess more of these skills and make use of them for value creation would be regarded in the marketplace as high-value firms.

Intellectual Capital:

- Human: decision making, know-how, learning and problem solving (Robinson and Kleiner, 1996).
- Structural: licence, patent, trade secrets and trademark copyright.

The viewpoint above was supported by Roos et al. (1997), who grouped IC into thinking (human capital) and non-thinking (structural capital) parts. The equating of IC to knowledge, a view propounded by Robinson and Kleiner (1996), was also supported by Sullivan (2000). In addition, Sullivan (2000) suggested that IC contained basically "knowledge, lore, ideas and innovations and subdivided IC into human capital and intellectual assets, where human capital refers to people and their knowledge, know-how is not directly commercialisable and intellectual assets (new ideas and innovations) can be transformed into commercialisable assets, in which firms have rights of ownership. Therefore, from Sullivan's point of view, "it is to the advantage of the firms to transform the new knowledge and know-how of their human capital into commercialisable assets such as tangible goods or services and supporting intellectual assets (administration and infrastructure)" (Sullivan, 2000).

IC was equally portrayed by the Organisation for Economic Co-operation and Development as the economic value of two categories of an organisation's intangible assets:

- Human capital
- Organisational (Structural) capital

IC was defined by Edvinsson and Malone (1997) as being made up of two main components: structural IC (e.g., the empowerment, embodiment, and supportive infrastructure of human IC) and human IC (e.g., on the basis of employees who leave the organisation at the end of a working day). They then defined IC as the possession of knowledge, organisational technologies, applied experiences, customer relationships and professional skills that provide a competitive advantage in the market as well as an insight into future earning capabilities. Structural IC is further broken down into organisational IC and customer IC as a result of its diverse components. IC is further categorised into process IC and innovation IC, such as a firm's relationships with its customers and suppliers (Dumay and Garanina, 2013).

Individual definitions of all three main components of IC are as follows: (1) relational capital, which encompasses all resources linked to the firm's external relationships; (2) human capital, which employees take along with them when they exit the firm; and (3) structural capital, which stays within the firm at the close of work. These three main components of IC can be influenced to create value and a competitive edge for stakeholders. In the same vein, although the terms used for the description of IC vary sometimes, they still essentially refer to the knowledge embedded in customers and other relationships external to the organisation (relational capital), the knowledge embedded in people (human capital) and the knowledge embedded in the organisation and its systems (structural capital) (Guthrie et al., 2012).

Synthesising the discussion above, there is a general agreement that structural IC, human IC and relational IC are all contained within IC (Sveiby, 1997; De Pablos, 2003). These three forms of IC work hand in hand. Therefore, a summary definition of IC in three categories is as follows:

• Human capital: comprising the skills, knowledge, abilities and experiences of people. It is basically the knowledge that employees take with them when they exit the firm. Some of this knowledge may be common, while some may be unique to the individual.

• Structural capital: consisting of the organisational procedures, routines, systems, databases and cultures etc. It is the knowledge that remains with the firm at the end of the working day. Some of the knowledge may be protected legally and may become intellectual property rights, or legally in possession of the firm under a separate title.

• Relational capital: consisting of that part of structural and human capital, involving the relationship of the company with stakeholders such as investors, creditors, customers, suppliers and so on and so forth, including the perceptions that they hold about the company. It also refers to all the resources that are connected to the firm's external relationships, including with R&D partners, customers or suppliers (Dumay and Garanina, 2013).

2.4 Intellectual Capital and Performance

In line with Kalbers and Fogarty (1993), performance measurement is a "mystery…complex, According to Kalbers and Fogarty (1993), performance measurement is a "mystery…complex, frustrating, difficult, challenging, important, abused and misused". Nevertheless, the measurement of performance functions as tangible evidence is useful in evaluating a firm's capability in strategy execution, as well as conducting an experimental test of its strategy (Choi et al., 2013). Furthermore, it is essential for any firm to evaluate the performance of all its critical success factors to pinpoint its market position and to equally discover its competitive resource base. An industrial modification, from being capital-intensive to knowledge-based, with an increase in intangible resources, has been observed by markets around the world. There is a need for novel techniques for the evaluation of the value of intangibles as well as the effect they have on the performance of a firm (Chen et al., 2014), This happens as a result of the

failure of traditional performance measures to monitor and evaluate various performance dimensions because they almost solely focus on the organisation's financial aspects alone.
While the business of past traditional firms (of the last two centuries) was centred on physical capital, firms of the present age are knowledge-based. Manual work, money and land have become knowledge (Pulic, 2004). The reason why there is a deduction of costs from income (for earnings to be gauged) is that the traditional mindset still sells high while it buys low. Business has been defined by the modern mindset as the organisation that creates wealth and adds value through knowledge (Drucker, 1995). In addition, Pulic (2000) opined that knowledge is deeply embedded in the employees who exchange it for less or more value based on their capabilities. Modern tools for measurement are, thus, required in order to manage that value creation. A continuously growing measurement dilemma was put forward by Drucker (1992):

> …a traditional measure is not adequate for business evaluation. A primary reason why traditional measures fail to meet new business needs is that most measures are lagging indicators. The emphasis of accounting measures has been on historical statements of financial performance. They are the result of management performance, not the cause of it.

Non-financial indicators are important for characterising the potential financial performance of an organisation in a setting where there is a never-ending change in technology and shortened assets are in great demand (Amaratunga et al., 2001). There is a failure of traditional financial measures in the evaluation of the performance of such firms with high intangible resources. As a result, there is a necessity for novel techniques so as to measure the effect and value of the intangibles in the performance of a firm.

Scholars have attempted to provide evaluation methods for intellectual capital, and each model has merits and demerits depending on the valuation objectives. Thus, researchers from various other fields have been contributing to developing intellectual capital valuation, such as the valuation community, the human resource accounting community, the intellectual capital community, the performance measurement community, as well as the accounting community.

Intellectual capital guarantees long-term sustainable competitive advantage. To estimate the value of individual intangible assets, it is important to calculate a market, a cost or an income approach (Sudarsanam et al., 2005). To calculate intellectual capital, two major methods are used: first, the internal management approach is used to measure its internal efficiency. This approach is used to enhance the strategic decision-making process. The second approach is the external reporting approach, which is used to provide an extra understanding of investing in intangibles and how to report the financial value of intangibles, which would increase transparency (Sydler et al., 2014).

A two-dimensional matrix was introduced by Sveiby (2010) to explain intellectual capital according to the component or organisational level. He then distinguished between monetary non-monetary valuation. Non-monetary valuation is divided into three sub-group methods (Andriessen, 2004). The first method is value measurement, which includes values used as criteria for determining the non-monetary value of intangible resources. The second method is the value assessment method, which contains values as a standard but does not depend on measurement to figure out values and cannot be directly transferred to observable phenomena. Rather, this method relies on the evaluator's personal judgment. The third one is the measurement method, which does not include any values as criteria for determining values. The demerit of using these non-monetary models is that they are qualitative in nature, and it is hard to use them in benchmarking as a result of their limited information value, transparency, and objectivity. This information is often company-specific, subjective, and somehow hard to acquire individually. There are no compulsory guidelines for companies on whether and how all the information about intellectual capital should be released (Ramanauskaitė and Rudžionienė, 2013).

According to Sveiby (2010), IC valuation should be categorised into two methods, namely monetary and non-monetary methods. In monetary methods, organisations would choose one of the following methods: market capitalisation methods including market to book value and Tobin's Q, return on asset method including economic value method, calculated intangible value, value-added intellectual coefficient, intangible driven earning and direct intellectual capital method. However, the non-monetary methods can make use of more subjective methods such as balanced scorecards, value chain scorecards, Skandia navigator, IC index or a benchmarking system, all of which would be suitable for small corporations rather than large organisations (Sveiby, 2010).

When it comes to the monetary side, there is the Direct Intellectual Capital (DIC) method that evaluates the monetary value of intangible assets through the identification of its components. The demerits of these models are that they capture only a few aspects of intellectual capital and are usually difficult to calculate. The monetary valuation models, which are based on the Market Capitalisation Method (MCM) and return of assets (ROA) are useful for demonstrating the monetary value of intangible assets and for comparing companies in the same industry. The models are very simple to understand, given that they are based on long-established accounting rules. Nonetheless, it can be misleading to translate everything into monetary terms. Furthermore, measurement methods based only on the level of the organisation are of limited use to the management (Sveiby, 2010). To conclude, various models for intellectual capital can be used depending on the research discipline. These models all have various disadvantages and advantages or need to develop a new approach (Sydler et al., 2014).

Obviously, it is challenging to develop a valuation model that reflects the real value of intellectual capital. However, the monetary valuation of intellectual capital seems the most reliable and transparent approach for this research so as to allow comparisons between companies. These methods would make collecting publicly available data on financial statements possible and will increase the reliability of the study and provide the opportunity to test the hypotheses. In summary, labour costs for human capital, advertising expenditure for customer capital and R&D expenditure for structural capital can be used to calculate a firm's intellectual capital (Ballester et al., 2002).

2.5 Intellectual capital methods of measurement

There are several methods of measuring IC that have been recognised in the literature (Andriessen, 2004; Sveiby, 2010). However, no general measurement method exists. A summary of 42 methods for the measurement of intangibles was listed by Sveiby (2010). They include the technology broker (Brooking, 1996), the Economic Value Added (EVA) (Stewart and Ruckdeschel, 1998), the VAIC (Pulic, 2000, 2004), the intellectual capital index (Roos et al., 1997), the Skandia navigator (Edvinsson and Malone, 1997), the intangible asset monitor (Sveiby, 1997), and the balanced scorecard (Norton and Kaplan, 1996).

VAIC methodology, however, was not included in these classifications. This approach was added into the already existing classification and rearranged by Chan (2009):

- market Capitalisation approach (MCM).
- direct IC Measurement approach (DIC).
- scorecard approach (SC).
- economic value added (EVA) approach; and

- VAIC methodology (the Austrian approach).

Although each method will be explained and justified in the intellectual capital empirical study (Chapter 5), here VAIC methodology and its components will be explained which has been selected for this study.

2.5.1 Value Added Intellectual Coefficient (VAIC)

Many studies have suggested that the VAIC or the Austrian approach may be a potential mechanism for IC measurement. According to Pulic (2000), the approach was devised by the Austrian Intellectual Capital Research Centre (AICRS). The Greek banking sector and the Austrian banking sector, including listed companies in the UK, have all used the VAIC (Pulic, 2004; Mavridis and Kyrmizoglou, 2005). A somewhat quantitative and simple approach based on the accounting data of a company is offered by the VAIC for IC measurement and its components. The available literature on this also shows that the VAIC has been used recently in Asia, including Malaysia, Japan, Singapore and Taiwan, to study corporate financial performance and IC (Shiu, 2006).

Corporate intellectual ability is an essential concept in the VAIC methodology. This refers to the efficiency of total value creation as a result of IC and physical capital working jointly in a business environment (Pulic, 2004). It is assumed that IC cannot operate on its own without the help of physical and financial capital. The VAIC measures corporate intellectual ability, which indicates the overall efficiency or ability of an organisation to use every resource of IC and physical capital to create value for the organisation. If more value is achieved with a similar amount of company resources, it is an indication of a higher VAIC (Pulic, 2004) and would deal with the efficiency of the total value creation of a company as a result of two key resources:

(i) Capital employed: comprising physical assets and financial capital; and

(ii) Intellectual capital: comprising structural IC and human IC.

Explicit economic values, capital employed (CE), and value added (VA) are assigned by the VAIC model to structural capital (SC) and human capital (HC). On this basis, an unambiguous VAIC index is generated. The VAIC or corporate intellectual ability is defined as:

$$VAIC = HCE + SCE + CEE$$

Where,

VAIC = Value added intellectual capital efficiency

HCE = Human capital efficiency,

SCE = Structural capital efficiency, and

CEE = Capital employed efficiency

The efficiency of the total value creation in a firm is measured and monitored by the VAIC model. More clearly, the VAIC is an indication of the overall efficiency of value creation from the entire resources used, and this shows that the efficiency of value created by the IC is utilised. Hence, the VAIC is a relational index that compares produced added value to human capital and capital employed (i.e., employee expenses). If structural capital is negative or zero, the values of the VAIC may be zero or negative. Practically, it is the sum of the ratios of value added to human capital and capital employed (known as employee expenses) (Ståhle et al., 2011).

Supporting the utilisation of the VAIC in the current study has to do with the objective of focusing on IC management practice, namely the reporting and measurement of IC. This implies that the industry and management may easily use the chosen method, and that the indicators and results derived may also gain the respect of fellow industry professionals and IC practitioners. Undoubtedly, the ability to verify the data collected for the compilation of the indicators and measurements is probably going to get much attention due to the derivation on which the methodology is based and the general acceptability of the conceptual model. For instance, all the data required to calculate the VAIC may be found in the audited financial reports of a company. This improves the objectivity of the calculation because it can be easily verified. The reason for using the VAIC methodology in the current study is summarised below (Chen et al., 2005).

2.5.2 HCE and Performance

According to Colombo and Grilli (2005), organisations that have greater human IC (i.e., skill or higher education) most likely have somewhat better entrepreneurial judgment. They believed that the continuous development of human IC would help the staff do their job well and, essentially, boost the performance of the organisation (Hsu, 2007).

Tseng et al. (2014) contend that it is important to be regularly training employees, which is an investment in organisational capital. Needless to say, organisations can increase their human capital by fully training their current employees. The focus of the training activities is to develop skills and personal knowledge. This will not only increase workers' human capital but will also increase the social capital of workers by leading them to cultivate relationships with their fellow workers and share knowledge among themselves (Hoang Thanh et al., 2018).

As staff accumulate know-how, specialised information and skill, human IC increases, which allows for effective and efficient communication, enhances performance, and helps to reduce errors when it comes to decision-making (Luthans and Youssef, 2004). This inference is also supported in other studies. For example, theorists of human capital (Becker, 1964) opined that an increase in the knowledge, skills and abilities of a worker usually results in increased organisational performance. Similarly, Dakhli and De Clercq (2004) suggested that the profitability of a firm is influenced by its stock of human IC.

2.5.3 SCE and Performance

Structural IC provides an enabling environment for a firm to create knowledge and maximise the knowledge. A firm usually has a supportive culture if they have a strong structural IC, which motivates employees to learn new things (Florin et al., 2003). Youndt et al. (2004) suggested that the processes of an organisation's operation and its commitment to sufficient resources impacted performance significantly. They found that structural IC is typically associated with Tobin's Q and financial returns. Also, Hsu and Wang (2012) opined that structural IC, i.e., procedures, operations and knowledge management processes, drive the value of organisations' creation activities, which positively impact their performance. This means that firms need technologies that are more advanced in order to compete in today's fast-paced economy. So, in order to achieve the required level of performance, greater care is needed to successfully manage structural IC. In addition, investing in structural IC can positively impact corporate performance (Hoang Thanh et al., 2018).

Scholars have proposed three social capital theoretical perspectives, which are network, functional and multidimensional perspectives. As a functional resource, social capital improves how individuals in an organisation collaborate. From the network perspective, social capital is seen as a resource integrated into social networks in which organisations or individuals are members (Bourdieu, 2011). When the network of a member is expanded, and there is trust, the members can willingly share intellectual resources, which, in turn, motivates sharing of knowledge. The multidimensional perspective, which is the last perspective, is developed when the network and functional perspectives are synthesised. Thus, this perspective forms the concept of social capital as a resource, both as an essential part of a network and as a resource that facilitates action among network members who are available for productive purposes. Generally, social capital goes beyond the stock of relationships, interpersonal trust, context and norms that tolerate specific behaviours and lasting relationships between people, as well as ensure conditions for knowledge exchange and organisational development (Zack et al., 2009).

According to Murthy and Mouritsen (2011), there might be trade-offs between the elements of IC, suggesting that numerous forms of intellectual capital might not be productive. As a result, not all industries profit from investing in the elements of IC (Youndt et al., 2004).

Additionally, investing in Research and Development (R&D), which is a type of investment in organisational capital, is important in creating new products, services and knowledge. Investment in R&D increases the chances and avenues for members of an organisation to figure out and use technology in products and services (Zack et al., 2009). Members' understanding of new knowledge and technologies is also improved. This means that if more investments are made in R&D, more individuals will be encouraged to enhance their knowledge and expertise, which helps to build up human capital (Hoang Thanh et al., 2018).

For instance, some scholars used many regression models to investigate the relationships between information technology (IT) capital and innovation capital (i.e., structural IC) and the performance of a firm. Their report showed that investing in structural IC positively affects performance. According to Cao and Wang (2015), major ICT firms are able to develop a less hierarchical organisational capital because they are small- and medium-sized, and this allows them to independently make decisions, allowing the absorption of new knowledge and increased innovation (Cao and Wang, 2015).

2.5.4 CEE and Performance

Seetharaman and Saravanan (2002) argued that there are currently four schools of thought for the valuation of IC (share, cost, market orientation and cash flow), although there are only two groups in existence (Mavridis and Kyrmizoglou, 2003). While one group asks for expenses or costs (process-oriented), the other asks for investment returns or profit and its drivers (value-oriented). As a result, the key research approaches for measuring IC follow these two key orientations as well. The group of researchers that deal with cost tries to find out what the intellectual essence is through the difference between market and book value (cost accounting).

To measure intangibles, the market-to-book value ratio is used as a "yardstick" because it is effective (Mavridis, 2004).

From the empirical evidence, it is clear that there is a positive relationship between corporate performance and CEE. For example, a significantly positive relationship between CEE and value added was found by Mavridis (2004). Likewise, Kamath (2007) found that Indian public sector banks were really performing well in terms of CEE in comparison to their foreign counterparts. In a further study of the Hong Kong Stock Exchange, Chu et al. (2011) found that the structural capital improved corporate profitability; however, CEE still significantly determined the financial performance.

2.6 Prior IC Studies using VAIC Method

A seminal work for this methodology was conducted in Europe by Pulic (2000), who is the pioneer and inventor. Using the VAIC to measure a company's overall intellectual ability, the author studied the IC efficiency of banks in Croatia from 1996-2000 (Pulic, 2002). The author suggested that the surveyed banks showed varying degrees of IC efficiency and total value creation from the measurement done by the VAIC. This study may be seen as an attempt to use the methodology as a benchmarking tool for banks in the region. At the national level, a similar study was also carried out to investigate the economy of Croatia, where 400 companies in Croatia were analysed by industry, sector, the number of employees, and the region of the country (Pulic, 2002). However, this study makes immediate reference to the empirical work done by Pubic on the Vienna and London Stock Exchanges. The relationship between the market value of 30 randomly chosen companies on the London FTSE 250 and the VAIC, from 1992 to 1998, was tested by Pulic (2000). In addition, from 1994 to 1997, an examination of 70 companies listed on the Vienna Stock Exchange was done in a separate study. These studies found a very close relationship between the market value of companies and the VAIC.

Problematic data and outliers (companies whose book value of equity is negative or have negative operating profit) were removed from the sample in order to be consistent with earlier studies (Shiu, 2006; Firer and Williams, 2003; Zéghal and Maaloul, 2010; Chan, 2009).

Contrary to these earlier studies, Williams (2000) used VAIC to examine the intellectual capital disclosure practices of 30 companies listed on the London FTSE 100. Several later VAIC studies widely quote and reference this research, especially the regression technique used with VAIC as the independent variable. Furthermore, the author's choice of control variables such as the gearing of the companies (firm leverage) and the size of the companies (firm size) during the investigation serves as a good reference for other studies. In Finland, between 2001 and 2003, no less than 60,000 sample companies representing 11 key industries were studied using the VAIC methodology (Kujansivu and Lönnqvist, 2005). The study conducted in Finland provided empirical evidence that IC efficiency contributed to the factors that affect the profitability and productivity of these companies. So far, the relationship between the performance of a company and IC have been reported in European companies in regions that are somewhat well-developed.

Analysing the data gathered in 2001 from 75 sample publicly traded companies listed on the Johannesburg Stock Exchange, South Africa, there was no conclusive evidence of a relationship between VAIC and traditional corporate financial performance in the study done by Firer and Williams (2003), as measured by productivity, profitability, and market valuation.

Contrary to the studies conducted in Europe, the study done in South Africa revealed that there was an increased local market valuation with an increase in physical capital rather than intellectual capital. The South African study showed that companies in South Africa do not rely heavily on IC as a performance driver when compared with developed countries, as is evident in the earlier European studies. One explanation for this is that companies operating in South Africa may still rely on the processing and trading of natural resources as a major growth driver. This is a country working towards building the needed human capital required for growth and prosperity after going through apartheid, which is an important part of intellectual capital. This implies that IC may play a more important role in firms that depend on technology and knowledge than in those that focus on physical capital investment (Chan et al., 2009).

Shiu (2006) carried out a cross-sectional study in Taiwan in 2003, involving 80 Taiwan-listed technology companies. The study showed that there is a notable positive relationship between profitability and VAIC, in addition to market valuation, but a negative relationship with productivity. A higher degree of explanatory power in the regression models among the surveyed companies in Taiwan was also recorded by the author when compared with the two earlier studies (Firer and Williams, 2003; Williams, 2001). It looks like this difference in explanatory power may indicate how highly placed IC is in technology companies since the Taiwan study samples were concentrated inside high-tech companies, whereas the two earlier studies chose samples across industries. In addition, Chen et al. (2005) undertook a well-documented research project in Taiwan. The study gathered 4,254 observations that were analysed using regression from samples of companies listed in Taiwan between 1992 and 2002.

This study is critical because, first, the size of the sample was relatively large when compared to the Asian studies done earlier. Secondly, a stronger association between profitability and IC was uncovered by the results compared to several prior studies. In addition, the authors discovered that each component of VAIC, namely the efficiencies of physical capital, human capital, and structural capital, showed a greater degree of association than that of the grouped measure of the VAIC in forecasting the market value of the surveyed companies. The implication is that the explanatory power of the three components of VAIC was greater than VAIC as independent variables, when analysed individually in the two regression models. The authors were trying to explain why capital market investors might be focusing on different aspects of IC, such as its components (Chan, 2009).

Petty and Cuganesan (2005) studied voluntary intellectual capital disclosure (ICD) in Hong Kong, based on the longitudinal data gathered from companies on the Hong Kong Stock Exchange. There was a growing shift towards ICD among the companies surveyed, even though voluntary disclosure of this type was still at a low level. The study showed that some companies in Hong Kong were getting to know about IC than others. It also showed that there is a positive link between company share prices and voluntary disclosure. Lastly, the study showed that bigger companies in Hong Kong seemed better equipped and were more likely to adopt ICD. Particularly, bigger companies in Hong Kong seem to be focusing on IC and the possible benefits that may be derived from reporting IC (Chan, 2009).

Between 2004 and 2009 in Iran, empirical data were obtained from pharmaceutical companies in the Iranian Stock Exchange (ISE). In total, VAIC had a positive association with ATO and ROA just like SCVA (which is a reflection of the firm's productivity. It is the ratio of the total revenue to the firm's book value as made known in the respective firms' annual reports) but had a notable negative association with MB (a reflection of market valuation; it is the ratio of market capitalisation to the book value of the total assets of the firm for a particular year). The connection showed that physical capital is the most crucial factor in the pharmaceutical industry, having a notable correlation with the firms' profitability. Firms that have a higher capital employed efficiency would also make more profit than others. Firms that have a high level of efficiency in IC are well undervalued in the market, as indicated by the notable negative relationship between the MB and VAIC. In terms of productivity (ATO) and profitability (ROA), the financial performance is relatively low when it comes to industry standards. Also, the market valuation (MB) of these companies was shown to decrease over the same time interval (Mehralian et al., 2012).

The results of a study of 615 firms in the banking industry on the island of Java, Indonesia, indicate that the VACA variables greatly affect financial performance and value-added human capital (VAHU) variables, and value-added structural capital (STVA) variables also have a great effect on financial performance. All the test results yielded a modified R2, which showed that the variables of intellectual capital have a significant effect on financial performance from the perspective of probability value. In Indonesia, banks have been able to maximise and use intellectual capital to build up assets in order to create value for themselves in the rural banking sector. This means that the employees have not been deployed successfully and do not assume the position of stakeholders in the company. As a result, they are yet to fully use the intellectual capital to add value to the company. The financial performance study done by the Indonesian rural banking sector placed more emphasis on some aspects of asset value, comparing the tangible elements of intangible assets (Sidharta and Affandi, 2016).

In general, the empirical studies that have adopted the VAIC approach for the evaluation of the effect of IC on different business variables have shown contradictory results. For instance, Firer and Williams (2003), in a study conducted in South Africa, were not able to identify a link between financial performance and VAIC, whereas Chen et al. (2005) identified a link between IC, financial performance and market value in the Taiwanese economy. Based on two studies conducted previously, the reasons VAIC is used extensively in those economies have a lot to do with the use of a validated IC measuring method and the fact that it is founded on traditional accounting measures, which has removed reporting criteria compared to other IC measurement methods. In terms of the reliability of VAIC, Malhotra (2003) stated that valuation in developing nations is, most of the time, based on tangible assets, usually forgetting the intangible ones. Hence, it is very logical for VAIC studies not to be able to establish a positive link between company value and IC (Mehralian et al., 2012).

Mavridis (2004) and Kamath (2008) found that the Indian public sector banks were really performing well in terms of CEE in comparison to their foreign counterparts. In a further study of the Hong Kong Stock Exchange, Chu et al. (2011) found that structural capital improved corporate profitability, yet CEE still significantly determined the financial performance. The study used three industry groups: traditional, high-tech and services from 300 UK companies, which was different to previous studies where only one sector was used. The results show that there was a notable positive relationship between the economic performance of a company and the value-added intellectual capital coefficient. This shows that IC can help reduce the production costs of a company, thereby cause a significant positive relationship with the financial performance of a company (Zéghal and Maaloul, 2010).

The study included 774 firms publicly listed on the London Stock Exchange from 2005 to 2014 to take a measurement of the relationship between firm performance (in terms of ROE, ROA, P/B and ATO) and IC efficiency (which was determined by measuring VAIC). The results showed that the efficiency of IC (VAIC) is significantly and positively linked to firm performance, especially with ROA, and weakly with ROE but not significantly linked with P/B ratio or ATO. They further analysed individual components of VAIC, i.e. structural, human and physical capital. Their findings showed that physical and structural capital are very well related to firm performance. The correlation between firm performance and human capital is not significant; however, there is a significant relationship when they applied fixed-effects and static OLS in the study (Nadeem et al., 2016).

The following table presents a summary of IC impact on some companies' financial performance:

Table 1: Summary of IC and financial performance:

Author	Intellectual Capital and performance Results
Pulic (2002)	Positive: Vienna and London Stock Exchanges
Kujansivu and Lönnqvist, 2005	Positive: Finland
Firer and Williams (2003)	No evidence: Johannesburg Stock Exchange, South Africa
Shiu (2006)	Positive in profitability and negative in productivity: Taiwan
Mavridis (2004)	Confirms the existence of significant performance differences among the various groups of Japanese banks
Chan. 2009	Positive: Hong Kong Stock Exchange.
Zéghal and Maaloul, (2010)	Positive; High-tech UK companies
(Mehralian et al., 2012).	Positive in profitability and negative in productivity: Iranian Stock Exchange (ISE)
Sidharta and Affandi, (2016)	Positive: Rural Banking Sector in Java, Indonesia

Source: Author

2.7 Research Gap

One of the aims of this study is that it investigates the impact of intellectual capital on top UK companies' financial performance. Although IC studies attract a lot of scholars, the results of the after-mentioned studies showed the mixed results of the impact of IC on firm performance. For instance, Firer and Williams (2003) found no relationships between IC and performance in companies listed on the Johannesburg Stock Exchange, South Africa. However, Chan (2009) found a positive association between IC and firm performance in Hong Kong Stock Exchange.

Previous studies have been conducted in different countries such as Finland (Kujansivu and Lönnqvist, 2005), South Africa (Firer and Williams, 2003), UK (Nadeem et al., 2016) and so on and so forth. Also, studies have been conducted based on different industries such as banking (Mavridis 2004) or High-tech companies (Zéghal and Maaloul, 2010) and so forth. Regardless of the developing literature in IC, there is a lack of empirical studies regarding IC effectiveness in UK's top companies due to their diversity in intellectual capital in terms of employees, investment, culture and policy. Therefore, it needful for further empirical research to examine this relationship to support the theories and claims related to the positive impact of IC on business performance.

In an IC study, it is crucial which method of measurement would be adopted as it would affect IC measurement and consequently the results of the empirical study. Studies that select the VAIC method for measurement are based on quantitative data collection, which provides different results than the Balanced Scorecard or another measurement that use qualitative methods. Although the VAIC method is more objective, still there is a scarcity in utilising this method within UK's top companies. Therefore, besides selecting different performance indicators are crucial as well in order to have clear evidence of IC component impact as each component would have an impact on different performance indicators. In this regard, there is currently a deficiency of investigation.

For instance, Gan and Saleh (2008) concluded that in Malaysia, VAIC is able to explain productivity and profitability but not explain market valuation. Kamath (2008) did not find any notable positive relationship between the performance of the firm when it comes to productivity, profitability, and market valuation and any of the independent variables in the pharmaceutical industry in India. With the help of the VAIC approach, Maditinos et al. (2011) came up with two questions: "Does the VAIC methodology properly describe the business reality, or does it need improvements/adjustments in order to better mirror the business landscape?"

To answer the questions above, they believed that attention should be paid to empirical studies by utilising the VAIC approach developed in emerging and developing nations such as Taiwan, South Africa, Malaysia, Singapore, Turkey, Bangladesh and Thailand rather than in developed such as Germany, France, and the UK. However, there is a deficiency of empirical studies regarding UK companies (Nadeem et al., 2016).

In summary, as there is no conclusive evidence in the literature to prove that intellectual capital can have a significant impact on firm performance; therefore, the first research question of this study has been formulated in order to provide an answer to this.

Having said that, in order to update IC empirical studies and provide clear evidence, top UK companies were selected to examine their financial performance for eight years to understand this relationship. For this reason, performance indicators have been selected based on market performance (Tobin's & P/E) and company's performance (ROA & ROE) to provide a wider area to test the relationships, which will update the IC literature and empirical study as P/E has not yet been tested with IC study. Also, the VAIC methodology to measure IC was adopted, which is based on secondary data collection. Although this study is country-based, it is not based on separate industries. Therefore, it will provide a holistic insight into the IC study, which empirical studies on the UK have not provided so far. In order to have more reliable and non-biased results, one-to-five years lag has been applied to observe the impact of IC. Previous studies did not use this time lag; therefore, their results are mostly related to the same year of applying the IC. For instance, it is beneficial to understand whether employees' training and development can affect firm financial performance even after one, three or five years (related to HCE)? Or whether an investment in technology or equipment can affect firm performance up to five years (related to SCE) or the impact of any other capital investment such as CEE. This study will commence an argument later on regarding the real impact of each component on financial performance and provide actual evidence for the impact of not only intellectual capital but also its components as well, considering the different performance indicators which some of them have not been tested with IC study yet. The following table presents the summary of the research gap for IC study based on the first research question:

Table 2: Summary of Research Gap for IC Study

Research question	Summary of research gap for IC study
Do intellectual capital have a significant impact on FTSE 350 companies?	Few studies have been conducted to investigate the impact of IC of firm performance holistically, most of them are industries or sectors based.
	Few studies have been conducted to investigate the impact of IC on firm performance in the UK companies.
	There is a need for empirical studies to understand the impact of IC components on firm performance.
	There is a lack of a conceptual framework to explore the relationships between IC and performance

The impact of intellectual capital efficiency and its components (HCE, SCE and CEE) on firm performance provided a varying degree and mixed results. Hence, further research is needed to examine this relationship and to reach more concrete evidence. Therefore, the aforementioned research gaps conduct one of the aims of this study, which is to investigate the impact of IC and its value creation on firm performance in top UK companies.

2.8 Chapter Summary

This chapter has discussed the origin of intellectual capital and its relationship with knowledge management, which is the most important factor for competitive advantage in today's life of companies. In a sense, knowledge management strategy is the process (the means), while intellectual capital is the output (the end). Intellectual capital management and knowledge management may thus be treated as two sides of the same coin, although they are not the same (Ling, 2013). Thus, most scholars agree that knowledge management provides the structure to manage intellectual capital (Shih et al., 2010).

Intellectual capital has been defined through its three components, namely human capital, structural capital and relational capital. Intellectual capital has been calculated and measured through the VAIC methodology (HCE+SCE+CEE), which has been applied by scholars such as Pulic (2000), Chen et al. (2005) and Nadeem et al. (2019). There remains a lack of study into the impacts of intellectual capital on firm performance, which result in a gap in the IC literature and illustrates the importance of the related empirical study in the latter chapters, as only a few studies have been conducted a long time ago in this domain on UK companies, such as the study into the relationship between the market value of 30 randomly chosen companies on the London FTSE 250 and VAIC, from 1992 to 1998 (Pulic, 2000). Intellectual capital guarantees long-term sustainable competitive advantage. To estimate the value of individual intangible assets, it is important to calculate a market, a cost or an income approach (Sudarsanam et al., 2005). To calculate intellectual capital, two major methods are used: first, the internal management approach is used to measure its internal efficiency. This approach is used to enhance the strategic decision-making process. The second approach is the external reporting approach, which is used to provide an extra understanding of investing in intangibles and how to report the financial value of intangibles, which would increase transparency (Sydler et al., 2014). The next chapter will discuss the female leaders' impact on financial performance and firms' intellectual capital on top UK companies.

3 Chapter 3 Literature Review: Female Directors

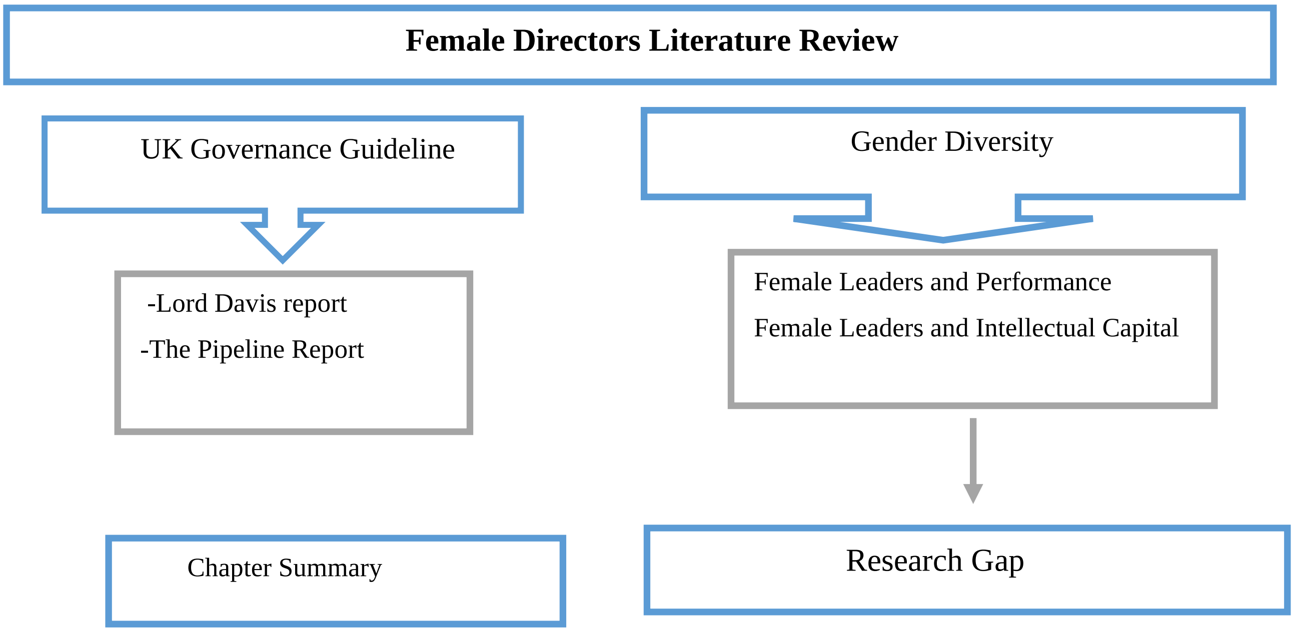
3.1 Introduction

As a result of recent financial crises and large corporate scandals, corporate governance has attracted the attention of scholar-activists and policymakers. Huse (2007) defined corporate governance as “the interaction between various internal and external actors and the board members in directing a firm for value creation”. It is defined by Nordberg (2011) as a system that controls the actions of the board of directors and the relationship of the board with the broader society, shareholders, and management.

The boards have two main responsibilities in the UK. The first one is that they are legally in charge of executing the strategic planning of the firm on behalf of the shareholders. The second one is that, with the help of accountability principles, they can manage the assets of shareholders and the financial performance of the firm (Keasey et al., 2005).

According to Robinson and Dechant (1997), board diversity can improve the performance of a firm in many ways: it would motivate people to be creative and innovative because of the different races, ages, beliefs and genders, which are available to the board; also problem-solving and decision-making would be enhanced due to the different perspectives and experiences that would be available to the board; fourth, the leadership would be effective because of the understanding of the uncertainties and complexities of the firm environment; finally, a diverse board can lead to a better global relationship due to the knowledge of global competition and cultural awareness.

On the other hand, company capital which contains physical, financial and intellectual capital plays a crucial role in a company’s development and performance. The way companies manage these capitals would affect their growth and survival, especially intellectual capital that becomes the source of competitive advantage of knowledge-based companies in the era of globalisation. Thus, it is necessary for companies not only to focus on the physical and financial capital but also on the intellectual capital as well. Since businesses are transferring from labour-based towards knowledge-based, intellectual capital development is fundamental (Efandiana, 2011). As corporate governance is responsible for utilising the intellectual capital, besides other factors such as people, structure, and processes of the companies, it is one of the most important mechanisms of corporate governance to get high performance in board structure (Fuad, 2017). Hence, this chapter will review the previous literature regarding the impact of female directors on firm performance and intellectual capital performance in the UK to identify the research gap. The following diagram presents the chapter structure.



3.2 UK Governance Guideline

The boards of companies have two main responsibilities in the UK. The first one is that they are legally in charge of executing the strategic planning of the firm on behalf of the shareholders. The second one is that, with the help of accountability principles, they can manage the assets of shareholders (Keasey et al., 2005).

Both responsibilities depend on a system called ‘accountability through disclosure’. They show two significant attributes of accountability: information and shareholder rights. The rights of the shareholders include appointing and removing directors, voting at the annual general meeting, and determining the salary of the management and directors. To be able to exercise these rights, they have to have enough information about the financial performance of the firm.

However, there has been an argument that the development of ‘creative accounting’ is used by executives to mislead shareholders on the financial conditions of firms. There are more insider directors in the firms listed in the UK, which shows that there is no independent control on executive activities and financial disclosures. “Accountability through disclosure” does not work well in UK listed firms, as is evident in corporate scandals.

It is now left for the regulators to determine how corporate governance should be practised in big corporations. Also, various recommendations and guidelines have been presented to enhance transparency, board independence, and accountability in public corporations. A discussion of the UK governance guidelines follows in the next section. Lord Davies Report and the pipeline Report regarding the percentage of top female leaders on board in the UK is presented below.

3.2.1 Females on Boards: Lord Davies Report

Four years ago, Lord Davies of Abersoch (2015) set out on a journey to ensure gender balance at the top management of Britain's biggest companies. As a matter of fact, there is little change in the boardrooms of FTSE firms. Overall, 23.5% of positions are now occupied by women on FTSE 100 boards, while 18% of positions are held by women on FTSE 250 boards, with an ongoing effort to achieve 25% representation by the end of 2021.

In addition, there are no all-male boards on the FTSE 100, which is the first time this has been the case in the history of the London Stock Exchange. Also, only 23 all-male boards remain on the FTSE 250, which is a lot. When the Davies Review was launched in 2011, there were around 152 all-male boards in the FTSE 350. So, this is a great achievement and a clear indication of the profound culture change shaking up British boards.

There is still a big job to be done. The target for the coming months is 25%. Also, the low number of women executive directors and chairs on boards and the loss of skilled, senior women from executive positions should be fixed.

Britain has great talent, and there are many experienced, credible women who can serve on British boards. Firms need to employ them in order to maximise their talent. This will benefit businesses, the economy of the UK and also its competitive position in the global market (Lord Davies of Abersoch, 2015).

In just over four years, the UK, without the need for EU legislative or government intervention, has made tremendous progress under a voluntary, business-led framework. With the help of the programme, chairmen would be encouraged to recruit more women to their top team, irrespective of the size of the company or the sector the company falls into.

The Davies Steering Group has been working with key stakeholders and the government during the year to encourage action under three main strategic priorities. The development of these priorities aims to help British businesses achieve the 25% target by 2015 and maintain gender-balanced boards into the future. In this section, the three strategic priorities and the details of the key initiatives that support them are as follows. motivating FTSE 350 companies, raising the bar with key stakeholders and leveraging support and indirect opportunities with like-minded organisations (Lord Davies of Abersoch, 2015). Regarding motivating the FTSE 350 companies influencing chairmen, the main focus of Lord Davies and Denise was to encourage FTSE chairmen and their teams to accept their great support so far. They also wanted to continue learning from their experiences so they could identify more opportunities for recruiting talented women. In the future, they aim to focus on taking advice from FTSE 250 chairmen, who, overall, have made tremendous progress from 7.8% female representation in 2011 to 18% today. Work continues to affect all-male boards and, given the decrease to 23.9% in relation to women appointments versus men this year, sustained focus on the performance of FTSE 250 is needed. Nonetheless, the number of all-male boards remaining at 23 from 131 initially clearly shows the commitment of many FTSE chairmen to gender-balanced boards (Lord Davies of Abersoch, 2015).

The Executive Pipeline was another emphasis in this matter as more women have continued to get executive directorships, with 8.6% of executive directorships being held by women today, compared to 5.5% in 2011. The difference is not that noticeable; however, because these are perhaps the biggest roles in UK's biggest companies, this is an area that is always going to be hard to crack. There is great room for progress here, along with the appointment of more women to the senior independent director and chairman positions on FTSE boards. To maintain the pool of talented women who qualify as board candidates, it is important to ensure a dual focus on the executive pipeline supply and board appointments. It has been always known that replenishing the executive pipeline would be very challenging and take some time. Nevertheless, our companies that are doing great, including others that want to address the gender gap; they have created innovative programmes and initiatives in the year in order to retain senior women and restock the pipeline. For example, Lloyds Banking Group, Barclays, Intercontinental Hotels Group, Credit Suisse, and the Marks & Spencer Group, etc., have launched smart ways of working with simple and measurable targets to create a more family-friendly workplace, and to introduce more progressive initiatives targeted at bringing back senior women and tackling bias in employment, promotion and remuneration (Lord Davies of Abersoch, 2015).

3.2.2 Enhanced Code for Executive Search Firms

It has been impressive to see the executive search community raise the bar for themselves with the creation of their second voluntary Code of Conduct in September after the recommendations given by the Charlotte Sweeney review, 'Taking the Next Step'.

The Enhanced Code of Conduct required a tougher standard of best practice on gender-equal selection. To be accredited under the Code, quality, as well as performance/output, is measured. It recognises those firms actively helping boards improve their gender balance, with a good record in advancing gender diversity in the FTSE 350 and having done a lot to make sure that the progress towards 25% on FTSE 350 boards is achieved. To be accredited, firms must have demonstrated the following in no longer than the last 12 months:

- At least 33% of their FTSE 350 board appointments should be women
- Should have supported the appointment of not less than four women on FTSE 350 boards
- Should have a track record of helping women achieve their first appointment to the board

An extra category of accreditation was created to acknowledge the efforts of organisations working with boards outside the FTSE 350, such as small-cap, private companies, mutual, or not-for-profit and government organisations.

Also, over 80 executive search firms have now signed up for the Standard Voluntary Code of Conduct, acknowledging the value added of this agenda to their clients and playing an increasingly important supporting function in the selection process. There are also many initiatives, innovative programmes, seminars and workshops from the executive search community, all of which are raising awareness, increasing the talent pool and bringing more women to the top positions in the British business environment. We are highly grateful to the executive search community for their continuous efforts on this agenda (Lord Davies of Abersoch, 2015).

Another matter was company reporting which improved. Since companies are required by the UK Corporate Governance Code of 2012 to implement and report their policy on boardroom diversity and disclose the gender split in the workplace from board level down, over 85% of FTSE 100 companies now disclose their policy on boardroom diversity and more than 58% have set clear objectives that can easily be measured. The Narrative Reporting Regulations that came into existence in October 2013 forced the majority of the companies to include the information on gender analysis at the board level for senior management and across the total workforce. Below are examples of data and reporting style taken from the websites of Great Portland Estates and the Esure Group respectively, which focus on FTSE action in 2015 as follows:

- All FTSE 350 companies which are currently below the target to move towards 25%
- The remaining all-male boards to appoint at least one woman in 2015
- The appointment of more women senior independent directors and chairmen to be supported
- Encouraging internal measures by FTSE 350 companies, which are aimed at replenishing the executive pipeline of women and showcasing female talent by sharing case studies/career insights to motivate women further down in their companies
- FTSE 250 companies to improve reporting and disclosure on gender diversity

The following is another report which has been published since 2012 regarding female leaders on board.

3.2.3 Woman Count, The Pipeline Report

The Pipeline was created in 2012 to deliver outstanding Executive Leadership programmes particularly designed for women. This is an economic concern as it is believed that organisations can succeed in a global world if they have more gender diversity at senior levels. The Pipeline offers a wide range of advisory services for boards, CEOs, and executive committees and also runs inspiring leadership programmes for female executives. According to the Pipeline Report, many FTSE 350 companies now publish the gender composition of their executive committees (241 in 2017 versus 221 in 2016). Consequently, this has increased the number of executive members, both female and male. However, only 16% of those on FTSE 350 executive committees are women. A lot of FTSE 350 companies (an increase of eight) have had no women on their executive committees since 2016.

The research conducted by Pipeline on net profit margin identified that FTSE 350 companies that do not have a woman on their executive committee were the worst of all groups in terms of performance. Compared to those with none, companies with at least 25% of positions filled by females on their executive committee recorded almost double profit margins. If all FTSE 350 companies were on the same level as those with at least 25% females on their executive committee in terms of performance, the effect could be a £5bn gender dividend for the Corporate UK. As of 14th April 2017, their findings confirm the positive relationship between better business outcomes and gender diversity, found in studies by other well-known organisations such as the IMF and McKinsey (McDonagh and Fitzsimons, 2017).

According to Pipeline's research, the percentage of FTSE 350 women executives in profit and loss (P&L) roles has reduced from 38% to 35%. Many companies have no women in executive P&L positions (this has increased by 16 since 2016). Only 6% of the members of the executive committee are women in P&L roles. The percentage of women holding functional roles on executive committees in the FTSE 350 is 60. These functional roles include marketing, HR, legal issues or compliance.

On the other hand, Women Count 2017 looked at the number of women on the FTSE 350 main plc boards as executive directors – the count was low. There are 791 executive directors, out of which 65 are women. This translates to less than 10% female representation (McDonagh and Fitzsimons, 2017).

The data were gathered from FTSE 350 companies, and the full details of their executive committees were published on 14th April 2017. On a positive note, an extra 20 companies have published information regarding their executive committee in 2017 compared to the 2016 figure (241 in 2017 versus 221 in 2016). Even though companies are now required to make their data on gender pay public, it is disappointing to see that there is no transparency regarding gender diversity and the executive committees. We support the Hampton-Alexander Review recommendations to amend the UK Corporate Governance Code so that all FTSE 350 companies would disclose in their Accounts and Annual Report how gender issues are balanced on the executive committee and direct reports to the executive committee.

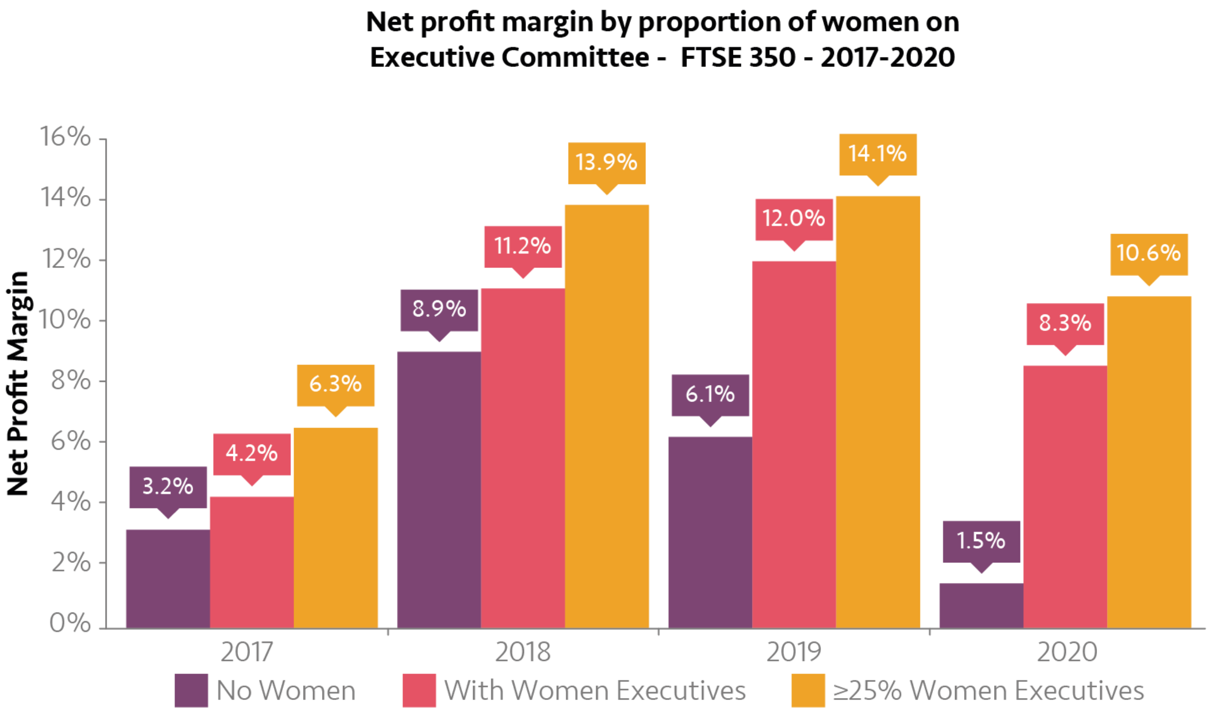
- The number of women executives: There has been no progress in the overall women's representation on executive committees since 2016 – it continues to be only 16%.
- Women executives are not distributed evenly across companies. Also, the number of women on each executive committee varies considerably.

There has been a decrease in the number of women executives in the FTSE 350. More FTSE 350 companies have no women on their executive committee – the number has increased by eight companies in the last 12 months. Those with at least 25% women have seen some improvements – an additional 11 companies since 2016. Unfortunately, those committees with over 50% women or less than 25% women were on the same levels.

- The relationship between performance and women on executive committees: our first measure of performance was net profit margin. The finding indicates that FTSE 350 executive committees with no women recorded the worst performance (3.2% net profit margin). On the other hand, double the profit margins were recorded in companies with at least 25% females on their executive committee compared to those with no women.

Women executives by sector: Electricity, Oil, Gas, Steam, Waste and Water stand out as high performers. The companies in this sector rely on employees with STEM-based skills, so it is exceptional that they are outperforming other sectors. Wholesale & Retail Trade was also a high performer. This was more expected as a sector that employs a high percentage of women (The-Pipeline-Women-Count-2017).

The following table was published by Pipeline in 2020 and provides an overview of the hiring of women in top positions from 2017 to 2020



Source: The-Pipeline-Women-Count-2020

There has been a general decrease in profit margins for all companies. The level of decrease is staggering for companies without any women in top positions. As the table has shown, in 2019, the net profit margin will increase with more women executives on the boards (13.9 %. 14.9% and 10.6%) from 2018 to 2020. However, there is no increase in the percentage of women executives from 2018 to 2020. Unfortunately, some FTSE 350 companies are going backwards in hiring women. Despite Theresa May's (Former Prime Minister of the UK) announcement "Act now to change your businesses, to make the most of every talent, and to play your part in making our economy one which works for everyone" (The-Pipeline-Women-Count-2020), things have yet to change significantly.

3.3 Gender Diversity

Gender diversity has attracted the attention of many academics as well as practitioners because of the marginalisation of females on the boards of directors. For some countries, there are rules and regulations to be followed when hiring more females on the boards. Previously in Scandinavian countries, which have been trying to amend gender diversity policy for boards since 2005, with Norwegian firms appointing at least 40% women on the board (Smith et al., 2006). Since 2010, there has been at least one female on the board of all Finnish firms. Spanish, Italian, and French firms have also applied a certain threshold for female directors since 2013 (Nekhili and Gatfaoui, 2013; Chapple and Humphrey, 2014).

The Lord Davies Report (2012), which concentrated on gender imbalance on boards, made gender diversity a fundamental issue in the UK. The Davies report recommended that females should occupy 25% of positions on the board of FTSE 100 firms by 2015. The result from the FSE 100 index shows that female directors have increased from 12% in 2011 to 25% by 2014 (Stern, 2014). In 2015, of the FTSE 100, only two companies (Unilever and Intercontinental Hotels) had only three females on the board. However, for the FTSE 350, the number of female directors rose to 33% (Cadman, 2015).

Notwithstanding, in the UK, most females on the board are non-executive directors instead of executive directors who are in charge of running the business. This means that the probability of hiring a non-executive female is higher. Thus, the number of female executive directors has remained almost the same (around 3%) from 2005 to 2010 on the FTSE 350 (Gregory-Smith et al., 2013).

The reasons to choose men over women in the boardroom include females' lack of expertise and experience, especially as executives in the boardroom in small firms. This could result in larger companies reducing the number of female directors they hire (Burke, 1997; Singh and Vinnicombe, 2004). This could subject gender diversity on the board for some companies to the target of a firm, which could be board diversity and due to the pressure from activist investors (Gillan and Starks, 2000) and industry factors (Bertrand and Hallock, 2001).

Twenty theories drawn from psychology, management, finance, and sociology could explain the impact of gender diversity (Terjesen et al.,2009). Several theories connect two or more levels of analysis. For instance, gender self-schema is an individual perception that can be demonstrated in groups, firms, industries, and the broader institutional environment. Some studies incorporate two or more theoretical perspectives. For instance, Burke and Nelson (2002) examine how a combination of individual and company' factors unravel the deprivation of talented women from top management. They argue that female directors impact the performance of a firm in many ways. There are two aspects of the impacts of gender diversity: board effectiveness (e.g., CEO turnover, M&A, financial report accountability) and firm performance (e.g., firm value and firm profitability).

The positive impact of female directors on board effectiveness, according to Adams and Ferreira (2009), can be seen in the board's monitoring or advisory roles. Females can have an effect on board committee participation, board meeting attendance, and CEO turnover. Jurkus et al. (2011) have shown that female directors can improve the quality of a firm's financial reports or reduce agency costs (Abbot et al., 2012).

In addition, various studies conducted by researchers, including the one done by Erhardt et al. (2003), reported that US gender diversity can enhance Tobin's Q and a firm's economic growth. Likewise, in Dutch firms (Luckerath-Rovers, 2013) and Spanish-listed firms (Campbell and Minguez-Vera, 2008), there has been a positive link between female directors and firm performance. In contrast, Rose (2007) and Smith et al. (2006) found no positive relationship between firm performance and gender diversity in Danish firms.

Other studies (Dezso and Ross, 2012; Chapple and Humphrey, 2014) show that firm industry is a significant factor that demonstrates the relationship between the performance of the firm and gender diversity. In a high-innovation industry and customer goods services, female directors contribute positively.

3.3.1 Female leaders and Firm Performance

According to Carter et al. (2003) and Erhardt et al. (2003), there is a positive association between firm performance and female directors in the firms listed in the US, Spain (Campbell and Minguez-Vera, 2007) and the Netherlands (Luckerath-Rovers, 2013). Similar studies conducted by other researchers in developing countries show that female directors can influence the performance of the firm in China (Liu et al., 2013) and 73 other developing countries (Strom et al., 2014). Notwithstanding, gender diversity issues on the boards are not as common as in developed countries.

Further, Jurkus et al. (2011) and Adams and Ferreira (2009) failed to prove a positive and direct relationship between firm performance and female directors. Also, Carter et al. (2010) reported an inconsistency between firm ROA and Tobin's Q and female directors in the US.

A similar case exists in non-US based studies. Ahern and Dittmar (2012) stated that there was a negative reaction by the market in Norway, and it had a negative impact on Tobin's Q after imposing the law, given that firms had to restructure their boards.

For Australian firms, female directors have a positive impact on the economic growth of the firm, including social responsiveness such as ethics, human rights, health and safety, but they hardly influence the environment-related policy of the firm in areas such as recycled waste and energy efficiency (Galbreath, 2011).

Gregory-Smith et al. (2013) found no proof of a positive impact of female directors on the performance of FTSE 350 firms from 1996 to 2010 in the UK. However, as Ross and Dezso (2012) stated initially, gender diversity may have a positive impact on the performance of the firm if the firm's strategy is based on innovation. Chapple and Humphrey (2014) stated that female directors can bring benefits to certain industries such as consumer goods and basic materials industries.

An element that can affect the relationship between firm performance and female directors is tokenism. In some companies, there is only one female director, which leads to little contribution from women on the board. Firms should have at least three female directors on the board in order to show performance (Torchia et al., 2011; Joecks et al., 2013; Liu et al., 2013).

Therefore, according to the previous section, there are a lot of theories with regard to gender diversity; however, the empirical results are mixed. Having said that, limited studies have been conducted regarding the impact of female directors on FTSE 350 companies as a panel data such as the Pipeline Report Women count, which is being published each year in this regard. For this reason and for the mixed empirical results of the previous studies in different countries, this study has chosen large UK companies to test this impact in the new domain. Theories have shown that the reasons for hiring female directors rather than the business case reasons such as firm employee composition and firm market result from external factors such as shareholder and government pressure. The merits of female directors have been seen in the areas of board controlling and monitoring roles rather than in terms of the overall financial performance of the firm (Terjesen et al., 2009).

Since these studies were conducted in the early 2000s when quota rules on female directors had not been introduced, and some of the studies were relatively poorly designed, it is difficult to decide whether the result is correct. In the 1990s and the early 2000s, firms enjoyed more flexibility in structuring their boards than in the middle or late 2000s.

Another study which was conducted by Chen and Lim (2016) in Malaysia found that female directors do not prove any significant linear or non-linear impact on a firm's financial performance. However, they found that female directors have a beneficial impact on the return on equity of companies in Malaysia. Having said that, the results may vary based on the country as Pasaribu (2017) addressed endogeneity problem, or certain characteristics such as governance, industry, competition. He conducted a study of all non-financial UK listed firms during the period 2004-2012 and employed several econometric models. He found that there is little evidence of the positive impact of female directors on firm performance. Having said that, he mentioned that UK's small firms experience a significant positive effect since they do not endure over-monitoring problems and they have more flexibility in creating their boards of directors (Pasaribu 2017). Furthermore, in a more recent study conducted in Spanish and Italian firms by Martín-Ugedo et al. (2019), they realised that female directors have a positive impact on Spanish firms' performance, whereas they have a negative impact on Italian ones. The authors also mentioned that the "masculinity" dimension has a negative impact on firm performance. This finding is beneficial for companies to understand that masculinity can have an impact on their firm performance, as masculinity has the cultural values for some countries, which affect the decision-making processes and thinking styles. Therefore, it is so crucial to encourage gender diversity, not only by laws but also by taking the initiative about the educational system (Martín-Ugedo et al., 2019).

3.3.2 Female Leaders and Intellectual Capital

In the previous chapter, the impact of intellectual capital on firm performance was discussed (Sudarsanam et al., 2005; Chen et al., 2014; Sydler et al., 2014). Also, in the previous section, the impact of female leaders on performance was reviewed (Martín-Ugedo et al., 2019; Pasaribu, 2017).

Interestingly, scholars pay attention to the relationship between female directors and firm performance through tangible assets and thus have neglected to investigate the value addition of intangible or intellectual capital (IC). Canaibano et al. (2000) argue that most manufacturing economies have been replaced by knowledge-driven, rapid and technologically advanced economies, while IC has been transformed into the source of firm competitive advantage. Thus, in the switch from tangible to knowledge-based economies, intangibles play a crucial role in firm value than physical assets (Nadeem et al., 2019).

Although there is limited research that specifically investigates the impact of female leaders on intellectual capital, there are studies regarding female leaders and performance. According to scholars, board gender diversity enhances the ability to solve complex problems and improve the performance of individuals working together and the overall behaviour of employees. In general, board gender diversity improves a firm's human capital by offering valuable services, such as insights into strategic issues and providing positive feedback on consumers and business partners (Dezsö and Ross 2012).

Furthermore, women possess a unique cognitive style which is particularly needed to create harmony and are also considered to be better sources of information dissemination (Earley and Mosakowski, 2000). Hence, gender diversity can enhance the overall performance of the human capital resources of the firm. Broadbridge et al. (2006) and Kravitz (2003) have argued that gender-diverse boards are able to resolve complicated problems and have more efficient communication.

Furthermore, firms with more females on boards show a tendency to be more generous (Dunn, 2012). Despite that, based on the previously mentioned discussion, there is a limited study investigating the impact of female leaders on firm intellectual capital and a mixed empirical result regarding firm performance around the world. However, understanding this impact is so crucial, especially after the financial crises and the failure of some companies with regard to corporate governance and recent rules regarding hiring more females on board. Therefore, there is still a need for more empirical studies to be conducted to understand the role of female leaders not only on the firm performance but also on the intellectual capital of the companies, which consist of all employees in the form of human capital, policies, culture, equipment, R&D under the name of structural capital and any kind of investment under the category of capital employed. The result of this study would shed light for researchers and practitioners to have an insight into female characteristics and leadership styles and aspects that can affect companies' performance and effectiveness.

The following table presents prior studies regarding female leaders, which have been discussed in this section.

Table 3: Female Leaders Prior Studies

Author	Study and results
Kalleberg and Leich (1991)	Examined 411 companies in South Central Indiana (USA) and discovered that women-led businesses had the same opportunity to succeed as those led by men.
Watson (2002)	Investigated data from 14,426 Australian firms and discovered that after the removal of certain variables, female-led firms tended to have better performance than their male-led counterparts.
Carter et al. (2003) and Erhardt et al. (2003),	Found positive impact of female directors on firm performance in the US.
Minguez-Vera and Campbell, 2007)	positive impact of females on the board on Tobin's Q in Spain.
Smith et al. (2006) and Rose (2007)	No direct impact of female directors on firm performance in Danish firms
Ryan and Haslam (2005) and Haslam et al. (2010)	No positive impact of female directors on FTSE 100 in the UK
Adams and Ferreira (2009)	No positive impact of female directors and firm performance in the US
Fairlie and Robb (2009)	Discovered that, compared to firms led by men, firms led by women were less successful in terms of financial performance
Carter et al. (2010)	Inconsistency between firm ROA and Tobin's Q and female directors in the US.
Jurkus et al. (2011)	No positive impact of female directors and firm performance in the US
Galbreath (2011)	Positive impact of female directors on firm economic growth in Australia
Ahern and Dittmar (2012)	No positive impact of female directors on Tobin's Q in the Norway

Luckerath-Rovers (2013)	Positive impact of female directors on return on equity (ROE) for Dutch listed firms.
Gregory-Smith et al. (2013)	No evidence of females' directors' impact on the firm performance in the UK FTSE350 firms from 1996 to 2010.
Liu et al. (2013)	Positive impact of female directors on firm performance in China
Strom et al. (2014)	Positive impact of female directors on firm performance in China
Davis, et al. (2010)	conducted a study on 155 small and medium enterprises (SMEs) operating in the US retail and service sector. They also concluded that women-led firms had better financial performance compared to the male-led ones, primarily due to stronger emphasis on market orientation.
Robb & Watson, (2010)	Showed that, after taking into account demographic differences, male-controlled firms did not outperform female-controlled ones in terms of ROA, survival rate, or in risk-adjusted terms (Sharpe ratio) in Australian firms between 1994 and 1998
Inmyxai and Takahashi (2010)	Examined and compared the performance of 493 firms led by males and 347 female-led micro-, small-, and medium-sized enterprises (MSMEs) in the Lao PDR and discovered that women-led firms performed poorly compared to men-led firms
Amran (2011)	Investigated 182 Malaysian family companies (firms listed on Bursa Malaysia between 2003 and 2007) and found out that female leaders had a negative impact on the firms' financial performance
Hsu et al. (2013)	Studied the data of small Taiwanese public accounting firms from 1992 to 2008 and found that firms led by men had better financial performance than women-led firms
Parrotta and Smith (2013)	Investigated the link between the gender of the CEO, the composition of the board of directors (share of women in the boardroom and female chairman), and the attitude of a firm towards risk measured as variability in four firm-outcome variables (investments, return to equity, profits, and sales) and found a negative relationship between a firm's attitudes toward risk and women CEOs.
Khan and Vieito (2013)	Found that firms managed by female CEOs had better performance when it came to ROA.
Peni (2014)	On a sample of S&P 500 US firms suggested a positive relationship between the performance of the firm and female CEOs.
Strom et al. (2014)	positive impact of female directors on firm performance in China
Chen and Lim (2016)	No significant impact of female directors on Malaysian companies' performance
Pasaribu (2017)	little evidence of female directors' positive impact on firm performance in the UK listed companies. But, positive impact on UK's small listed firms.
Martín-Ugedo, et al. (2019)	Positive impact on Spanish firm and negative impact on Italian firm performance.

Source: Author

Although a significant number of studies examined the impact of female leaders on firms' performance, still there is no conclusive evidence to confirm that female leaders have a positive or negative impact on performance since the results are mixed. Also, some studies show no difference between male and female leaders' impact on performance at all. One of the reasons might be either countries or industries in which these studies were conducted. As a matter of fact, it is not expected that all females around the world with different backgrounds, cultures and experiences lead their companies in the same manner. Thus, more studies are needed, particularly in the UK, to examine the impact of female leaders not only on firm performance in small and large companies but also on the intellectual capital of the company as well, where there is a limited number of studies in the latter domain. It is crucial for companies to understand how their board of directors lead the company, on the one hand, and the human capital, structural capital, and other resources on the other hand. On that account, the second and third research questions have been formulated, which will be explained in detail in the following part.

3.4 Research Gap

Even though there are a number of research studies on the performance of firms led by females around the world, such as Italy and Spain (Pasaribu, 2017), China (Liu et al., 2013) and Strom et al. (2014), Dutch (Luckerath-Rovers, 2013), Norway (Ahern and Dittmar, 2012), which have all been discussed above. There is limited research on UK based companies. The few are the study by Ryan and Haslam (2005) and Haslam et al. (2010), Pasaribu (2017), who do not provide adequate evidence for the after-mentioned relationships. Besides, there is only one study to the best of the author knowledge so far, which investigated the impact of female leaders on intellectual capital in the UK, which was conducted by Nadeem et al. (2019). The result of that study showed a positive impact of female directors on firm IC (which was discussed previously). As one study is not sufficient to reach determinative evidence thus, the present study will provide more concrete evidence to address this question: Do female leaders really have a positive impact on IC. The results of this study would provide an answer to practitioners who are responsible for recruiting and scholars who are investigating this relationship as well.

Nonetheless, there are a good number of reasons why the UK is suitable for another case study of firms led by females and their performance. To begin with, according to Kleinman (2018) which is the editor of Sky News, the UK is behind Europe when it comes to the number of females on boards since most top UK companies have adopted a 'one and done' approach to gender diversity. Secondly, a study by Deloitte and the Manufacturing Institute (2013) shows that obsolete and sometimes wrong perceptions of manufacturing have affected the desires of women to join the ranks of manufacturers. Consequently, the percentage of women CEOs in the manufacturing sector globally is, on average, less than that of women CEOs in other sectors. Historically, gender bias could be a contributor to the exclusion of women from core managerial roles, such as operations managers and production supervisors, which are crucial to climbing up the industry ladder. Given that many people think of manufacturing jobs as involving back-breaking labour, being unskilled, and dirty, women tend not to fancy this industry in the first place, let alone be in positions that would help their promotion up the ladder. Hence the second and third research questions have been formulated to examine the impact of female leaders on performance based on industry and on intellectual capital to update existing literature. The following presents the research questions that reflect the ongoing discussion.

Second research question: Do female leaders have a significant impact on FTSE 350 companies' financial performance?

Third research question: Do female leaders have a significant impact on FTSE 350 companies' intellectual capital?

The following table presents a summary of the research gap for female leaders based on the second and third research questions:

Table 4: Summary of the Research Gap

Research questions:	**Summary of the research gap**
- Do female leaders have a significant impact on FTSE 350 companies' financial performance? **-Do female leaders have a significant impact on FTSE 350 companies' intellectual capital?**	Few studies have been conducted to investigate the impact of female leaders on FTSE 350 companies in the UK
	Few studies have been conducted to investigate the impact of female leaders on FTSE 350 companies' IC in the UK.
	There is a need for empirical studies to understand the impact of female leaders on IC components and firm performance.
	There is a lack of conceptual framework to explore the relationships between female leaders, IC and performance

3.5 Chapter Summary

Gender legislation around the world has led firms to increase the number of female directors and leaders on their boards. According to the Davies Report on gender diversity in the UK, the number of female directors on the boards of FTSE 350 firms has doubled since 2011. Therefore, this area has become the centre of attention of many scholars as well as practitioners, in particular, since the financial crisis. In some studies, the performance of firms with more female directors on their boards is better than companies with male-dominated boards. This is due to women's collaborative characters with internal and external stakeholders, risk-averse decision-making and improved monitoring systems.

This chapter commenced by highlighting the key reporting regarding the importance of female leaders following the discussion of gender diversity on boards and its impact on the financial performance of large companies. In summary, there is an inconsistency in the positive impact of female leaders on firm performance around the world. Having said that, in the UK, small firms experience a significant positive effect of female leadership since they do not endure over-monitoring problems and they have more flexibility in creating their boards of directors.

Apart from that, this chapter has looked at the impact of female leaders on a firm's intellectual capital, which is a new domain for researchers to explore. According to one study that has been conducted so far in this regard, female leaders show a positive impact on intellectual capital in the UK, in particular human capital. They would enhance innovation and complex problem-solving, and better communication within and outside the organisations. Thus, it is worthwhile to investigate the impact of female leaders not only on top UK companies' firm performance but also on their intellectual capital and its components as well.

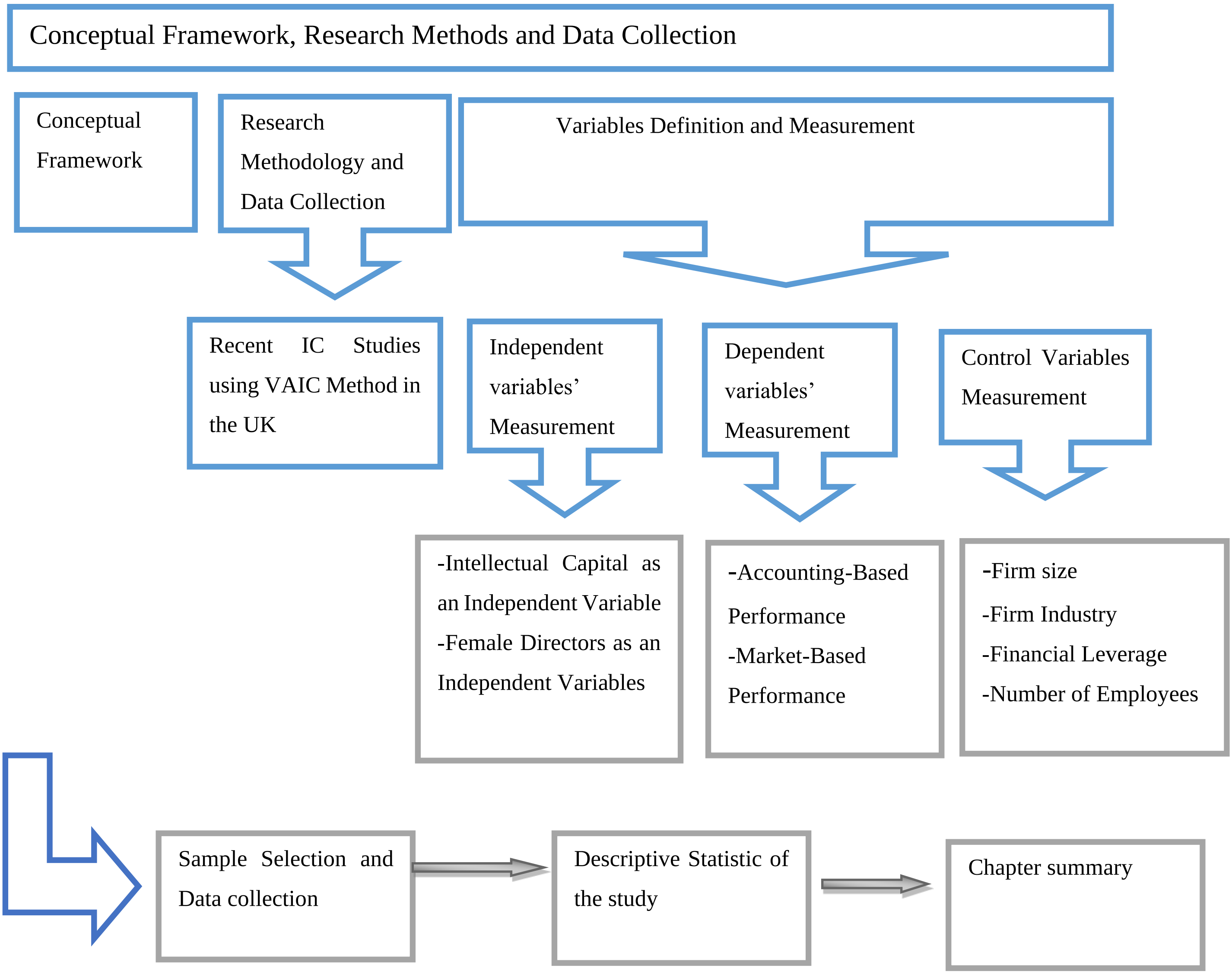
The next chapter will discuss the conceptual framework, research methods, data collection and analysis procedure employed for the entire study.

4 Chapter 4: Research Methods and Conceptual Framework

4.1 Introduction

The conceptual framework, as Creswell (2014) and Sekaran and Boogie (2013) stated, should provide a complete picture and full structure for conducting the research and also enable the researcher to describe different relationships between the elements under investigation in the research. Thus, the researcher is able to develop hypotheses.

Various theoretical perspectives, including the literature review for this research, have been discussed in the previous chapters. This chapter will discuss the conceptual framework of the study, data collection, analysis procedure, variables explanations and method of analysis (i.e., descriptive statistics). There are three empirical studies to test the variables relationships, which will be discussed in the following chapters. Firstly, the theoretical approach will be defended. The intellectual capital and the broad categories of independent variables, which are female directors (CEO, chairperson, executive and non-executive), as well as the dependent and control variables, will be discussed. There will be the clarification of the measurement of the independent variables (intellectual capital and board of directors) and dependent variables (firm performance), and subsequently a discussion of how to measure the control variables. Secondly, the database employed for this study, as well as the sample selection and data-gathering, is discussed in this chapter. Thirdly, there will be an explanation of the analytical techniques to provide details about the analysis procedures adopted. Lastly, there will be a descriptive statistic of the study and a chapter summary. The following diagram presents the chapter structure:


Conceptual Framework, Research Methods and Data Collection
Conceptual Framework
Research Methodology and Data Collection
Variables Definition and Measurement
Recent IC Studies using VAIC Method in the UK
Independent variables' Measurement
Dependent variables' Measurement
Control Variables Measurement
-Intellectual Capital as an Independent Variable
-Female Directors as an Independent Variables
-Accounting-Based Performance
-Market-Based Performance
-Firm size
-Firm Industry
-Financial Leverage
-Number of Employees
Sample Selection and Data collection
Descriptive Statistic of the study
Chapter summary

4.2 Conceptual Framework of the Study

In recent years, some scholars have demonstrated their interest in the impact of directors, especially female directors, on firm performance (Chen and Lim, 2016; Martín-Ugedo, et al., 2019) on the one hand, and the impact of intellectual capital on firm performance (Chen et al., 2014) on the other hand. However, there has rarely been a study on the impact of female directors on the intellectual capital of the firms, although it is believed that there is a relationship (Nadeem et al. 2019). Therefore, this study brings these two fields together and has been supported by the following theories:

a) **Fit View**

Fit view has been defined in earlier literature and measured in numerous ways, which includes moderation and co-variation (Olson et al., 2005), every one of which possesses a statistical method for testing. An "ideal" profile is explicitly a set of organisational features that suit other(s) most and, therefore, leads to better results (Chen and Huang, 2012). Such a standpoint enables us to define an "ideal" IC profile that fits for KM strategy as a set of elements of IC that are organised in such a way as to promote the execution of a specified KM strategy and thus result in a great performance. An evaluation of the extent to which a firm's IC profile differs from that of the "ideal" one, which gives an indication of the fit of IC and KM strategy. Human Resource Planning and System Dynamic, which enhance Fit view, would assist firms to apply them because Fit can further be established for the firm's IC and certain KM strategies based on how little variation there is between a firm's IC profile and the "ideal" profile. Based on such fit evaluation, the difference between the "ideal" and "actual" profile of IC can be acknowledged, and therefore an assessment of its effect on performance can be carried out. Therefore, the idea is that female leaders can help to recruit or retain the "ideal" employees who fit with the organisation's needs and enhance performance.

b) **Recourse-based theory**

Recourse-based theory is connected to a firm's competitive advantage which is one of the strategy theories and has been widely utilised in academic literature and management practice (Acedo et al., 2006). The resource-based view argues that the source of competitive advantage of a firm is a valuable resource and capability (Peteraf, 1993). Furthermore, as Toms (2010) stated, these resources, which are valuable, rare, inimitable and non-substitutable, can deliver economic profit. Therefore, in the first empirical study, five main hypotheses have been formulated to be tested and answer the research questions regarding the impact of intellectual capital on firm financial performance.

The second empirical study, which is related to the impact of female directors on firm financial performance, has been supported by other empirical studies and theories such as resource-based theory as well as agency theory which both support the fact that female directors will bring about positive impacts on firm performance. As Salancik and Pfeffer (1978) mentioned regarding resource-based theory, the board's main duty is to find proper resources and secure them to the best of the shareholders' interests. Therefore, according to this theory, board roles involve monitoring, controlling and advising the team; also, they need to provide external dependencies, for example, knowledge and expertise (Hillman et al., 2000). Diverse boards will help the firm with information, diverse perspectives and non-traditional alternatives that benefit decision-making due to its unique resources. Consequently, diversity on a board demonstrates the firm's commitment to minorities and females; it can also provide equal opportunities for current and potential employees (Hillman et al., 2007).

From the agency theory perspective, diversity on boards is beneficial because a diverse board is independent, which is an important factor for board effectiveness as they do not have the traditional background (Carter et al., 2003). Thus, diverse board members can be considered activist board members. As a matter of fact, the more diverse a board, the fewer agency problems in a firm. Hence, according to these theories, the four main hypotheses for the second study have been formulated.

-The stakeholders of the firm are individuals or groups who have commercial contact with a firm, whether it is temporary or permanent (Bloomfield, 2013).

The most important stakeholder is the shareholder (Jensen, 1986). Shareholders are placed above other stakeholders because they provide the capital, and they claim any free cash flow after other stakeholders have been paid. The function of governance is to protect the rights of shareholders (e.g., right to vote, appointment and dismissal of directors). The biggest beneficiaries of the firm's responsibility and accountability are the shareholders (Banks, 2004). Two aspects are mostly considered in stakeholder theory. Firstly, it is difficult to measure the performance of directors. Hence their effectiveness cannot easily be judged (Clarke, 2004). This is the reason that intellectual capital measurement can help to judge the firm performance on the one hand and directors' effectiveness on the other hand. As in IC measurement, most aspects of the organisation performance would be considered. Rezaee (2009) stated that various measures can be used for listed firms. These measures include financial measures such as market, earnings, stock price, share, and social measures such as customer satisfaction, employment, fair trade with suppliers, as well as ethical measures such as business code of conduct, business culture, and environmental measures such as preservation of natural resources and antipollution. Secondly, the satisfaction of the interests of the stakeholders is not just morally important but also a commercial necessity, especially in an industry where strategic and competitive advantage is crucial (Clarke, 2004). There is a growing need to create a good relationship with workers, suppliers, customers, and investors. Nonetheless, managers are faced with a more complex body of customers in stakeholder theory than in agency theory.

The developed conceptual framework tries to fill several gaps in the literature summarised in the following:

- The lack of a conceptual model to explore and explain the relationships between female leaders, intellectual capital and firm performance within the context of UK large companies.

- Lack of investigation of female top leaders' impact on UK's large companies' financial performance.

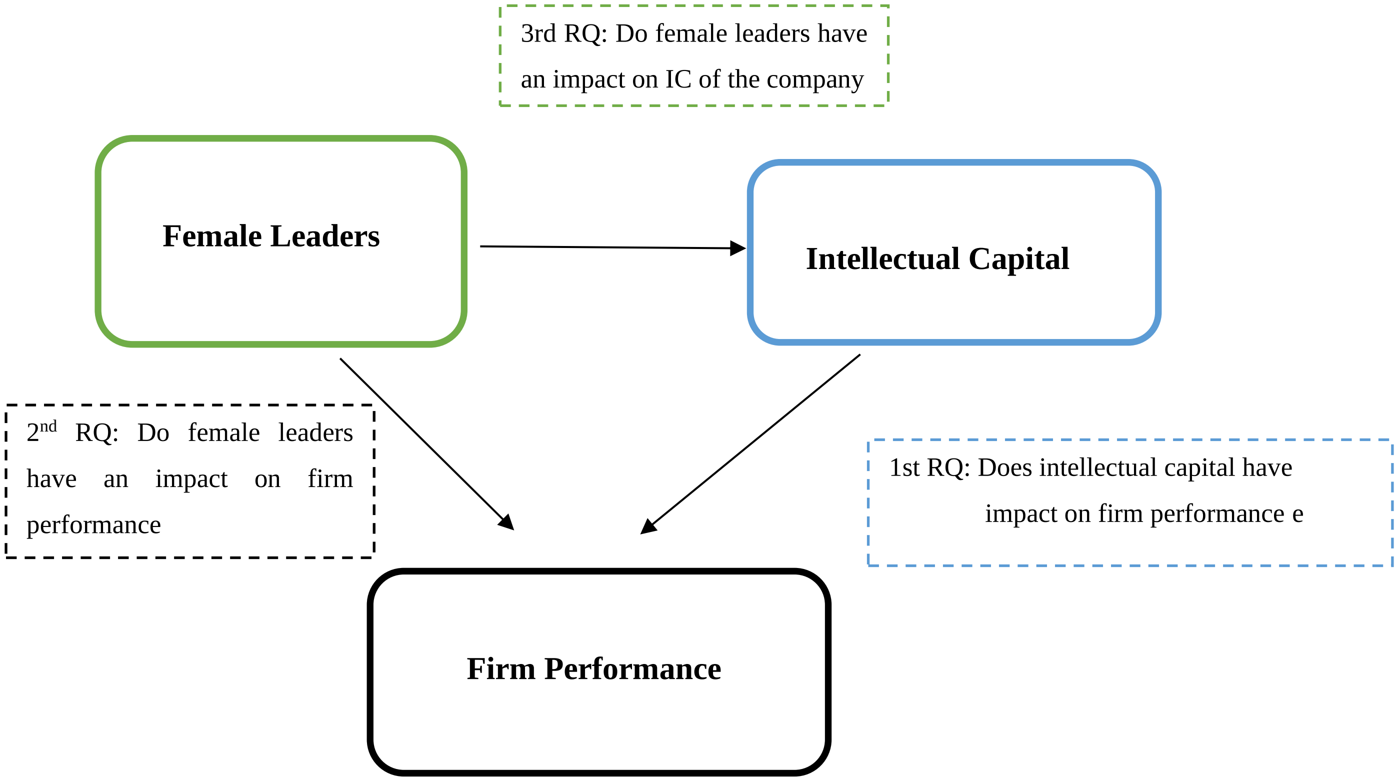
- Lack of empirical study on the impact of female leaders on the intellectual capital of UK's large companies.

- Lack of empirical study on the impact of intellectual capital on UK's large companies' financial performance.

- Lack of empirical study on the impact of female leaders on financial performance and intellectual capital of the companies up to a five-year time lag.

- Lack of empirical study on the impact of intellectual capital on companies' financial performance up to a five-year time lag.

Figure 2 Conceptual Framework



This framework will present the three relationships, which will be separately discussed in detail in the empirical studies chapters.

4.3 Research Methodology and Data Collection

The beliefs and views in a study define the research philosophy, which involves the establishment of the project and data collection. Moreover, questions about the research will be addressed based on these philosophical assumptions (Saunders et al., 2016).

Positivism, realism, interpretivism and pragmatism are the primary paradigms of research. The positivist paradigm is applied in this study since its hypotheses are concerned with the effect of intellectual capital and female directors on firm performance. Researchers' analytical tools will be used to experimentally investigate relevant theories (Saunders et al., 2016).

Two research approaches, which are inductive and deductive approaches, are suitable for the research philosophy. While the inductive approach goes from specific theories to the general ones, in contrast, the deductive strategy reaches the specific theories from the general. As a result, the deductive strategy would be appropriate for testing hypotheses based on theories that are already in existence. The implication is that the formulation of new theories necessitates that researchers should make observations. The deductive approach is applied in this research in order to probe the casual relationships among variables to examine the outlined hypotheses and, consequently, generalise about the theory rather than generate new theories (Saunders et al., 2016).

Qualitative and quantitative methods are the two methods of carrying out a study. Information collection using a descriptive and non-numerical approach, such as interviews, to explore the interpretation of social phenomena is known as the qualitative approach. In contrast, the quantitative method uses numeric data obtained from questionnaires or secondary data, as well as using different statistical analysis tools to examine the hypotheses. The decision to use either one or more qualitative methods, one or more quantitative methods, or even a mixture of both is at the researchers' discretion. The quantitative data needed for empirical analysis can be classified into three groups: longitudinal or panel data, cross-sectional data and time-series data. The variables from one entity are studied over a period as time-series data, while in cross-sectional data, variables from several entities are collected in the same timeframe. Variables from several entities, which are collected in each timeframe, are employed in panel data (Saunders et al., 2016).

For this study, an investigation into the impact of intellectual capital and female directors on the FTSE 350 companies' performance within a particular timeframe has been carried out using quantitative methods to collect panel data. As a consequence, examination of the casual relationship between intellectual capital, female directors and firm performance was carried out using multiple regression analysis. The basis of this is that when one dependent variable is suspected to be related to more than one independent variable, multiple regression analysis is employed as the best analytical method (Hair et al., 2010). The impact of corporate governance or board of directors on firm performance has been investigated in previous studies by applying multiple regression analysis (Huang et al., 2013).

4.4 Intellectual Capital Methods of Measurement

There are several methods of measuring IC that have been recognised in important literature (Andriessen, 2004; Sveiby 2010). However, no general measurement method exists. A summary of 42 methods for the measurement of intangibles was listed by Sveiby (2010). They include the technology broker (Brooking, 1996), the Economic Value Added (EVA) (Stewart and Ruckdeschel, 1998), the VAIC (Pulic, 2000, 2004), the intellectual capital index (Roos et al., 1997), the Skandia navigator (Edvinsson and Malone, 1997), the intangible asset monitor (Sveiby, 1997) and the balanced scorecard (Norton and Kaplan, 1996).

VAIC methodology, however, was not included in these classifications. This approach was added into the already existing classification and rearranged by Chan (2009):

- market capitalisation approach (MCM).
- direct IC Measurement approach (DIC).
- scorecard approach (SC).
- economic value added (EVA) approach; and
- VAIC methodology (the Austrian approach).

The approaches mentioned above are discussed and reviewed in the section below.

4.4.1 The Market Capitalisation approach

According to the MC approach, the IC of a company is obtained when the net asset value of the company is subtracted from the company's observable market value. This approach is based on the evaluation of the cost and balance sheet. One problem this approach may have is that the company's market value varies on a daily basis and may be subject to capital market speculation. In addition, this approach does not help managers easily understand the meaning of IC, its existence or how it affects the operation of a business since it does not identify IC components immediately (Sveiby, 2005).

4.4.2 The Direct IC Measurement approach

All intangible resources could be classified under intellectual capital (Edvinsson and Malone, 1997; Bontis, 1996; Roos and Roos, 1997), including how they are interconnected (Roos et al., 1997; Bontis, 1998) with two different categories if they require different managerial actions (Bontis, 1998).

In sum, human capital is the collection of intangible resources that are implanted in an organisation's members. There are three main types of these resources: attitude (leadership qualities of the top management and motivation), competencies (including know-how and skills), and intellectual agility (organisational members' ability to be `quick on their intellectual feet': entrepreneurship and innovation, being able to adapt and cross-fertilise, etc.).

According to Leif Edvinsson, Vice President and Corporate Director of Intellectual Capital for Skandia, structural capital is defined as "everything that remains in the company after 5 o'clock." The knowledge embedded within the day-to-day activities of an organisation is the essence of structural capital. Its scope is external to the human capital nodes but internal to the firm. It is made up of all the intangible resources that are the property of the company: hence, in the majority of cases, a market exists for structural capital, although it is a limited one, where the firm can sell or buy intangible resources, and this market’s dynamics resemble those controlling the market for more traditional resources (even though there are clear drawbacks as a result of the problem of correctly evaluating these intangible resources). Instead, the market for human resources, while it exists, presents completely dissimilar features, since what is `bought' and `sold' are human beings, and hence nobody can say they own them. Structural capital can be split into relationships (with external actors: customers, suppliers, allies, shareholders, local communities, government, etc.), organisation (such as culture, structure, processes and routines) and renewal and development (all future projects: new plants, R&D, BPR, new products and so forth).

The creation of a system that measures intellectual capital is basically a top-down process. The birth of the idea must come from the top management of the firm. Nonetheless, top management has the capability to supply only the framework and the language. The people at the local level who know how the business is run because they are part of it every day, 250 days a year, can create forms to be filled. Familiarity with how the business is run is very important. Crucial success factors are absolutely general, and in the majority of the cases, have to do with most companies. This is not to undermine the importance of the step required for the identification of Key Success Factors (KSFs). However, KSFs are inevitably general, and therefore can be applied to several companies, if not to all segments or industries. The type of indicators chosen is rather a close indication of the features of the company: in essence, it is limited to a specific context (Hauser and Katz, 1998). Lastly, indicators should be organised and put together based on the specific view of the company on intangible resources.

The identification of various types of intellectual capital is similar to the identification of stocks of intangible resources: this is not enough though. As a result, it is important to take measurements and control the flows of intellectual capital, that is, changes in the number of intangible resources (Roos and Roos, 1997).

Generally, IC is affected by the drawback of its own major advantage. If IC is truly very flexible as a concept, it would be right to say that it would be extremely complicated for anyone to have a clear understanding of the various contributions, even though they all suggest that slightly varying things have been provided by the same idea. As a matter of fact, this same context specificity and diversity do not allow for any comparison. Even though it is true that consolidation represents progress towards comparing companies, in this situation, the only element that can be compared is the performance of IC (i.e., changes in IC levels), and then only if similar IC systems are used by the two companies that are being considered. It is difficult to compare IC stocks (i.e., accumulated performance over time), and it remains elusive (Bontis et al., 1999).

Thus, this approach's weakness undeniably lies in the qualitative nature of the identification and determination of the major intangible assets, which may be very much influenced. This approach doesn't look like it will become a generally accepted method of carrying out a comparison of companies and uniform measurement even though there is no universally accepted definition of IC (Sveiby, 2005).

4.4.3 Balance scorecard approach

After several years of studying many companies, in a study sponsored by Harvard Business School, Norton and Kaplan (1996) suggested that managers need a measurement system that is multi-dimensional to direct their decisions: a Balanced Scorecard (BSC) comprising lagging and leading indicators and measurements that focus on the inside and outside of the company.

The BSC groups its system of measurement into four perspectives. The financial perspective comprises different measures taken in traditional accounting. But the authors' suggestion was to adopt different measures for various areas of the company, giving up comparability to match with the strategy of the Strategic Business Unit. Measures that have to do with the identification of target groups for products manufactured by the company, including marketing-focused measures of retention, customer satisfaction, etc., are grouped under the customer perspective. The internal business process takes a lot from the general notion of value chain. Norton and Kaplan combine all the processes that have to do with the realisation of products and services to satisfy the needs of customers. Lastly, the learning and growth perspectives consist of all measures that have to do with systems and employees that the company has on the ground to promote knowledge diffusion and learning (Bontis et al., 1999).

However, a BSC is, or should be, more than one collection of measures. As a result, all measures should be connected through a cause-and-effect chain that results in establishing a connection with financial results. Therefore, managers should always check if the strategy they decided to go with is being implemented correctly as time goes by (the single measures should reflect this) and then confirm if their assumptions about the cause-and-effect connections are true. However, financial results may not be achieved because either the causal chain is not the same as their hypothesis or there are longer time lags than predicted.

To build a BSC, the process starts with reinterpreting the vision in a different light or envisaging the long-term strategy through the different points of the four perspectives. This results in major success factors for every perspective, which can become critical measures. The top management team should carry out the process listed above. Essential commitment is created during this process, and hence it is important that the team does this together. In particular, the BSC can be of great help to managers when it comes to carrying out four activities:

1. Communication and linking by strategically aligning the objectives of the entire organisation;
2. Business planning by coordinating initiatives, managing targets, and budget planning;
3. Learning and feedback by updating strategies, plans, and the BSC; and
4. Making the vision unambiguous by stating clearly the mission and long-term strategy for all the organisation's constituencies.

These are recurring activities, and a spiralling movement across them should be described by the company.

The main idea behind the BSC does not go beyond genius: an extremely powerful concept is the creation of a measurement system that would allow companies to systematically keep track of several dimensions. Nevertheless, the weaknesses of BSC do not allow it to reach its full potential (Bontis et al., 1999).

Firstly, BSC is not entirely flexible. This inflexibility is apparent in various aspects of BSC. First of all, the identification of the Key Success Factors (KSFs) is driven by the perspectives. This is a limitation because some KSFs (if not most of them) will embody two perspectives, thereby simultaneously impacting many dimensions of the company's intangible resources. There is no doubt that this is not a big issue if managers can still figure out all the KSFs. However, the fear is that they will focus their attention on just the perspectives and then miss some of the important KSFs simply because they do not clearly fall into any of the categories. The perspectives can equally be somewhat limiting. According to Norton and Kaplan (1996), the four perspectives should not be restricted, and companies should increase the number as they desire, but treat them as if they are a complete classification of all likely measures, which disagrees with the statement they made earlier. At the same time, when it comes to the external environment, this is limited to the customers. Companies communicate and take advantage of the relationship they have with other actors, such as the alliance with partners, suppliers, unions, local community, and the final consumers (Bontis et al., 1999).

One other problem of BSC is that it considers employees as an afterthought. From the learning and growth perspective, both the personnel and IT systems are lumped together. Apart from that, innovation (the outcome of human learning and action) forms part of the focus of the internal business process. Innovation is seen almost as a routine, something the organisation can carry out without the personnel, or at the very least without the help of the personnel. As a result, the BSC undermines this particular drawback of managing people and their knowledge. In addition, knowledge is made more real/concrete, i.e., it is seen as a physical thing: this misunderstanding might strengthen the mistake some companies make, which is to believe that it is enough to manage knowledge automatically by creating an IT system.

Lastly, it is not possible to undertake external comparison. Honestly, the BSC is meant to be an internal document, so this is not a disadvantage per se as much as an assumption (Bontis et al., 1999).

4.4.4 Economic Value-Added Approach (EVA)

In the late 1980s, a New York-based consulting firm, Stern Stewart and Co., introduced Economic Value-Added Approach (EVA) as a tool to help companies go after their main financial directive by helping their shareholders maximise wealth (Stewart, 1994). Broadly speaking, EVA is a comprehensive system that measures financial management, which can be used to merge financial planning, capital budgeting, goal setting, shareholder communication, performance measurement, and incentive compensation. EVA's objective is to develop a measure of performance that accurately considers all the ways the corporate value could be added or lost. EVA helps managers to take every decision based on the main principle of maximising the value of shareholders by building accountability into a measurement system. As a result, Stern Stewart and Co. claim that EVA is the only performance measure that accurately considers all the complicated trade-offs associated with creating value.

Certainly, the concept is not an outright revolution. The General Motors patriarch, Alfred Sloan, knew EVA as early as the 1920s, although not by that name. As a matter of fact, accountants have known a closely related acronym for a long time: RI, or residual income. Residual income is the value that remains after the compensation of other providers of capital and the stockholders of a company. EVA is slightly different because it has been developed further and taken very seriously by consultants, practitioners, and researchers (Bontis et al., 1999).

EVA equals the difference between net sales and the grand total of taxes, operating expenses, and capital charges. To make this more formal:

EVA=Net sales –Taxes – Operating Expenses – Capital charges

Capital charges are calculated by multiplying the total capital invested and the weighted average cost of capital. Practically, if the weighted average cost of capital is smaller than the return on net assets, EVA is increased, and vice versa.

EVA might be a reasonable way to measure IC if we agree with the assumption that a company's increase in EVA is only the result of effectively managing the knowledge assets of the company and nothing else. It might be difficult to accept this challenging assumption because of the contribution of tangible assets to the growth of a company, as shown by the resource-based view (Barney, 1991). On its own, IC may not work without the support of tangible assets such as machinery, stock, and financial capital (Bontis et al., 1999).

In addition, EVA does not clearly have anything to do with the management of intangible resources; the implied argument here is that effectively managing knowledge assets will increase EVA. What this means is that these investments should still be evaluated based on the standard criteria for evaluating any long-term project: cost-benefit analysis, net present value and so on and so forth. This is as a result of the short-lived nature of intangible resources: how can a training programme be evaluated in terms of worth? Or of the development of a database for best practice? What about capitalisation, depreciation, and amortisation of R&D, outlays, market building, acquisition premiums, restructuring charges, and other `strategic' investments that have deferred pay-off patterns (Bontis et al., 1999)?

4.4.5 Value Added Intellectual Coefficient (VAIC)

Many studies have suggested that VAIC or the Austrian approach may be a potential mechanism for IC measurement. Under Pulic (2000), the approach was devised by the Austrian Intellectual Capital Research Centre (AICRS). The Greek banking sector and the Austrian banking sector, including listed companies in the UK, have all used VAIC (Pulic, 2004; Mavridis and Kyrmizoglou, 2005). A somewhat quantitative and simple approach based on the accounting data of a company is offered by VAIC for IC measurement and its components.

The literature on this also shows that VAIC has recently been used in Asia, including Malaysia, Japan, Singapore and Taiwan, to study corporate financial performance and IC (Shiu, 2006).

Corporate intellectual ability is an essential concept in the VAIC methodology, and it refers to the efficiency of total value creation as a result of IC and physical capital working jointly in a business environment (Pulic, 2004). It is assumed that IC cannot operate on its own without the help of physical and financial capital. The VAIC measures corporate intellectual ability, which indicates the overall efficiency or ability of an organisation to use every resource of IC and physical capital to create value for the organisation. If more value is achieved with a similar amount of company resources, it is an indication of a higher VAIC (Pulic, 2004) and would deal with the efficiency of the total value creation of a company as a result of two key resources:

(i) capital employed: comprising physical assets and financial capital; and

(ii) intellectual capital: comprising structural IC and human IC.

Explicit economic values, capital employed (CE) and value added (VA) are assigned by the VAIC model to structural capital (SC) and human capital (HC). On this basis, an unambiguous VAIC index is generated. VAIC or corporate intellectual ability is defined as:

$$\mathbf{VAIC = HCE + SCE + CEE}$$

Where:
VAIC =Value-added intellectual capital efficiency
HCE = Human capital efficiency,
SCE = Structural capital efficiency, and
CEE = Capital employed efficiency

The efficiency of the total value creation in a firm is measured and monitored by the VAIC model. More clearly, the VAIC is an indication of the overall efficiency of value creation from the entire resources used, and this shows the efficiency of value created by the IC utilised. Hence, VAIC is a relational index that compares produced added value to human capital and capital employed (i.e., employee expenses). If structural capital is negative or zero, the values of VAIC may be zero or negative. Practically, it is the sum of the ratios of value added to human capital and capital employed (known as employee expenses) (Ståhle et al., 2011).

In supporting the utilisation of VAIC in the current study, one of the main things that is considered has to do with focusing on IC management practice, namely the reporting and measurement of IC. This implies that the industry and management may easily use the chosen method, and the indicators and results derived may also gain the respect of fellow industry professionals and IC practitioners. Undoubtedly, the ability to verify the data collected for the compilation of the indicators and measurements is probably going to get increased attention due to the derivation on which the methodology is based and the general acceptability of the conceptual model. For instance, all the data required to calculate VAIC may be found in the audited financial reports of a company. This improves the objectivity of the calculation, and it can be easily verified. The reason for using the VAIC methodology in the current study is summarised below (Chen et al., 2005).

The benefits of the VAIC methodology:

- Its measurements are objective, quantifiable and quantitative, and it does not require any subjective grading and award of scores or scales. It also allows for more computation and statistical analysis of a big sample size that may be up to thousands of data items gathered over a certain period.
- It provides useful, relevant and informative indicators to all stakeholders, not just shareholders. These indicators may also help figure out and compare the major components of IC in order to evaluate the performance of a company.
- It makes use of financially oriented measures so that computed ratios, indicators or relations may be used for comparison together with traditional financial indicators frequently used in business, which are based on measures or units monetarily derived.
- It makes use of somewhat straightforward and simple procedures in the calculation of the required coefficients and indexes, which may be understood easily, especially for people in management and business who are used to information on traditional accounting.
- It produces standardized measurement. The indexes or indicators calculated may be applied consistently to and utilised for comparison on an industry, company, and national level, which means that benchmarking may be possible.
- It uses published or public financial data to improve measurement reliability and enhance the availability of data.
- It provides a measurement system for IC that aligns with the resource-based view and stakeholder view by using a value-added approach.

- Employees or human capital is treated as the most vital source of IC, which agrees with all the key definitions of IC found in the literature.
- It has a reputation for being deployed and applied in the IC research of companies listed in several countries, which researchers may refer to when they review published papers.

To sum up, the need for a practical method to measure IC for the present study has been fulfilled by VAIC. The focus has now shifted to earlier empirical studies carried out in Europe, Asia and Africa, in which VAIC was utilised as an IC measuring tool (Chan, 2009).

Recent studies have challenged the use of the VAIC model for measuring efficiency. The VAIC methodology was modified by Chang (2007), adding intellectual property (IP) components and R&D expenditure into VAIC when measuring IC. According to Chang (2007), the sub-component of VAIC–SC efficiency might not be complete given that it does not consider intellectual property and R&D expenses. Currently, intellectual property assets and R&D expenditures (Brooking, 1996) have a huge impact on business. Thus, those intellectual property assets and R&D expenses should be seen as asset-like investments (Chang, 2007). Different authors have noted the benefits and drawbacks of VAIC as a tool for measuring IC (Ståhle et al., 2011).

In addition, the model is unable to handle companies with a negative operating profit or negative book value of equity, which leads to a negative value for "value added". This then means that the company uses its input resources more than its output resources. The negative sign appears in all later indexes, resulting in meaningless analysis.

The existence of an inverse relationship between SC and HC (Pulic, 2000) is not instantly noticeable from the model even though it is theoretically sound and agrees with the universal definition of IC to work out structural capital by subtracting value added from human capital. This type of inverse relationship is reasonable and intuitively valid, although it may require more empirical support before it can be accepted by a wider audience. The VAIC model is also criticised because it may not adequately identify the synergistic effects of creating value from the interactions of various forms of capital (Andriessen, 2004). This criticism may apply to other IC models too. The VAIC methodology shows exactly what each component (among structural capital, human capital, and capital employed) contributes to value added.

Nevertheless, the components of IC may interact (Bontis et al., 2001), and, thus, it may be difficult to know the contribution of each resource to value creation. For instance, advancements in computer automation or IT (which is an element of structural capital) sometimes improves labour productivity (which might be seen as an improvement in the efficiency of human capital). So, it may be difficult to isolate how each factor facilitates an increase in SCE, HCE, or CEE. Nonetheless, for the aim of finding an objective measurement method for IC and an indicator, the VAIC methodology has been widely used in various contexts because it can be easily administered. It allows for an objective and financially based measure of the efficiency of IC. This is because it uses audited financial data that can be easily accessed (Chan, 2009). With the VAIC methodology, you are sure of an objective and more standardised measurement base, unlike other models for measuring IC, which require any customised work to fit the features of the individual companies (Chu et al., 2011).

4.4.6 Recent IC Studies using VAIC Method in the UK

After consideration and comparison of IC measurement methods, VAIC methodology has been selected in this study to be used in the first and third empirical studies. In terms of sample selection and data collection, this study is similar to studies that were conducted in other countries. The VAIC approach will provide a holistic and objective viewpoint that helps large companies in the UK to consider it as well as its practicality compared to the other methods mentioned in the previous chapter.

The previous study's sample comprised all UK companies listed on the London Stock Exchange. Those companies were also on the "Value Added Scoreboard" database made available by the UK DTI. In total, 342 companies made up the original data sample. These companies contributed greatly to the VA in the UK in 2005. Following the suggestion by Firer and Williams (2003) and Shiu (2006), companies that had a negative book value of equity or companies that had negative SC or HC values were removed from the sample. Moreover, companies that had some of their data missing (unavailability of yearly reports in consequence of the merger, repurchase, suspension, delisting) were removed. Lastly, to have control over the presence of "outliers" or extreme observations in the sample, companies that had the chosen variables at the extremes of every distribution were removed. Thus, the final sample was reduced to 300 UK companies. The study used three industry groups: traditional, high-tech and services. This was different to previous studies where only one sector was used. Research evidence shows that there was a notable positive relationship between the economic performance of a company and the value-added intellectual capital coefficient. This shows that IC can help reduce the production costs of a company. Further, the results also indicate that the value-added intellectual capital coefficient has a significant positive relationship with the financial performance of a company. This finding agrees with the important role IC plays in creating value for stockholders and other stakeholders. However, only in the high-tech industry is the link between the stock market performance of a company and the value-added intellectual capital coefficient significance. This shows that UK investors view IC as a source of "value creation" only when it comes to this sector. Lastly, the results indicate that VACA has a great positive association with the financial and stock market performance of a company. According to these findings, capital employed (financial and physical) is the most important to stakeholders and stockholders through its important function in value creation. Nonetheless, the results show a negative relationship between the VACA and the company's 2005 economic performance (Zéghal and Maaloul, 2010).

A series of tests, such as a strict exogeneity test and dynamic OLS, were applied to the other study carried out by Nadeem et al. (2017) to show that the nature of this relationship is dynamic and that applying static estimators such as fixed-effects and the traditional OLS can produce biased results. Dynamic panel data estimation was used in this study to solve the endogeneity problem in analysing the relationship between the financial performance of the companies and IC. A two-step system generalised method of moment’s estimator was used, which can include this dynamic relationship to generate valid instruments that can be used to overcome simultaneity issues and unobserved heterogeneity.

The study included 774 firms publicly listed on the London Stock Exchange from 2005 to 2014 to take a measurement of the relationship between firm performance (in terms of ROE, ROA, P/B and ATO) and IC efficiency (which was determined by measuring VAIC). The results showed that the efficiency of IC (VAIC) is significantly and positively linked to firm performance, especially with ROA, and weakly with ROE but not significantly linked with P/B ratio or ATO. They further analysed individual components of VAIC, i.e., structural, human and physical capital. Their findings showed that physical capital and the structural capital are very well related to firm performance. The correlation between firm performance and human capital is not significant; however, there is a significant relationship when they applied fixed-effects and static OLS in the study. The financial crisis of 2008 and the interaction terms of IC showed that the efficiency of IC was generally not changed during the financial crisis. Also, they found out that the current IC efficiency is linked to the firm’s past performance for up to three years. This means that investments in IC resources require some time before they start giving a return. To policymakers, these findings are useful when deciding to invest in IC resources (Nadeem et al., 2017).

In addition, there are three control variables employed in the current study which may have an effect on the impact of female directors on intellectual capital and firm performance, namely firm size, firm industry and number of employees. The FTSE 350 companies, which include the most powerful listed companies on both financial and economic grounds, are selected because of their similitude with respect to most prior research that has been carried out in regard to large companies (for example, large companies have been the main focus in the USA). Also, in the UK, the application of the Corporate Governance Code is more common in larger companies than in smaller ones.

A quantitative research approach is inclusive of the positivist social sciences paradigm, which shows the scientific method of social sciences (Creswell, 1994; Jennings, 2001). A deductive approach to the research procedure is embraced by the positivist paradigm. The approach commences with theories and hypotheses on a specific phenomenon; it then progresses to the collection of data, and thereafter statistical analyses of the data are undertaken in order to either support or reject the initial hypotheses (Welman and Kruger, 2001).

The researchers apply a deductive approach in relation to the quantitative approach and use a theory to design the research and interpret their findings (Neuman, 1997). Rather than construct a new theory, a proposed theory is examined and validated by this research approach (a framework is proposed for the whole study by the identified theory, aiding as an organising model for the data collection process and the research hypotheses). In conclusion, the construction of this research approach is objective. The results of the research are often characteristic of the population under study (Neuman, 1997).

Empirical studies employ quantitative methods such as financial data analysis to ascertain the effectiveness of corporate governance. This justifies the researcher’s decision to precisely employ the quantitative research approach in regard to this particular research. Previous research depicts the percentage of non-executive directors out of the total number of directors as a measure of the independence of the board (as an example of the board composition variable). The impact of board composition on firm financial performance is interpreted by these measures.

The role of corporate governance and its effect on the performance of a firm has been examined in previous research. This made the development of hypotheses that can be tested and the research intentions easy to develop. Nevertheless, the positivist approach was used in this research. Data surveys created from an analysis of published sources were used in this explanatory research (Clarke, 2004). This research is related to the scientific, quantitative, experimental, and deductive frameworks. The researcher is interested in simple quantifiable observations. Thus, the researcher regularly employed statistical methods to test the hypotheses (Neuman, 1997). The difficulty in obtaining access to the required information prevented the use of other paradigms in this research.

4.5 Variables Definition and Measurement

Independent variables were classified into two main categories. Part one contains the intellectual capital, and part two is dedicated to female directors. The second category contains the roles and occupations of females on boards (chairperson, CEO, executive and non-executive). The dependent variable (firm performance) is measured using both accounting-based measures (ROA) and market-based measures (Tobin's Q). Each variable will be discussed in turn in the following sections.

4.6 Independent variables' Measurement

Variables will be discussed based on empirical studies, Therefore Part one will discuss variables related to the first empirical and Part two is related to the second empirical study. The third empirical study will have the same measurement as first and second studies.

4.6.1 Intellectual Capital as an Independent Variable

The value-added intellectual capital (VAIC) indicator developed by Pulic (2000) was applied to measure the level of intellectual capital in the firm. Pulic (2000) stated that this composite coefficient is calculated as a sum of capital employed coefficient (CEE) and intellectual capital efficiency coefficient (ICE). The first coefficient (ICE) consists of structural capital efficiency (SCE) indicator and a human capital efficiency (HCE) indicator. HCE indicates the amount of value added (VA, a difference between the total output and total input that represents the newly created wealth) created by the human capital (HC, total cost of labour, which represents the investment in knowledge workers). The calculation formula is as follows: HCE=VA/HC. SCE takes a measurement of the share of structural capital (structural capital and human capital are inversely proportional here, SC=VA-HC) in creating value added. This is what the calculation formula looks like: SCE=SC/VA. Thus, the value of ICE is the sum of SCE and HCE. The latter coefficient (CEE) acts as an asset value efficiency indicator, and it is the value (VA) created by a unit of financial and physical capital of a company (CE). The formula for the calculation is as follows: CEE=VA/CE (Pulic, 2000).

The VAIC is a designed analytical procedure that allows the shareholders, management and other important stakeholders to effectively monitor and examine the efficiency of value added using all the resources of a firm and each significant resource component (Ho and Williams, 2003). The VAIC introduces a unique concept of 'corporate intellectual ability' unlike traditional accounting whose focus is on controlling costs (Pulic, 2004). It has to do with the total value creation efficiency of the firm, which comes from two major resources: 1) financial or physical capital (capital employed efficiency); and 2) intellectual capital, which comprises structural IC and human IC.

The VAIC is formally a composite sum of three indicators, which are: (1) capital employed efficiency (CEE), which is an indication of how much value is created for every monetary unit invested in physical or financial capital; (2) human capital efficiency (HCE), which indicates the efficiency of value added by human capital resources employed; and (3) structural capital efficiency (SCE), which is an indication of the efficiency of value added by structural capital. The VAIC relationship is formalised algebraically as follows:

Independent variables. The current study contains four independent variables (Pulic, 2000):

(1) VACA, which is an indicator of value-added efficiency of capital employed.

(2) VAHU, which is an indicator of value-added efficiency of human capital.

(3) STVA, which is an indicator of value-added efficiency of structural capital.

(4) VAIC, which is the composite sum of the three separate indicators.

To calculate the above variables, the first thing to do is to calculate VA. The calculation of VA is based on the methodology proposed by Riahi-Belkaoui (2003).

Secondly, human capital (HU), capital employed (CE), and structural capital (SC) are also calculated.

CE= Total assets- intangible assets

HU= Total investment in employees (salary; wages; etc.)

SC = VA – HU

Finally, VAIC and its three components are calculated too:

VAIC=HCE+SCE+CEE

A high coefficient shows that there is a higher value creation using the resources provided by the firm, including IC. Below are the different phases one must go through in order to execute the VAIC method.

Step 1: Value added (VA)

According to Pulic (2004), VA is the most important indicator for the success of a business. A firm's VA is calculated using VAIC by subtracting input from output, whereby personal expenses are not part of the input. Financially, this is equal to:

Eq. (1) VA = Output – Input

where: VA = Value added, Output = Total income, Input = Total expenses (excluding employee cost).

Step 2: Human Capital Efficiency (HCE)

To calculate HCE, divide the company's VA by its HC (all the expenses for employees are covered in human capital) to practically show the real productivity of personnel of the firm, i.e. the value the company creates per unit of monetary investment in human resources. The calculation of HCE is as follows:

Eq. (2) HCE = VA/HC

Step 3: Structural Capital Efficiency (SCE)

According to Pulic (2004), SC and HC are reciprocal. If HC participates less, then the SC participates more (SC = VA – HC). To calculate SCE, divide the firm's SC by its VA. SCE is a measure of how much capital a company can create per unit of investment in VA, i.e. it takes a measurement of the efficiency or productivity of VA from structural capital.

Eq. (3) SCE = SC/VA

Step 4: Capital Employed Efficiency (CEE)

According to Pulic (2004), IC might not work on its own and needs to work in conjunction with physical and financial capital to create value. In addition, to get a full insight into how efficient value creating resources are, it is important to consider both physical and financial capital. The CEE of a firm is calculated by dividing its VA by its CE (where CE = book value of the net assets of company):

Eq. (4) CEE = VA/CE

Step 5: Value Added Intellectual Coefficient (VAIC)

The last step is to calculate the VAIC. The VAIC is the composite sum of the capital employed efficiency and the intellectual capital efficiency, and this shows how much value a firm is able to create in total for every monetary unit invested in each resource.

Eq. (5) $\quad VAIC = HCE + SCE + CEE$

The efficiency in using IC and the amount of VA can be quantitatively measured using the formula above. A high coefficient is an indication of a higher value creation using the resources of the firm, including IC.

The VAIC has its advantages and disadvantages. In terms of advantages, the VAIC provides a consistent and standardised basis of measurement, allowing for effective comparative analysis. Forty-two (42) methods of measuring IC were outlined by Sveby (2007), and none of the methods of measuring IC is considered the best. Secondly, the VAIC uses audited financial data that is publicly available. Therefore, the calculations can be easily verified and are considered objective (Pulic, 2000; Pulic, 2004; Ho and Williams, 2003). Other IC measures were criticised because their measurement is subjective and cannot be verified easily (Williams, 2001; Sveby, 2007). Thirdly, the VAIC technique is straightforward, which improves cognitive understanding and allows various external and internal stakeholders to easily do the calculation (Schneider, 1999). Lastly, the IC research of listed companies in various countries is adopted in the VAIC method.

The first step is to calculate corporate value added as:

VA=OUTPUT-INPUT

VA is corporate value added. It is usually calculated from the two factors SC and HC; OUTPUT is the total earnings; and INPUT is the total amount spent on services provided and materials. Wage is not seen as a cost in this model since these types of costs play a major role in creating value, and they are known as capital. Therefore, the following expression can be used to calculate value added:

VA=OP+EC+D+A

where OP is operational profit; D is deprecation; EC is employee cost; and A is amortisation.

The second step has to do with calculating the efficiency of the capital employed (VACA). Pulic assumes that in this model, a unit of capital employed results in more output than other elements, so it is better to calculate this capital first. Later, the coefficient can be used to calculate the value added of financial capital:

VACA=VA/CA

where VACA is the value added of the capital employed. CA is the capital employed, which is equal to the book value of total assets minus intangible assets.

The third step has to do with calculating the efficiency of human capital (VAHU). It is an indication of the added value of each dollar paid as workers' salary.

VAHU=VA/HU

where HU is the total employee cost considered as human capital, and VAHU is the value-added human capital.

The efficiency of structural capital is calculated in this step. Structural capital is equal to value added minus human capital in this model:

SC=VA-HC

where, SC is structural capital.

SCVA=SC/VA

We can finally calculate the value-added intellectual coefficient (VAIC) as:

VAIC=VACA+VAHU+SCVA (Alipour, 2012).

Calculus of VAIC

To incorporate the other contributions from the literature (e.g., Ståhle et al., 2011), the key points of the VAIC are taken into consideration in this section. Pulic's main idea is to maintain that the value-added income statement can also be used in a knowledge organisation if interpreted appropriately in order to measure value creation and the knowledge workers' productivity. Like Skandia Navigator, Pulic is not interested in measuring the value of IC but the value created by human resources or IC. In fact, intellect is a typical characteristic of humans. A value-added income statement, according to Pulic (2008), is shown in the following table. The performance of a knowledge organisation (value creation and work productivity) can be measured using starting indicators. According to Pulic, the fundamental equation of value accounting is:

(1) VA=HC+SC

Dividing both sides by VA:

VA/VA= (HC+SC)/VA

1= (HC/VA) + (SC/VA)

And then:

(2) 1=1/ (VA/HC) + (SC/VA)

By placing:

HCE = VA/HC (HCE or work productivity)

SCE = SC/VA (Structural capital efficiency)

Then we have:

(3) SCE=1- (1/HCE)

Thus, the term HCE is an indication of the productivity of knowledge workers. When the value created by each employee (HCE) goes higher, the part of VA obtained by SC holders (SCE) also increases. It results that:

(4) (dSCE/dHCE) = (1/HCE^2) >0

As has been shown, HCE = 1 is the break-even value that marks the transition from the value destruction zone (SCE < 0) to the value creation zone (SCE > 0).

Further:

- If productivity of knowledge workers is <1 (HCE<1), then VA cannot cover salaries and wages (VA<HC) and then SCE is negative. There is value destruction.
- If HCE = 1, or if SCE = 0, then VA covers only the employee costs and there is no value creation.
- If HCE >1 or if SCE > 0, there is value creation, and VA covers employee costs.

Note that the condition HCE >1 is important for the existence of a profit-oriented firm. In fact, if

0 <HCE≤1, no operating profit would be produced by the firm (VA≤HC) and then it will not be able to exist as a profit-oriented firm. To a greater extent, a profit-oriented firm cannot exist with VA<0 (HCE<0), a possibility excluded by hypothesis.

The definition of ICE, according to Pulic, is:

(5) ICE = HCE + SCE

The concept of ICE should not be confused with the concept of productivity of Capital (HCE). As a matter of fact, the SC "returns" (has an efficiency), however it is not directly productive like HC (SC does not produce). The relationship between productivity (HCE) and efficiency (ICE) can be highlighted by replacing (3) in (5). We have:

(6) ICE = HCE + SCE = HCE + (1- $\frac{1}{HCE}$)

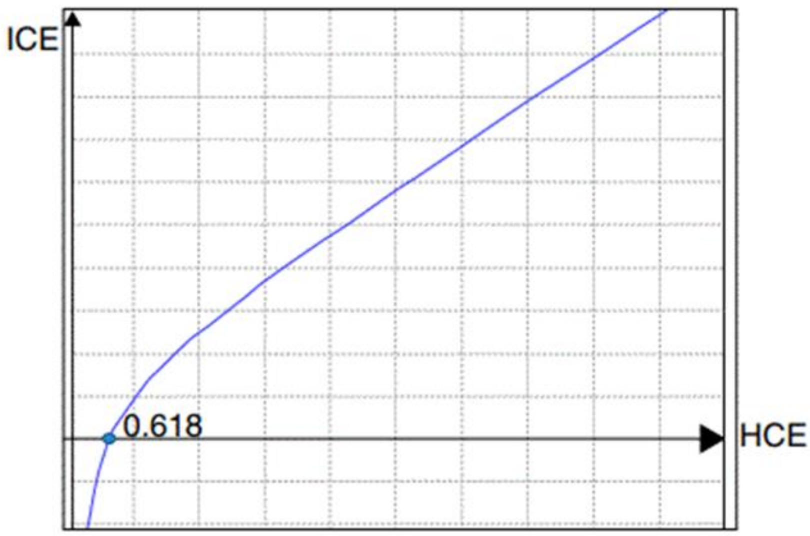
Or: (7) ICE = (HCE^2+HCE-1)/HCE

As can be verified immediately, there is a direct link between ICE (efficiency) and HCE (productivity); i.e.

(DICE/DHCE)>0

Figure 2 demonstrates that there is a break-even value for HCE = 0.618. ICE is negative under this value.

Figure 2:



Source: Iazzolino and Laise, 2013

In Table 2, some benchmark values for ICE were calculated by Pulic. These are useful for quickly evaluating the performance of a firm. The authors calculated SCE and HCE using (5) and (6) or (7). Pulic sums up his analysis by creating an overall efficiency indicator defined as:

(8) VAIC= ICE + CEE

where: CEE = VA/CE is the capital employed efficiency; CE is the book value of capital employed. Pulic's proposal has been described briefly. His proposal indicates that the tools used for traditional accounting, which are based on the value-added income statement, can be used to measure the efficiency of IC and the productivity of knowledge workers if correctly interpreted and used. Pulic asserted that "similar to Taylor's system of manual work, intellectual capital efficiency is introduced providing a base for productivity increase of knowledge workers" (Pulic, 2008, pp. 12-13).

4.6.2 Female Directors as an Independent Variables

There are two ways of measuring female directors as independent variables: the proportion of an indicator variable and female directors is denoted as 1 if at least 30% of the directors on the board are female and 0 otherwise. In the literature (e.g., Hafsi and Turgut, 2013; Adams and Ferreira, 2009; Campbell and Mı´nguez-Vera, 2008), the proportion of women on the board is a common measure. The critical mass theory is the basis for the second measure. This theory states that a good number of adopters of an innovation in a social system is important in order for the rate of adoption to be able to sustain itself and create more growth (Kanter, 1977). In regard to the critical mass theory, a critical mass of three women or more is the least required to effect a fundamental change in the boardroom (Torchia et al., 2011). Considering the difference in the board size of our sample, the 'three or more female directors' indicator proposed by Torchia et al. (2011) will not be used. Alternatively, the related indicator at least 30% of female directors has been used due to the impact of three women or more on a board of four members (the minimum value) can vary distinctively from their impact on a board of 42 members (the maximum value). The dependent variables are being regressed on the lagged women on board variables. This procedure has been done in order to address causality concerns and because the probable consequence of having female directors is unlikely to materialise immediately. The sensitivity of the results to this assumption is examined in the findings section.

Two independent variables are being used – the percentage of CEO/Chair and the percentage of independent directors. The two variables are measured in terms of the percentage of the board. In a situation where a company has supervisory and management boards, the structure of the board is defined in terms of the supervisory board.

4.6.3 Board of Director Characteristics

The measurement of each of the board characteristics that may affect the firm's financial performance in accordance with the literature review will be explored in this section. These board characteristics are mainly Board size, Director nationality diversity and Directors' age diversity.

4.6.3.1 Directors' Nationality Diversity

The diversity of boards of directors in the UK, according to Veen and Elbertsen (2008), is more than in other countries such as the Netherlands and Germany. Nevertheless, among 13 European countries based on international experience, the UK follows Switzerland, which is first in the financial sector. According to Estelyiova and Nisar (2012), 13% of foreign directors were appointed by UK-listed firms between 2001 and 2011.

Hiring foreign directors can increase Tobin's Q due to the enhanced decision-making and problem-solving as depicted in prior research carried out in Korea by Choi et al. (2012) and in Norway and Sweden by Oxelheim and Randoy (2003). Nationality symbolises an individual's background, perception, perspective, and behaviour (Hambrick et al., 1998). Also, people from different countries possess varying values, awareness and expertise, and this would help the company in a complicated situation.

In this study, people from different countries are categorised into three and are denoted by a dummy variable. Thus, UK nationality is equal to 1, EU nationality is equal to 2, and the rest of the world is equal to 3.

4.6.3.2 Directors' Age Diversity

In the firm, age diversity has become the goal or stated policy for many corporations. The first Code of Practice on Age Diversity in Employment in the UK was written in 1999. It provides a set of voluntary measures used to enhance the fairness and productivity of the company across six topics, namely selection, recruitment, training and development, promotion, redundancy and retirement. Positive firms report higher productivity, higher staff morale, and access to a wider customer base, according to findings from the UK, which drives towards greater age diversity (Department for Work and Pensions, 2002). All three of the paradigms (discrimination/fairness, access/legitimacy and learning/effectiveness) are in line with these topics and reports which have been examined. We are particularly interested in the last two – those ones that are closely connected with the resource dependency theory and positive reports. These last-mentioned paradigms need more than just statistical fulfilment of diversity quotas within the corporation.

A mathematical model was used by Hong and Page (2004) to prove that "diversity trumps ability". Hence, this model examined only a snapshot in time and disregarded the learning component.

Nevertheless, with a hard problem and a heterogeneous group of people – hard meaning that no one can solve it – their model predicts that it is very efficient to randomly select problem-solvers instead of picking the same selection size because they scored well in a relevant test. Their result relies upon the idea that an increase in the sample population will result in increased and similar top-scoring problem-solvers, making the random selection more and more diverse, thereby improving the decision-making ability.

The only empirical study (based on Canadian firms of the TSE 300) of the relationship between firm performance and age diversity on the board of directors was conducted by McIntyre et al. (2007) in order to predict board function and improve board processes and increase the use of organisational behaviour theory. The average (mean) age of directors on firm performance will be used in the study.

4.6.3.3 Executive Director's Age

The effect of the age of executives on the success of a firm has gained attention in the literature, as it can be inferred that executives who are older have a competitive advantage over the younger executives, who, unavoidably, have less business experience. Davis (1979), in a seminal paper, inspected the connection between corporate performance and executive age and discovered no connection between the two. However, Bertrand and Schoar (2003), in a more recent study, suggested older executives are more conservative in their work, which may have an effect on the performance of the firm. Nevertheless, the effect can either be negative or positive. Davidson et al. (2007) investigated the impact of an executive's professional horizon on the company's earnings management. Interestingly, they discovered that CEOs close to the retirement age have large accruals in the year before they retire. Older CEOs are prone to selecting projects that pay off before their retirement (Gibbons and Murphy, 1992). Similarly, Hirshleifer (1993) suggested that younger CEOs may channel their attention to short-term goals, which are driven by the desire to make a name for themselves. So, in general, prior literature shows that the age of the executive may affect the performance of a firm, but the empirical evidence is mixed (Peni, 2014).

Barker and Mueller (2002) and Herrmann and Datta (2002) stated that the age of the chairman is measured in years, and so the same should be obtainable in terms of the executive and non-executive ages (Zhang, 2017).

Notwithstanding, McIntyre et al. (2007) measured age diversity as the spread of directors' ages ranges between the oldest and youngest directors.

4.6.3.4 Board Size

According to Klein (1998), Hermalin and Weisbach (1988), Adam and Mehran (2003), Coles et al. (2008), and Anderson et al. (2004), the size of a board is an indicator of both advisory and monitoring roles. Recent discovery shows that the size of the board increases with firm size and firm age (Coles et al., 2008). To study its impact, different studies measured the size of a board as the total number of directors on the board (Coles et al., 2008). Thus, in this study, the size of a board will be measured as the natural logarithm of the overall number of directors (McGuinness et al., 2017).

4.7 Dependent Variables Measurement

In order to empirically examine board characteristics' impact on the firm performance, appropriate performance measures should be selected to allow for objective analysis. A variety of financial measures were traditionally used in exercising the role of the boards. Those financial measures are ROA (Zajac and Westphal, 1996; Shrader, Blackburn and Iles, 1997; Kiel and Nickolson, 2003); Tobin's Q (Yermack, 1996; Kiel and Nicholson, 2003); return on investment (Adjaoud et al., 2007); sales revenue (Bhagat and Black., 1999); ROE (Bhagat and Black, 1999; Adjaoud et al., 2007); stock returns (Bhagat and Black., 1999); earnings per share (Adjaoud et al., 2007).

The literature on corporate governance categorised performance measures into two broad sets: accounting-based measures and market-based measures. Empirical studies on corporate governance use either market-based measures or accounting-based measures to measure firm performance. Users of accounting-based measures, like Klein (1998) and Core et al. (1999), use ROA as a performance indicator. Bhagat et al. (1999) and Adjaoud et al. (2007) used ROE as a performance indicator. Brown and Caylor (2005) used both ROA and ROE as the two operating performance measures. Users of market-based measures, like Mehran (1995) and Yermack (1996), used Tobin's Q as a performance indicator. Barnhart et al. (1994) and Vafeas (1999) used market-to-book value ratios as a performance indicator. To a great extent, there is much debate as to which measures are the most reliable. A study conducted by Dalton et al. (1998) showed that there is no agreement about which measurement is more reliable.

As a result, and based on the literature, this research will use both accounting-based and market-based performance measures. ROA will be used as the accounting-based performance indicator, and Tobin's Q will be used as the market-based one.

4.7.1 Accounting-Based Performance

Financial-based indices like ROE and ROA are traditionally used as a measure of performance (Usoff et al., 2002). ROE measures how efficient a firm is at making profits from every dollar of net assets, and this explains how well a firm uses investment dollars to generate earnings growth, while ROA is an indication of how management efficiently uses its assets to generate earnings. These performance measures that are based on traditional accounting have been criticised because they could not adequately inform strategic decisions. In particular, they don't take into consideration the cost of funding the projects that generate these returns and, therefore, cannot be used as instruments to guide managers when they are looking for areas that create value. Furthermore, they fail to provide a detailed explanation of why organisations perform low and sometimes high (Bontis, 1998). Nonetheless, Stewart and Ruckdeschel (1998) maintained that financial-performance measures, especially ROA, were more suited for IC studies due to the fact that they can be used to explain the financial value of intangible assets.

The gross ROA financial indicator was used in both studies as a dependent variable to measure the performance of a firm. This indicator is a typical firm performance financial indicator in both entrepreneurship and strategy research and intellectual capital (Javornik et al., 2012. Gross ROA equals the ratio of gross profit and book value of the total assets of the company. It is an indication of the profitability of a firm in relation to its overall assets.

In female director studies, ROA measures performance by showing investors to what extent the firm has generated earnings from its invested capital (Epps & Cereola, 2008). In other words, ROA indicates the management achievement in regard to the given assets or resources, as managers are responsible for utilising the firm's assets being part of the firm's operations. Agency theorists argue that managers would most probably disseminate profits with less return left for shareholders; a lower ROA indicates the inability of management to efficiently utilise corporate assets.

The relationship between managing the firm and efficiency, by which managers employ the corporate assets owned by shareholders, is directly reflected by the ROA. A lower ROA indicates inefficiency (Mehran, 1995). Accordingly, ROA could reliably measure firm performance; thus, it is used by this research.

As concluded by various studies, ROA is regarded as a dominant measure of firm performance used in many studies (Taghizadeh and Saremi, 2013). ROA is taken as a performance proxy, measured as a percentage of net income to total assets.

4.7.2 Market-Based Performance

Apart from the accounting-based measure of performance, also considered was the market-based performance measure. Tobin's Q and market-to-book value, which are market-based performance measures, are widely used as an indication of how the market assesses the value of the firm.

The most common IC indicator is the market-to-book value approach (or MB ratio). This is an easy IC indicator and is generally used by public corporations when they discuss the difference between book and market value. The argument is that the IC value of a firm is represented by the difference between the market value of the firm and its book value (Dzinkowski, 2000). Book value is the net value of all the assets of the firm, while market value is the firm's most probable price. This is equal to the price of a unit share multiplied by all the outstanding shares (Chang, 2007).

Tobin's Q is defined as the ratio of the firm's market value (share price multiplied by the number of shares) to the cost of replacing its assets (Chung and Pruitt, 1994). If the firm's market value is higher than the cost of replacing its assets, this shows that the firm is making more returns than normal on its investment. One of the strengths of this measurement method is that it tackles a noticeable weakness in the traditional accounting framework, such as using historical costs to measure assets. In his argument, Dzinkowski (2000) claimed that the accuracy of Tobin's Q was far better than the market-to-book method because it used replacement costs instead of historical costs. Due to this, this study will employ Tobin's Q as the proxy measure of market performance and because it is also consistent with previous research (Chen and Li, 2013).

James Tobin, the Nobel Laureate economist, developed the 'Q' in the 1950s. Tobin's Q ratio is defined as the ratio of the market value of a firm to the cost of replacing its assets (Chung and Pruitt, 1994). A higher market value means that the firm is making far more returns on its investment. Traditionally, human IC and technology were associated with a high Q value. This measure is able to tackle a serious weakness in the traditional accounting framework, such as using historical costs to measure assets (Abeysekera, 2008).

Tobin's Q has been used a lot in the empirical literature as a proxy for the performance of a firm (Anderson and Reeb, 2003; Carter et al., 2003; Barnhart et al., 1994; Florackis et al., 2009;). Tobin's Q is the sum of total assets minus the book value of equity plus the market value of equity, divided by total assets and gives an idea of the expected performance of the firm. If Tobin’s Q is greater than one, this means that the shareholders believe that the firm is worth more than its book value. Hence, a value less than one is an indication that the market is expecting the firm to do away with shareholders’ value in the future.

According to Starovic and Marr (2003), it was argued that the accuracy of Tobin's Q was way better than the market-to-book method. This is because it used historic costs instead of replacement costs. Nevertheless, it is more difficult to find these replacement costs than simply referring to a balance sheet. Like the value or market-based approach, its weakness is in using the market value as one of its main measures. Therefore, it is difficult for this measure to provide an accurate figure for the separate intellectual assets. Its real value depends on analysing trends: if the Q is decreasing, the company is either not effectively managing its intellectual assets, or investor sentiment no longer favours it, as cited in Sofian (2004). Abeysekera (2008) supported this argument and argued that since the assumptions on which Tobin’s Q are based were anachronistic (as they related to the industrial era) and were more appropriate to tangible assets than intangible assets, using it was more likely to give a false indication of the IC value of a firm.

Price Earnings Ratio, Garrison and Noreen (2000) stated that the Price Earnings Ratio reflects the relationship between stock market prices by its earnings per share (EPS) of the stocks widely used by investors as a general guide to measure stock values. Price Earnings Ratio is used by investors to predict the company's ability to generate future profits. Investors can consider this ratio to sort out which stocks will benefit substantially in the future (Thio Lie, 2017).

ROA and ROE are usually misleading when intangible assets are not fully recorded in financial statements. Therefore, the share prices of firms with high intangible assets would less precisely reflect their fundamental values. According to Ritter and Wells (2006), voluntarily disclosed intangible assets reveal a company's potential profitability, so these intangible assets would benefit from a rise in stock prices. Owing to IC’s positive impact on economic and financial performance (Zéghal and Maaloul 2010).

4.8 Control Variables' Measurement

This research on female directors mainly focuses on the board of directors' effect on firm performance, specifically identifying the effect of board characteristics on firm performance; however, it is important for other factors to be controlled. Those factors may not be related to corporate governance practices yet may also contribute to improving firm performance, such as the effects of firm size and number of employees (Fiegner et al., 2000; Kiel & Nicholson, 2003).

4.8.1 Firm Size

Firm size is one of the factors that affect governance. Peasnell et al. (2003) opined that governance structures could be replaced and that a firm should adopt the best governance options. More complex governance processes and structures are required for more complex firms. There are more agency costs for larger firms, as larger spans allow for greater managerial opportunism and discretion, which in effect requires increased monitoring (Jensen and Meckling, 1976). In contrast, large organisations can generate more funds, mitigate financial constraints, and use the funds they have available to invest in profitable projects more easily than smaller firms can (Short and Keasey, 1999). Surely, as the size of the firm changes, different components of the board might be affected. In this regard, this research uses the size of a firm as a control variable to examine the effect of board characteristics on the performance of a firm. The size of a firm will be measured as the natural logarithm of total assets (Anderson and Reeb, 2003, Carter et al., 2003)

4.8.2 Number of Employees

Human beings and/or their skills have been considered by economists and non-economists as capital. Human capital has, for a long time, been acknowledged as an important factor for productivity and recently has been identified as a factor that affects the competitiveness of firms. Human capital activities such as formal education and on-the-job training (specific human capital) and off-the-job training (general human capital), for many researchers who adopted the human capital framework, skills, education, and human capital, are concepts that can be interchanged. In this period of human capital, what is important is not organisational form (managerial or entrepreneurial) but the organisational process (transformation and learning) (Teixeira, 2002).

The studies respecting economic performance and human capital point to the 'rationality' made available by the human capital theory, for example, increasing the quantity of the human capital of the firm. Therefore, in this study, the human capital of the firm is measured as the natural logarithm of the number of employees (Dang, 2015).

4.8.3 Firm Industry

The industry variable has been selected to control for any potential impact of other factors on firm performance. The sensitivity of the industries, macroeconomic and other political factors can have an impact on firm performance; therefore, the industry sector can be considered as a key factor of firm performance (Short and Keasey, 1999). Also, an industry dummy variable is important as a control variable for the probable specious relationship between ownership structure and firm performance, which could be originated from the industry influence. Also, firms operating in highly competitive industries have an efficient performance (Demsetz and Lehn, 1985).

4.8.4 Financial Leverage

Leverage has been considered as a positive signal of firm value. Financial leverage (LEV) was calculated by dividing total liabilities by the total assets' book value. This is to control the effect of liabilities on the performance of firms (Holienka and Pilková, 2014).

4.8.5 Board of Director Characteristics

Characteristics of the board play a crucial role in the effectiveness and firm performance. Due to the mixed result of the board size, board nationality and age, these factors have been selected for this study. Pranati (2017) claimed that board size plays a crucial role in firm performance. Some studies support small board size in order to prevent communication and coordination problems. On the other hand, some empirical works claim that a large board size would benefit from better monitoring, a broader pool of knowledge and expertise, a better network, more flexibility in the scheduling committee meeting and so on (Pranati, 2017).

Nielsen and Nielsen (2013) investigated the relations between board diversity and firm performance, and they confirmed that nationality diversity has a positive impact on firm performance, particularly in international firms (Khan and Subhan, 2019).

A number of scholars claim that executive age and experience have an impact on firm performance as older executives have more experience than younger executives. However, the rustles are mixed as the impact can be negative or positive (Peni, 2014). Therefore, in this study, after mentioning board characteristics, the following are discussed:

4.8.5.1 Board Size

The board of directors of a firm plays a crucial role in the performance of the firm. The size of the board is one of the characteristics of a board that has been the focus of attention. Some researchers claim that a small-sized board is better, as a large-sized board has problems with coordination and communication, which reduces the effectiveness of the board and the firm's performance. However, some researchers argue that a larger board size enhances the board's key functions at the onset. Notwithstanding, most scholars agree that there is a negative relationship between worse performance and large board size. The argument is that the size of a board should not be greater than eight or nine for all firms, but this statement is in no way universal (Guest, 2009).

Quite a few current papers have shown that board size depends on firm-specific variables such as firm size and profitability. Nonetheless, Wintoki et al. (2012) found that there exists no relationship between firm performance and board size. In addition, the effect of board size on performance may differ depending on firm-specific characteristics. For large firms, this shows that the impact of board size on firm value is positive. Hence, a large board size may be optimal for maximising outcomes for firms like that (Coles et al., 2008).

Adams and Ferriera (2007) believe that the two most crucial roles of the board of directors are monitoring and advising. The advisory function involves advising the CEO and access to essential information and resources, which can be provided by either an insider or an outsider.

Fama and Jensen (1983) stated the significant function of outside directors who bring crucial connections and valuable expertise. The advantage of a large board size is the large amount of information that the board possess, and this will affect the performance of the firm, as well as helping the board monitor and discipline team management more effectively to ensure that the interests of the shareholders are pursued by the managers. Raheja (2005) believes that insiders are a great source of information for the board, although they are likely to be distorted due to their lack of independence from the CEO and their own benefits.

Unlike insiders, outsiders are more independent and can provide great monitoring. They are less informed about the activities of the firm. Hence, the benefit of a larger board size is the capacity to collect more information, which is also important for the monitoring function. Thus, an increase in board size improves the performance of the firm. Also, increasing the number of non-executive directors is expected to have a more positive impact than when the number of executive directors is increased. Many studies have shown that board size has a positive relationship with firm size and a number of elements; for example, the age of the firm, financial leverage, and industrial diversification have an impact on the size of the board (Coles et al., 2008).

However, the effect of board size on performance depends not only on firm characteristics but also on the country since the roles of boards may be different in some countries. The problems that may arise due to large boards depend on the effectiveness and particular functions of boards, and these are different for every firm and institution. As a result, researchers argue that the role of UK boards, in terms of monitoring, is much weaker when compared with US boards (Guest 2008).

In fact, some monitoring and advisory roles for both countries are the same; however, there are reasons for the weaker UK monitoring. First, UK's outside directors feel less responsible for failing to carry out their legal duties and do not care much about loyalty. They consider themselves advisors instead of monitors (Franks et al., 2002). Secondly, it is on record that UK boards have lower percentages of outside directors with less dependence on the management. Thirdly, there are lower financial incentives (reward and shareholding) for outside directors in the UK to perform their duties (Cosh and Hughes, 1987). This is because the size and structure of UK boards are determined by advisory needs, not by benefits and the costs of monitoring, which is opposite to their US counterparts. The number of outside directors does not affect the total performance of UK boards because their monitoring role is weak, and the effectiveness of their monitoring may not depend on board size. However, UK boards do play a crucial advisory role. Hence, no negative relationship between performance and board size caused by the advisory role has been recorded (Guest, 2008).

4.8.5.2 Directors' Nationality Diversity

The diversity of boards of directors in the UK, according to Veen and Elbertsen (2008), is more than in other countries like the Netherlands and Germany. Notwithstanding, among 13 European countries based on international experience, the UK follows Switzerland, which is first in the financial sector. According to Estelyiova and Nisar (2012), 13% of foreign directors were appointed by UK-listed firms between 2001 and 2011.

Hiring foreign directors can increase Tobin's Q due to the enhanced decision-making and problem-solving as depicted in prior research carried out in Korea by Choi et al. (2013) and in Norway and Sweden by Oxelheim and Randoy (2003). Nationality symbolises an individual's background, perception, perspective, and behaviour. Besides, people from different countries possess varying values, awareness and expertise, and this would help the company in a complicated situation (Hambrick et al., 1998). Having said that, board diversity in terms of gender, age, nationality, and functionality sometimes have a negative impact on firm performance due to the cultural differences and barrier to clear communication amongst board members (Khan, and Subhan, 2019).

4.8.5.3 Directors' Age Diversity

In the firm, age diversity has become the goal or stated policy for many corporations. The first Code of Practice on Age Diversity in Employment in the UK was written in 1999. It provides a set of voluntary measures used to enhance the fairness and productivity of the company across six topics, namely selection, recruitment, training and development, promotion, redundancy and retirement. Positive firms report higher productivity, higher staff morale, and access to a wider customer base, according to findings from the UK, drive towards greater age diversity (Loretto et al., 2000). All three of the paradigms (discrimination/fairness, access/legitimacy and learning/effectiveness) are in line with these topics and reports which have been examined. We are particularly interested in the last two – those that are closely connected with the resource dependency theory and positive reports. These last-mentioned paradigms need more than just statistical fulfilment of diversity quotas within the corporation.

The only empirical study (based on Canadian firms of the TSE 300) of the relationship between firm performance and age diversity on the board of directors was conducted by McIntyre et al. (2007) in order to predict board function and improve board processes and increase the use of organisational behaviour theory.

The effect of the age of executives on the success of a firm has gained attention in the literature, as it can be inferred that older executives have a competitive advantage over the younger executives, who, unavoidably, have less business experience. Davis (1979), in a seminal paper, inspected the connection between corporate performance and executive age and discovered no connection between the two. However, Bertrand and Schoar (2003), in a more recent study, suggested older executives are more conservative in their work, which may influence the performance of the firm. CEOs close to the retirement age have large accruals in the year before they retire. Older CEOs are prone to selecting projects that pay off before their retirement (Gibbons and Murphy, 1992). Similarly, Hirshleifer (1993) suggested that younger CEOs may channel their attention to short-term goals, which are driven by the desire to make a name for themselves. Thus, in general, prior literature shows that the age of the executive may affect the performance of a firm, but the empirical evidence is mixed (Peni, 2014). Similarly, Hirshleifer (1993) suggested that younger CEOs may channel their attention to short-term goals, which are driven by the desire to make a name for themselves. Thus, in general, prior literature shows that the age of the executive may affect the performance of a firm, but the empirical evidence is mixed (Peni, 2014).

4.9 Sample Selection and Data Preparation

The data were collected from all non-financial FTS 350 companies because their data were available on the Osiris database from 1st April 2010 until 31st March 2018. Therefore, of the companies such as financial services, banks, investments, water, oil and gas producers and utilities, 233 companies remained, and their financial statements for the fiscal year from 1st April 2010 until 31st March 2018 were considered.

Board characteristics such as age, gender, and nationality, the positions (e.g., CEO, chairman, financial directors) and functions (e.g., executive and non-executive) are available on the Osiris database.

The total number of companies according to the list is 340 companies. The reason that the number of companies is less than 350 is that the FTSE constituents are reviewed every quarter. At each review, some companies will exit, and others will enter. These impacts share price and the number of companies as well (FTSE Russell, 2020).

The data were downloaded from Osiris on 22/07/2018. The number of companies may differ if collected before or after this date. The data were collected after the financial crises of 2010-2018 (the time of the conducting this study). The reason for collecting data from 2010 and not 2008 (financial crisis) is due to the huge missing data from 2008 to 2010. As logically market needed some time to recover and even update the system in that time.

The data were downloaded from the Osiris database relating to the period from 1st April 2010 to 31st March 2018.

Companies such as Financials, Real State, Energy and Utilities were removed due to incomplete data; therefore, 201 companies remained whose financial statements, for the fiscal year from 1st April 2010 until 31st March 2018, was considered. This time period has been chosen to investigate the impact of IC and female directors on firm financial performance after the financial crisis in 2008. In the beginning, data were collected from 2007; however, the analysis would not be possible due to incomplete data in particular for IC study, so many required data were missing which SPSS could not fill the gap. This problem was due to companies that did not disclose their non-financial data at that time. However, a number of researchers have called for non-financial intangible assets' disclosure for companies (Mouritsen et al., 2001). Although this procedure was not affordable for them as it would change the accounting system dramatically. This was a sensible approach towards the enhancement of financial reports to encourage voluntary disclosure of intellectual capital information. (Jin et al., 2010). Therefore, the data were collected from 2010 which companies started to report their data as a matter of transparency. The data collection process was based on the Industries Global Classification, which presents here in this section.

Data preparation

Data screening and filtering are crucial to prepare data for multiple regression analysis. Therefore, the process began with identifying missing data in the row and columns, then identifying outliers with an extreme influence on a single variable using SPSS (Hair et al. 2014).

Having missing data is one of the most common issues in data analysis (Hair et al., 2010; Kline, 2005). Therefore, statistical tests based on sample size, such as significant level, could be distorted. As Hair et al. (2010) mentioned, missing values on dependent variables should be omitted, and cases with missing values on variables other than dependent variables can be

excluded optionally. Data screening and cleaning for the current study was conducted by checking raw data before proceeding to the analysis in order to check the accuracy of data entry and data coding for each construct under investigation; thus, in this study, missing data were deleted manually. The next step is detecting outliers. In statistics, outliers are cases with scores that are substantially different from the rest (Hair et al., 2014). For this reason, it is very important to screen the data to detect outliers, as they can potentially bias the mean and inflate the standard deviation (Field and Hole, 2003). According to Kline (2005), cases with scores of more than three standard deviations beyond the mean may be considered as outliers. Thus, in this study, outliers were deleted manually as well.

The following table summarises the research design of the Study

Table 5: Summary of the Research Design of the Study

Research Aim	Investigating the impact of IC and female directors on FTSE 350 companies' performance.
Literature review	Reviewing the previous literature in order to recognise the research gap
Conceptual Framework	Developing conceptual framework motivated by the literature review
Data Collection	Quantitative, Osiris database
Population	FTSE 350 companies (340 companies)
Data preparation	Data screening for missing data and outliners
Sample Size	201 companies: following industries were omitted: Energy (10 companies) Financials (91 companies) Utilities (12 companies) Companies (26 companies)
Research Method	Deductive, testing the hypotheses
Type of Investigation	Empirical, regression using SPSS
Time Horizon	Longitudinal, panel data

Source: Author

The following table will present the classifications of industries based on the global standard (GICS), which data for his study was collected based on this classification. The number of companies that were omitted shows in red. In each section, the subcategories of this classification, the number of the firms and the global code have been mentioned. This would help to understand the nature of each named industry and the number of companies included in the industry, which will be used in the empirical chapters.

Table 6 Industries Classification (Global Classification):

Number of firms	GICS Classification and Subcategories	GICS Codes
10	**Energy**	1010
30	**Materials** • Chemicals, • Construction Materials, • Containers & Packaging	1510
55	**Industrials** • Capital Goods: Aerospace & Defence, Building Products, Construction & Engineering, Electrical Equipment, Industrials Conglomerates, Machinery, Trading Companies & • Commercials & Professional Services: Commercial Services & Supplies Professional Services • Transportation: Air Freight & Logistics, Airlines, Marine, Road & Rail, Transportation Infrastructure	2010
60	**Consumer Discretionary** • Automobile and Components: Auto Components, Automobiles • Consumer Durable & Apparel: Household Durables, Leisure Products, Textiles, Apparel, Luxury Goods • Consumer Services: Hotels, Restaurants & Leisure, Diversified Consumer Services • Retailing: Distributors, Internet & Direct Marketing Retail, Multiline Retail, Specialty Retail	2510
19	**Consumer Staples** • Food & Staples Retailing FOOD • Food, Beverage & Tobacco • Household & Personal Products	3010
14	Health Care	3510
91	**Financials** • Banks: Thrifts, Mortgage Finance • Diversified Financials: Diversified Financial Services, Consumer Finance, Capital Market, Mortgage Real Estate Investment Trusts • Insurances	4010
19	**Information Technology**	4510

	• Software & Services: IT Services, Software • Technology Hardware & Equipment: Communication Equipment, Technology Hardware, Storage & Peripherals, Electronic Equipment, Instruments & Components • Semiconductors & Semiconductor Equipment	
4	**Communication Services** • Telecommunication Services: Diversified Telecommunication Services, Wireless Telecommunication Services • Media & Entertainment: Media, Entertainment, Interactive Media & Services	5010
12	Utilities	5510
26	Real State	6010

Source: Osiris Database (22/07/2018)

4.10 Descriptive Statistics of the Study

The following table gives the descriptive statistic of the whole study. Tables 4, 4.1. 4.2 and 4.3 present descriptive statistics of the performance indicators, control variables, IC independent variables and female leaders' independent variables from 2010 to 2018. (Please see appendices for the full analysis data)

As presented in Table 4, Tobin's Q mean varies from 1.23 to 2.06; ROA mean varies from 6.16 to 10.78; ROE mean varies from 11.64 to 24.15; while P/E mean varies from 20.36 to 3.31, which means that P/E mean is higher than all other financial performance indicators.

In Table 4.1, descriptive statistics of the control variable, the number of employees (Nemp), mean varies from 8.85 to 9.65. Firm size's mean varies from 12.51 to 14.81. Leverage's mean varies from 56.17 to 80.50 from 2010 to 2018, which indicates that leverage is greater than all the other control variables.

Table 4.2 presents descriptive statistics of IC independent variables from 2010 to 2018. As has been shown in this table, HCE's mean varies from 2.25 to 3.17. SCE's mean varies from 0.43 to 0.55. CEE's mean varies from 0.44 to 0.59, which demonstrates the excess of HCE over two other components of the IC. The sum-up of this component VAIC mean is from 3.12 to 4.05.

Table 4.3 presents the descriptive statistics for female leaders as independent variables. The female chair and CEO mean is 0.79. The female executive mean is 0.88 and the female non-executive directors mean is 0.25. Thus, female executive shows excess over other female directors' roles in the companies.

Table 7 Descriptive Statistics Dependent variables

	N	Minimum	Maximum	Mean	Std. Deviation
TOB18	233	.09	57.26	1.7500	4.10329
TOB17	233	.08	60.18	1.6113	4.04884
TOB16	233	.04	78.21	1.8835	5.26813
TOB15	233	.05	50.79	1.8510	3.59341
TOB14	233	.09	71.52	2.0615	4.91072
TOB13	233	.01	36.87	1.5818	2.66398
TOB12	233	.05	26.04	1.3951	1.97054
TOB11	233	.13	17.23	1.4173	1.53942
TOB10	233	.10	10.93	1.2316	1.13354
ROE18	233	-101.13	119.18	17.1393	23.99792
ROE17	233	-424.42	154.52	11.6394	39.62718
ROE16	233	-614.07	210.45	11.7618	50.79861
ROE15	233	-396.67	587.43	17.7143	61.80483
ROE14	233	-79.78	904.98	26.1148	69.40396
ROE13	233	-617.07	388.91	20.5203	62.96051
ROE12	233	-880.00	483.46	24.1529	75.13046
ROE11	233	-382.95	373.52	24.0028	57.84830
ROE10	233	-487.61	601.24	14.1555	65.39605
ROA18	233	-27.12	217.89	8.4400	16.07217
ROA17	233	-26.02	233.81	7.4299	16.77321
ROA16	233	-19.38	234.14	8.2165	17.30919
ROA15	233	-53.54	235.46	8.9295	18.24383
ROA14	233	-14.01	188.63	9.0765	15.84626
ROA13	233	-23.66	136.25	8.3776	13.29239
ROA12	233	-55.47	219.68	10.7894	18.98106

ROA11	233	-34.67	111.02	8.5232	11.30142
ROA10	233	-33.98	58.53	6.1622	8.94116
PE18	233	3.07	174.18	23.0594	22.94167
PE17	233	3.79	285.85	28.7938	35.57777
PE16	233	2.06	437.36	30.3112	44.31933
PE15	233	2.73	276.44	26.2240	34.49489
PE14	233	2.57	104.01	21.8703	13.40422
PE13	233	.24	238.15	20.5837	23.12057
PE12	233	.93	462.46	20.3668	33.24606
PE11	233	3.88	696.84	24.7904	51.47001
PE10	233	3.33	674.55	30.1612	55.36786

Table 8 Descriptive Statistics Control variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NEm18	233	2.94	13.28	8.8774	1.80076
NEm17	233	3.00	13.29	8.8272	1.79966
NEm16	233	2.94	13.32	8.7770	1.84697
NEm15	233	4.09	13.88	9.2707	1.61196
NEm14	233	4.11	13.77	9.2346	1.62032
NEm13	232	3.09	13.66	9.2047	1.65063
NEm12	233	1.95	13.46	9.2447	1.67284
NEm11	233	2.89	13.37	9.1889	1.64160
NEm10	233	4.20	17.85	9.6404	2.08284
FSize18	231	11.18	19.52	14.8066	1.41493
FSize17	231	11.01	19.63	14.7241	1.42126
FSize16	231	10.83	19.25	14.5608	1.43873
FSize15	231	10.27	19.24	14.4163	1.50628
FSize14	231	10.56	19.20	14.3749	1.51437
FSize13	232	10.60	19.22	14.3730	1.53242
FSize12	232	10.41	19.22	14.3616	1.54839
FSize11	233	2.80	19.14	13.1921	3.67947
FSize10	228	2.17	19.01	12.5122	4.14840
LEV18	233	-237.45	516.79	67.0430	89.73500
LEV17	233	-569.14	870.61	76.7326	122.32837
LEV16	233	-768.16	564.83	80.4983	115.49760
LEV15	233	-635.79	932.39	68.1339	130.91628
LEV14	233	-632.20	898.87	60.5778	116.04620

LEV13	233	-778.05	876.61	63.0853	121.06701
LEV12	233	-919.69	883.67	56.1699	114.17744
LEV11	233	-771.26	876.61	69.9580	115.06624
LEV10	233	-758.97	880.18	73.2034	138.46745

Table 9 Descriptive Statistics independent variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
HCE18	233	-.47	38.51	2.9767	3.83816
HCE17	233	-2.68	47.91	2.7981	4.06020
HCE16	232	-1.41	33.04	2.8674	3.84538
HCE15	233	-35.38	35.60	2.7070	4.93911
HCE14	233	-4.20	30.80	2.9291	3.95102
HCE13	233	-3.78	22.86	2.7078	2.84017
HCE12	233	-1.48	75.91	3.1698	5.85466
HCE11	233	-27.39	27.34	2.6262	4.51708
HCE10	233	-11.40	29.22	2.2486	2.98508
SCE18	233	-.27	11.89	.5446	.79767
SCE17	233	-.52	1.98	.4853	.27158
SCE16	233	-7.80	2.29	.4507	.60489
SCE15	233	-.58	8.47	.5364	.64672
SCE14	233	.02	12.70	.5384	.83239
SCE13	233	-2.71	3.11	.4811	.37319
SCE12	233	-2.40	2.47	.4796	5.30907
SCE11	233	.11	2.68	.4906	.25661
SCE10	233	-2.28	3.41	.4309	.40553
CEE18	233	-2.03	2.47	.4547	.43757
CEE17	233	-5.70	2.86	.4208	.58303
CEE16	233	-2.86	6.08	.4836	.62892
CEE15	233	-6.23	2.49	.4710	.63000
CEE14	233	-.13	7.37	.5861	.78332
CEE13	233	-.02	2.66	.5186	.48083
CEE12	233	-.04	7.06	.5264	.58232
CEE11	233	-.64	3.54	.4821	.42176
CEE10	233	-3.44	2.17	.4418	.45312
VAIC18	233	.62	39.79	3.9760	3.91509
VAIC17	233	-1.32	49.22	3.7041	4.12448
VAIC16	232	-7.66	34.16	3.8013	3.97986
VAIC15	233	-34.35	36.76	3.7143	5.00287

VAIC14	233	-2.86	32.00	4.0536	4.05473
VAIC13	233	-2.53	24.08	3.7074	2.93944
VAIC12	233	-80.39	77.26	3.8658	8.10485
VAIC11	233	-26.62	28.47	3.5988	4.58638
VAIC10	233	-10.27	30.40	3.1213	3.08049

Table 10 Descriptive Statistics independent variables

	N	Minimum	Maximum	Mean	Std. Deviation
FCh17	233	.07	.09	.0791	.00442
FCh16	233	.07	.09	.0791	.00442
FCh15	233	.07	.09	.0791	.00442
FCh14	233	.07	.09	.0791	.00442
FCh13	233	.07	.09	.0790	.00430
FCh12	233	.07	.09	.0788	.00419
FCh11	233	.07	.09	.0789	.00423
FCh10	233	.07	.09	.0788	.00411
FCeo17	233	.07	.09	.0791	.00446
FCeo16	233	.07	.09	.0789	.00426
FCeo15	233	.07	.09	.0791	.00442
FCeo14	233	.07	.09	.0791	.00447
FCeo13	233	.07	.09	.0790	.00421
FCeo12	233	.07	.09	.0788	.00411
FCe011	233	.07	.09	.0788	.00411
FCeo10	233	.07	.09	.0791	.00440
FEx17	233	.08	.09	.0883	.00397
FEx16	233	.08	.09	.0884	.00383
FEx15	233	.08	.09	.0884	.00393
FEx14	233	.08	.09	.0884	.00384
FEx13	233	.08	.09	.0883	.00394
FEx12	233	.08	.09	.0884	.00384
FEx11	233	.08	.09	.0883	.00394
FEx10	233	.08	.09	.0883	.00394
FNEx17	233	.23	.33	.2525	.02677
FNEx16	233	.23	.33	.2531	.02772
FNEx15	233	.23	.33	.2535	.02817
FNEx14	233	.23	.33	.2540	.02850
FNEx13	233	.23	.33	.2531	.02773

FNEx12	233	.23	.33	.2524	.02679
FNEx11	233	.23	.33	.2524	.02680
FNEx10	233	.23	.33	.2524	.02680

4.11 Chapter Summary

As discussed throughout the chapter, this study's primary objective was to examine the impact of intellectual capital and female leaders on the UK top companies' financial performance; therefore, the study used mainly secondary data. Accordingly, the study adopted a quantitative research technique. This exhibited the relationship between theory and research as a deduction process, followed a positivist approach, and entailed the collection of numerical data. FTSE 350 companies have been selected as the population; however, due to some incomplete data, 201 companies have been selected as the final sample from 2010 to 2018. The data used in this study were derived mainly from the Osiris database. In addition, the missing data were extracted manually from each financial institution. The next step was to apply statistical techniques in testing the research hypotheses and answering the research questions, and, ultimately, fulfilling the research objectives. SPSS software has been utilised for analysing the next three chapters will present the three empirical studies, and their results and discussion alongside the hypotheses results to answer all research questions of this study.

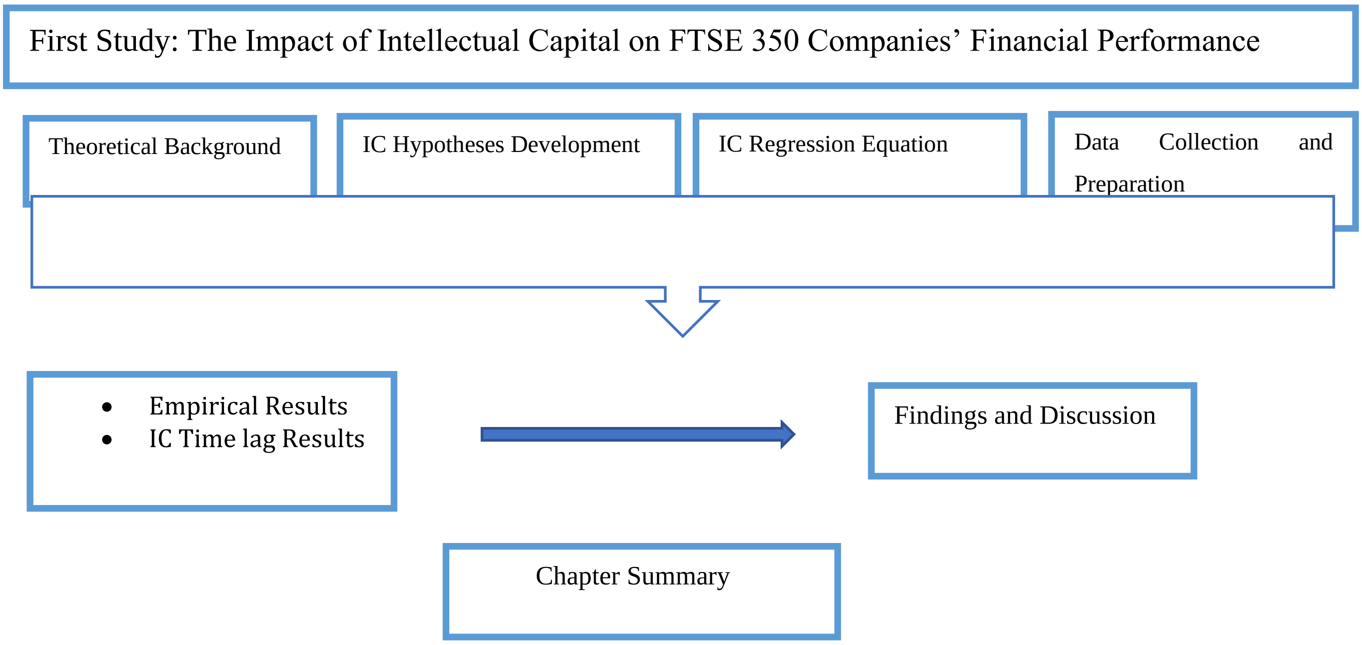
5 Chapter 5

The Impact of Intellectual Capital on FTSE 350 Companies' Financial Performance

5.1 Introduction

This chapter presents and discusses the first empirical model, which will test the impact of the intellectual capital efficiency of FTSE 350 companies and its components (HCE, SCE, and CEE) on the four financial performance measurements for the firms. Model 1 regression is the impact of all three components of the IC alongside the control variables (number of employees, firm leverage and firm size) on the performance, which will be tested against ROA, ROE, Tobin's Q and P/E. Model 2 is the impact of the sum of these components, which is VAIC, on all types of performance mentioned above. Model 3 is the performance of the IC after a two-year time lag, while the types of performance and control variables are the same as for the two previous models. This empirical study addresses the first research question: Does intellectual capital have a significant impact on firm financial performance in the UK?

The following diagram will present chapter' structure:



5.2 Theoretical Background

In recent years, scholars have examined the relationships between IC and firm financial performance by using different theoretical lenses. This study's conceptual framework was based on different theories: Knowledge-Based View, Fit View Theory and Resource-Based Theory, which have been discussed previously.

Originating from the resource-based view (Teece et al. 1997), the Knowledge-Based View (KBV) sees knowledge as the major source of competitive advantage. Consequently, the channels by which firms access and make use of their knowledge for creating value becomes a tool for advancing performance. An appropriate KM strategy creates a common insight concerning the location of a firm's knowledge, the means to articulate knowledge capabilities in creating value and also the means for the integration of activities for effective strategy implementation; thus, an appropriate KM is critical to the success of a firm (Oluikpe, 2012). This theory explains the competitive advantage of the firm either in terms of employees' knowledge, skills, expertise and so forth, or in terms of culture, policy, patent, brand equity and so on and so forth.

Resource-Based Theory emphasises that the success of a firm commences with the success of an adequate selection of resources and their combinations. However, as the theory of dynamic capabilities mentions, the firm's success is not only the efficient usage of resources, but also the availability of certain capabilities in production, procurement, sales, research and development. Therefore, the capacity to use resources through an information-based and firm-specific organisational process is a firm's capability that can be developed through complex interactions between the firm's resources (Radjenović and Krstić, 2017).

Fit View theory, on the other hand, has been defined by earlier literature and measured in numerous ways (Olson et al., 2005). It explains an "ideal" profile which is explicitly a set of organisational features that suit other(s) most and, therefore, leads to better results which means competitive advantages (Chen and Huang, 2012).

For achieving superior competitive advantage, IC is one of the principles that a company must create, which depends on its long-lasting capability and capacity to utilise its resources.

5.3 IC Hypotheses Development

One of the objectives of this study is to examine the impact of IC on the financial performance of FTSE 350 companies. Regarding the impact of IC on performance, each component, based on VAIC methodology, would affect the performance. Therefore, it is crucial to measure and investigate them separately as well as collectively. Colombo and Grilli (2005) suggested that greater human IC such as higher education or skill could affect the firm to have a better managerial judgment. Thus, developing human IC in staff could improve their job performance and eventually improve the firm's performance (Hsu, 2007). Structural IC enables companies to create and enhance knowledge. Strong structural IC supports and encourages employees to learn new knowledge (Florin et al.,2003). According to Youndt et al. (2004), there is a positive association between structural IC and financial returns and Tobin's Q. Hsu and Wang (2012) mentioned that structural IC such as operations, procedures and the processes of knowledge management drive a company's value creation activities which have a positive effect on their performance. Regarding the capital employed efficiency, there is a positive relationship between CEE and firm performance based on empirical evidence, (Mavridis, 2004). Kamath (2007) found a significant positive impact of CEE on the financial performance of Indian public sector banks, Chu et al. (2011) found a similar impact on the Hong Kong Stock Exchange.

The first empirical study presented in this chapter, investigates the impact of intellectual capital (i.e., human capital, structural capital and capital employed) on firm financial performance. The following tables constitute the summary of hypotheses that have been formulated and tested: these hypotheses are based on three components of intellectual capital (HCE, SCE and CEE). Also, there are hypotheses based on the sum of these components, such as VAIC hypotheses and time lag hypotheses, which consider the impact of IC after two years on performance; these have also been tested.

The following research question underpins the first empirical study:

First Research Question:

Does intellectual capital have a significant impact on FTSE 350 companies' financial performance?

Hypothesis 1:

Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' financial performance.

Hypothesis 2:

Human capital efficiency (SCE) has a significant impact on FTSE 350 companies' financial performance.

Hypothesis 3:

Human capital efficiency (CEE) has a significant impact on FTSE 350 companies' financial performance.

Each hypothesis contains 4 sub-hypotheses as follows:

Table 11 Intellectual Capital and Performance Hypotheses

1	**Human capital hypotheses**
H1	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' financial performance
H1(a)	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' ROA
H1(b)	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' Tob Q
H1(c)	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' ROE
H1(d)	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' P/E
2	**Structural capital hypotheses**
H2	Structural capital efficiency (SCE) has a significant impact on FTSE 350 companies' financial performance
H2(a)	Structural capital efficiency (SCE) has a significant impact on FTSE 350 companies' ROA
H2(b)	Structural capital efficiency (SCE) has a significant impact on FTSE 350 companies' Tobin's Q
H2(c)	Structural capital efficiency (SCE) has a significant impact on FTSE 350 companies' ROE
H2(d)	Structural capital efficiency (SCE) has a significant impact on FTSE 350 companies' P/E
3	**Capital employed hypotheses**

H3	Capital employed efficiency (CEE) has a significant impact on FTSE 350 companies’ financial performance.
H3(a)	Capital employed efficiency (CEE) has a significant impact on FTSE 350 companies’ ROA
H3(b)	Capital employed efficiency (CEE) has a significant impact on FTSE 350 companies’ Tobin’s Q
H3(c)	Capital employed efficiency (CEE) has a significant impact on FTSE 350 companies’ ROE
H3(d)	Capital employed efficiency (CEE) has a significant impact on FTSE 350 companies’ P/E

The following table presents VAIC hypotheses, which is the sum of the three IC components.

Hypothesis 4:

VAIC has a significant impact on FTSE 350 companies’ financial performance.

Hypothesis 4 contains 4 sub-hypotheses as follows:

Table 12 VAIC Hypotheses

H4	**VAIC has a significant impact on FTSE 350 companies’ financial performance**
H4(a)	VAIC has a significant impact on FTSE 350 companies’ ROA
H4(b)	VAIC has a significant impact on FTSE 350 companies’ Tobin’s Q
H4(c)	VAIC has a significant impact on FTSE 350 companies’ ROE
H4(d)	VAIC has a significant impact on FTSE 350 f companies’ P/E

The following table presents performance of IC after two years’ time lag.

Hypothesis 5:

IC has a significant impact on FTSE 350 companies’ financial performance after two years.

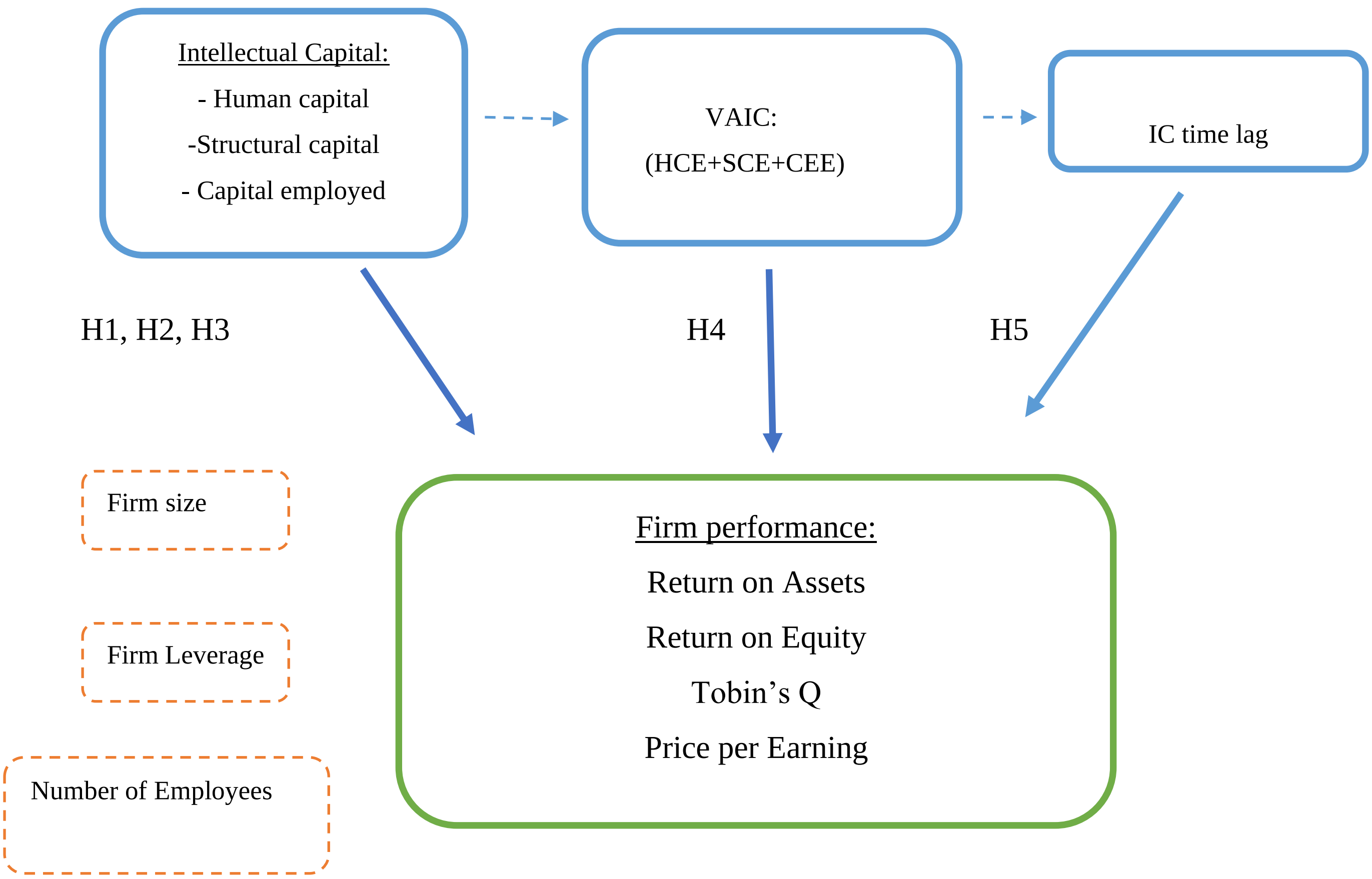
Hypothesis 4 contains 4 sub-hypotheses as follows

Table 13 IC Time Lag Hypotheses

5	**IC time lag hypotheses**
H5	IC has a significant impact on FTSE 350 companies' financial performance after two years
H5(a)	IC has a significant impact on FTSE 350 companies' ROA after two years
H5(b)	IC has a significant impact on FTSE 350 companies' Tobin's Q after two years
H5(c)	IC has a significant impact on FTSE 350 companies' ROE after two years
H5(d)	IC in this year has a significant impact on FTSE 350 companies' P/E after two years

Following figure presents the intellectual capital study conceptual framework

Figure 3 IC Study Conceptual Framework



- Independent variables: Human Capital, Structural Capital, Capital Employed
- Dependent Variables: ROA, ROE, Tobin's Q, P/E
- Control variables: Firm size, Firm Leverage, Number of Employee

5.4 Regression Model

The following regressions tested the impact of the intellectual capital of the FTSE 350 on the four financial performance indicators. Model 1tested the intellectual capital components (HCE, SCE and CEE) alongside the control variables (firm size, firm leverage and number of employees) on financial performance (ROA, ROE, Tobin and P/E). Model 2 examined the sum of the intellectual capital components as VAIC on the four performance indicators with the same control variables, while Model 3 tested the performance of the intellectual capital components (HCE, SCE and CEE) and their sum (VAIC) after two years. However, the test was conducted for one- and three-year time lags as well.

IC Study Regression Equation

The following regression equations are related to the impact of intellectual capital on firm performance. Model 1 is the impact of all intellectual capital components as HCE, SCE and CEE on the four different types of performance (ROA, ROE, Tobin, P/E). Model 2 is the sum of these components (HCE+SCE+CEE) as VAIC on all four types of performance, while Model 3 is the impact of the intellectual capital components after one, two, three, four and five years on all four types of performance.

Model 1 (IC & Performance)

$Performance$= $\alpha + \beta_1\, HCE + \beta_2\, SCE + \beta_3\, CEE + \beta_4\, TA + \beta_5\, LEV + \beta_6\, NEmp + \varepsilon$

Model 2 (VAIC & Performance)

$Performance$ = $\alpha + \beta_1 VAIC + \beta_2\, FSize + \beta_3\, \mathrm{LEV} + \beta_4\, \mathrm{NEmply} + \varepsilon$

Model 3 (IC Time Lag)

$Performnace_T$= $\alpha + \beta_1\, HCE_t + \beta_2\, SCE_t + \beta_3\, CEE_t + \beta_4\, TA_t + \beta_5\, LEV_t + \beta_6\, NEmp_t + \varepsilon$

where Tobin's Q, ROA, ROE and P/E are the performance of FTSE 350 companies.

β is several coefficients assigned to control and independent variables during the regression and α is the coefficient.

HCE is human capital efficiency

SCE is structural capital efficiency

CEE is capital employed efficiency

VAIC is the value-added intellectual coefficients (sum of its sub-components which are HCE SCE, and CEE

FSize is the size of the firm measured as total assets of the firm

NEmply is the total number of the firm's employees and

LEV is the financial leverage of the firm

T is time and will be added from one year to five years in this study

ε is the standard error of estimates

5.5 Data Collection and preparation

The data for this study has been collected from Osiris's database, which can provide FTSE 350 index based on industry indicators. The data were collected all together for the time frame provided for this study which is from 2010 to 2018. There are two reasons why this time frame was selected. First, this time period is after the financial crisis of the late 2000s; therefore, it will provide more robust results due to market stability. Second, before 2010, the IC disclosure report was not common; thus, not all data needed for IC components calculation were available.

After all, data collected from the database were transferred to SPSS for screening and prepared for analysis. In statistics, screening is needed to detect outliers, which refer to numbers that are significantly different from the rest and can affect the standard deviation if scores are more than three standard deviations beyond the mean (Hair et al., 2014).

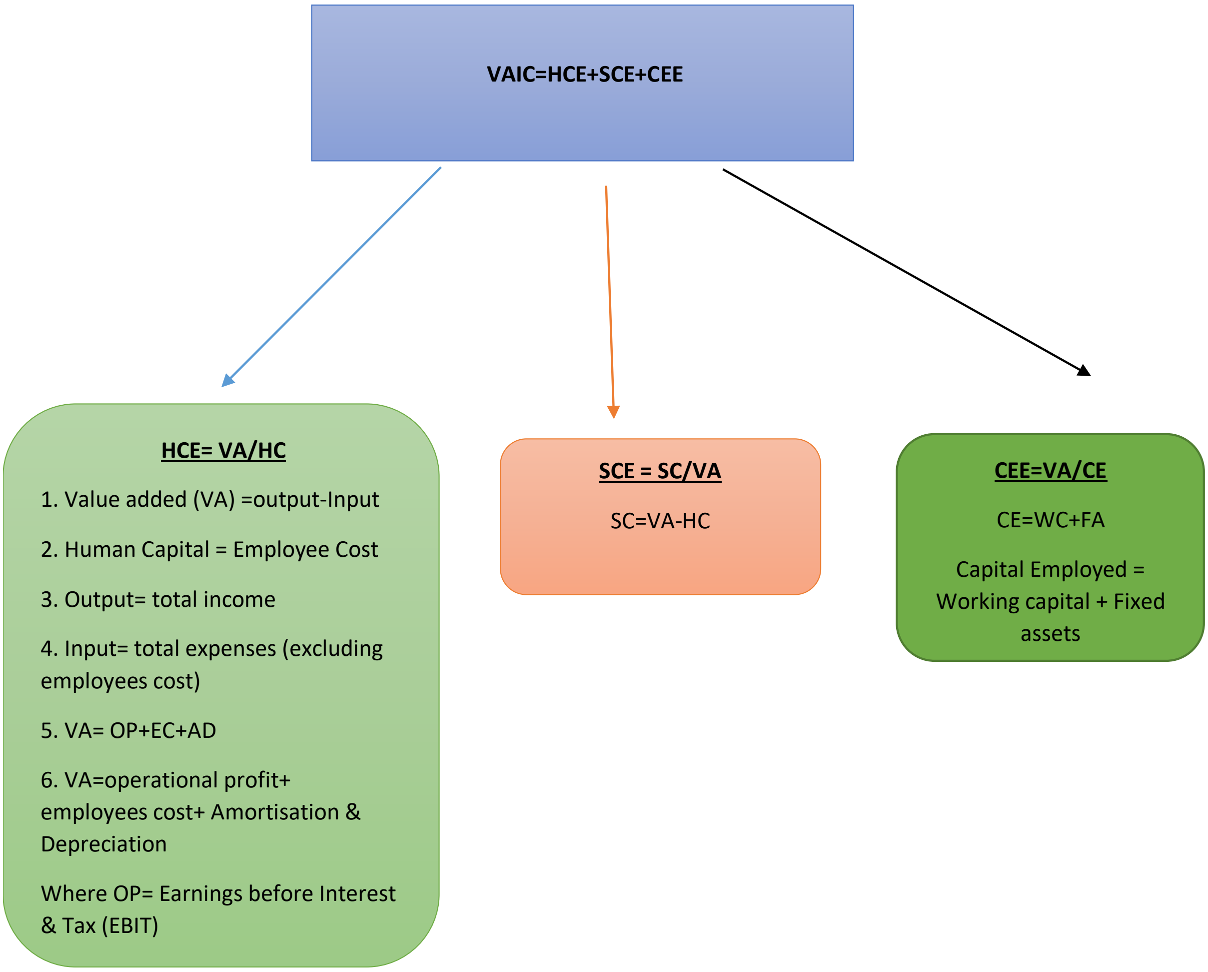
Then we needed to calculate the IC components data based on VAIC methodology as follows.

Variables for this study was measured based on VAIC methodology (discussed in Chapter 4). The following figure summarises the IC independent variables based on VAIC methodology.

Figure 4 VAIC Methodology

Summary of the VAIC Methodology:

Value added intellectual capital is the sum of the human capital efficiency, structural capital efficiency and capital employed efficiency



The VAIC frame presents how the components of the VAIC have been calculated based on the available data in the database as follows

IC, HCE, SCE and CEE were calculated separately using SPSS and were added up to reach VAIC

Independent Variables data: (VAIC= HCE+SCE+CEE)

HCE=VA/HC

1.Value added (VA)= output-input

2. Human Capital= Employee’s cost (Employee cost must be deducted from Total expense as Employees are assets not Expenses

3. Output= Total income (here collected as Earning)

4. Input= Total Expenses Excluding employee’s cost

5. VA=OP+EC+AD

6. VA= Operational Profit +Employees Cost + Amortisation & Depreciation)
Where OP= Earnings before Interest & Tax (EBIT)
Because OP did not exist in Osiris data base, EBIT used as its replacement

SCE= SC/VA

SC=VA-HC

CEE= VA/CE

CE=WC+FA

Capital Employed =Working Capital + Fixed Assets

VAIC=HCE+SCE+CEE

Calculating IC depends on the database being used. For instance, in this study, as it was mentioned before, while the operational profit (OP) was not available on the database to compute VA, we used earnings before interest and tax (EBIT) to compute value added. Also, to calculate CEE, CE is needed; however, the database did not provide this data. Thus, we calculated it by adding working capital (WC) to fixed assets (FA) in order to reach CE for each company.

Moreover, Pulic (2002) mentioned that labour expenses must be deducted when the value added is calculated because labour expenses represent an asset called HC. In general, VAICs represent the sum of three component coefficients as follows:

1) Efficiency rate of capital employed – CEE
2) The rate of the effectiveness of human capital – HCE
3) The rate of structural capital efficiency – SCE

It is worth noting that the VAIC methodology aims to calculate the efficiency of the three parameters; however, some scholars argue that the ratios of the parameters would not provide sufficient information regarding the impact of IC on performance (Andriesson, 2004).

Although Nadeem et al. (2019) applied the A-VAIC, which is an adjusted version of VAIC, they added innovation to HC in order to overcome the criticism of the original VAIC model; however, it still does not incorporate all the concerns raised by different scholars in the literature. For example, Maditinos et al. (2011) argue that the VAIC model overlooks risk factors, which is still missing in the A-VAIC model. Similarly, Ståhle et al. (2011) argue that the VAIC model ignores important components of IC, such as relational capital. Moreover, they also question the measure of human capital; human capital in the VAIC model is based on salaries and wages and, hence, ignores the knowledge and skills employees acquire through their experience. Therefore, issues still exist in the A-VAIC model, and thus caution is needed when interpreting the results based on this model. Having said that, the VAIC model is still the most efficient, objective and holistic approach for measuring IC (Nadeem et al., 2019).

The following table is the summary of independent, dependent and control variables and their measurement; it also shows the calculation of VAIC methodology as the sum of all its components (HCE, SCE, CEE) which are used in the study.

The following table presents the summary of the IC study variables measurement:

Table 14 Summary of Variables & Measurement

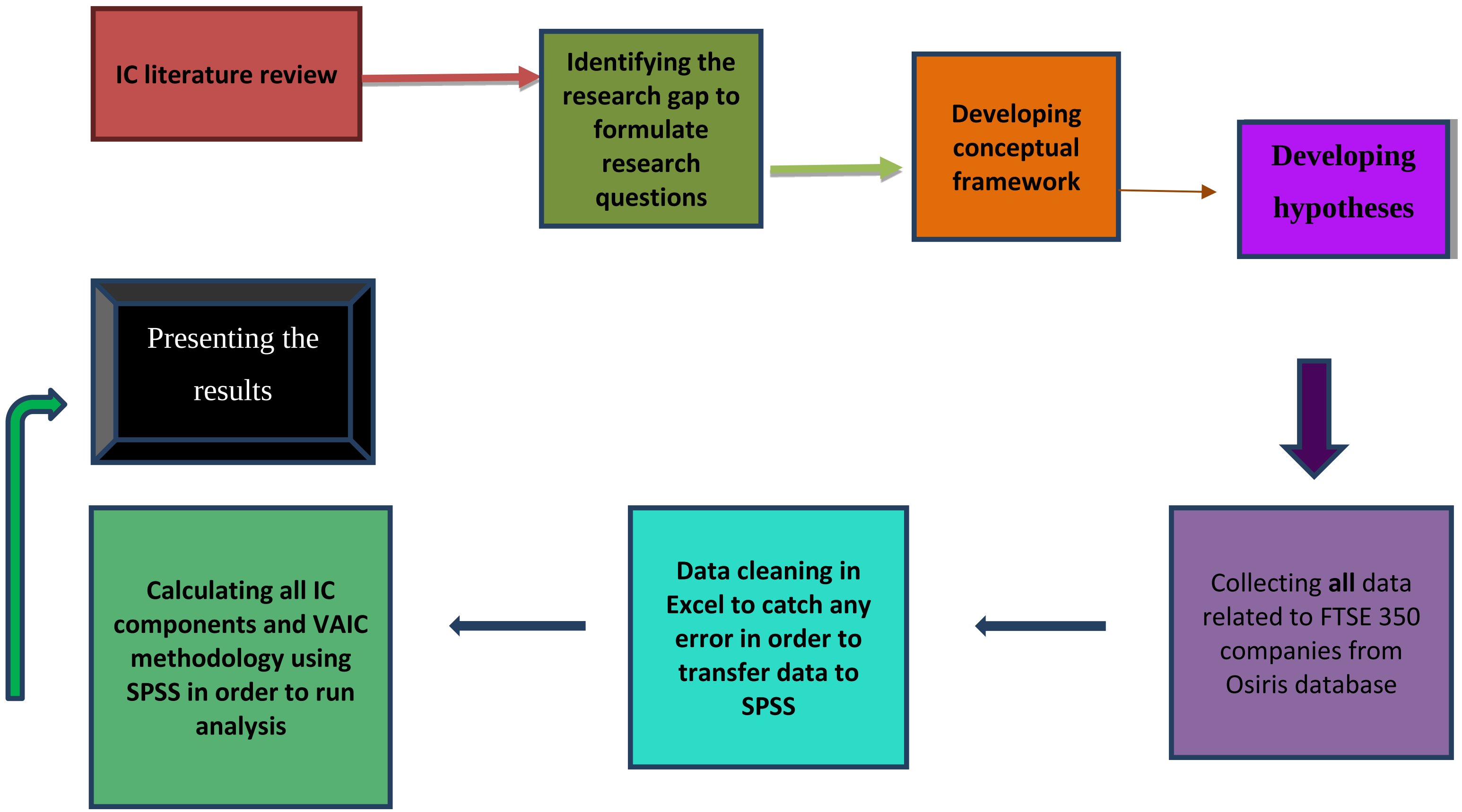
Independent variables	**Formula**	**Description**
Value Added (VA)	Output-Input	Total income-total expenses
Human Capital (HC)	HC	Total personal expenses
Structural Capital (SC)	SC = VA – HC	Value added – human capital
Capital Employed (CE)	CE	Physical and financial capital employed

Human Capital Efficiency (HCE)	HCE = VA/HC	Company's VA/ all the expenditures for employees
Structural Capital Efficiency (SCE)	SCE = SC/VA	Structural capital /value added
Capital Employed Efficiency (CEE)	CEE = VA/CE	Company's VA / book value of the net assets of company
Value Added Intellectual Coefficient (VAIC)	VAIC = HCE + SCE + CEE	Human capital efficiency + structural capital efficiency + capital employed efficiency
Control Variables		
Firm Size	FSIZE	The natural logarithm of book value of firm's total assets
Financial Leverage	LEV	Calculated through dividing total liabilities by book value of total assets
Number of Employees	NEmploy	Human capital of the firm is measured as the natural logarithm of the number of employees
Dependent Variables		
Return on Assets	ROA	Calculated as a ratio of gross profit and book value of the company's total assets
Tobin's Q	Tobin's Q	The ratio of the market value of a company's assets divided by the replacement cost of its assets (book value)
ROE	Return on Equity	Net assets or assets minus liabilities
P/E	Price per Earning	The ratio of a company's share (stock) price to the company's earnings per shar

The following figure is the summary of the Intellectual Capital Hypothesis Testing Procedure

Data screening and filtering are crucial in preparing data for multiple regression analysis. Therefore, the process began with identifying missing data in the row and columns, then identifying outliers with an extreme influence on a single variable using SPSS (Hair et al. 2014). The main method used in this research is regression analysis which is almost the most important and available method for the econometricians (Brooks, 2008). SPSS has been used to test the regression model. All calculations for HCE, SCE and CEE in addition to the sum of them (VAIC) were performed using SPSS. Then we used SPSS for the time lag to test the impact of independent variables on all four types of performance indicators after one, two, three, four and five years. In the end, their impact was summarised and discussed in later chapters. After the data were collected, some companies that did not provide complete data were deleted, as has been mentioned before; therefore, the remaining companies were screened for any outliers, and SPSS software was utilised to prepare the final dataset.

Figure 5 Schema of Intellectual Capital Hypotheses Testing Procedure



Source: Author

5.6 Empirical Results

This part illustrates the correlations amongst the variables of intellectual capital and firm financial performance, which was tested using the Pearson correlation. The following tables present the impact of HCE, SCE, CEE on FTSE 350 companies' performance, which has been indicated by ROA, ROE, Tobin's Q and P/E from 2010 to 2018 (Model 1).

Besides, control variables such as firm total assets, number of employees and firm leverage have been tested as well.

The VAIC, which comprises HCE, SCE and CEE, has been calculated and presented in a separate table demonstrated as Model 2 in order to demonstrate the accurate impact of intellectual capital, whether as a component or accumulative, on all different performance.

Table 15 Model 1 Coefficients Results ROA (2010 -2018)

	Variables	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Constant	-.415	5.401	5.212	.582	7.320	6.963	5.725	-.163	5.993
		.720	.013**	.008**	.761	000***	.001**	.007**	.953	.007**
		(-.360)	(2.494)	(2.696)	(.305)	(3.894)	(3.289)	(2.711)	(-.059)	(2.7080
Beta	HCE	.142	.239	.147	.206	.108	.177	.090	.039	.124
P value		.023**	**.000*****	.020**	.002**	.104	.006**	.182	.576	.063*
t statistic		(2.293)	(3.617)	(2.335)	(3.063)	(1.633)	(2.753)	(1.339)	(.560)	(1.865)
Beta	SCE	.124	.011	.055	.106	-.011	.001	.135	.210	-.075
P value		.053*	.877	.020**	.126	.873	.987	.044**	.005**	.253
t statistic		(1.942)	(.155)	(.883)	(1.538)	(-.160)	(.016)	(.2.028)	(2.856)	(-1.147)
Beta	CEE	.418	.183	.300	.327	.153	.170	.141	.198	.203
P value		.000***	.008**	.000***	.000***	.024**	.010**	.035**	.004**	.004**
t statistic		(6.672)	(2.683)	(4.749)	(5.083)	(2.2770	(2.584)	(2.127)	(2.939)	(2.905)
Beta	TA	-.023	-.029	.031	-.042	-.046	-.053	. -.066	-.076	.024
P value		.707	.659	.635	.514	.489	.414	325	.255	.717
t statistic		(-.376)	(-.4420)	(.475)	(-.654)	(-.693)	(-.818)	(-.987)	(1.142)	(.363)
Beta	NEmp	.074	-.090	-.110	-.094	-.082	-.080	-.056	-.011	-.083
		.225	.174	.090*	.141	.223	.228	.420	.873	.238

P value t statistic		(1.217)	(-1.365)	(1.703)	(-1.477)	(-.892)	(-1.208)	(-.809)	(-.160)	(-1.184)
Beta P value t statistic	**LEV**	164 .007** (2.733)	-.076 .236 (-1.1890)	-.044 .480 (-.707)	-.094 .130 (-1.520)	-.058 .373 (-.892)	-.135 .036** (-2.105)	-.126 .057 (1.913)	-.102 .115 (1.581)	-.104 .114 (-1.587)
ANOVA Reg. (Sig)	**ROA**	**.000*** **	**.000*** **	**.000*** **	**.000*** **	.106	.003**	.004**	.003**	.013*
F Value	**ROA**	9.541	4.341	5.036	6.797	1.769	3.390	3.282	3.488	2.748
R Square	**ROA**	.202	.103	.118	.153	.045	.083	.080	.085	.068
Adjusted R Square	**ROA**	.181	.080	.095	.130	.019	.058	.056	.060	.043

Notes: This table provides the coefficients results for intellectual capital components (HCE, SCE and CEE) and the control variables (number of employees, firm leverage and firm size) based on ROA.
***p<0.01, ** p<0.05, * p<0.1

Table 16 Model 2 VAIC Coefficients Results ROA (2010 -2018)

	VAIC Model	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Constant	3.943 .000*** (4.445)	7.495 .000*** (6.990)	10.393 .000*** (6.468)	5.716 .000*** (3.876)	8.654 .000*** (5.298)	8.594 .000*** (5.224)	3.943 .000*** (4.577)	7.495 .000*** (4.264)	10.393 .000*** (5.052)
Beta P value t statistic	LEV	.118 .067* (1.839)	-.095 .136 (-1.498)	-.044 .496 (-.681)	-.100 .117 (-1.574)	-.062 .346 (-.944)	-.136 .036** (-2.108)	-.143 .030** (-2.179)	-.108 .102 (-1.642)	-.114 .089* (-1.707)

Beta P value t statistic	NEmp	.192 .085 (1.308)	.342 -.062 (-.952)	.212 -.084 (-1.250)	.395 -.056 (-.852)	.349 -.063 (-.938)	.395 -.056 (-.852)	.599 -.036 (-.527)	.790 -.018 (-.267)	.704 -.026 (-.380)
Beta P value t statistic	TA	-.047 .463 (-.736)	-.053 .422 (-.805)	.008 .907 (.116)	-.076 .243 (-1.171)	-.064 .339 (-.958)	-.071 .276 (-1.091)	-.079 .241 (-1.175)	-.075 .266 (-1.115)	-.013 .850 (-.189)
Beta P value t statistic	VAIC	.186 .005** (2.845)	.244 .000*** (3.840)	.159 .016** (2.437)	.237 .000*** (3.696)	.104 .115 (1.582)	.179 .006** (2.777)	.137 .036** (2.114)	.122 .064* (1.865)	.074 .267 (1.113)
ANOVA Reg. (Sig)	ROA	.005**	.000***	.016**	.000***	.201	.007**	.036**	.081*	.027**
Adjusted R Square	ROA	.046	.062	.018	.028	.009	.043	.038	.019	.004

Notes: This table provides the coefficients results for sum of the intellectual capital components (VAIC) and the control variables (number of employees, firm leverage and firm size) based on ROA.
***p<0.01, **p<0.05, *p<0.1

Table 17 Model 1 Coefficients Results Tobin's Q (2010 -2018)

	Variables	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Constant	.930	.945	1.427	1.141	2.050	1.775	1.761	.624	1.305
		.000***	.002**	.000***	.005**	.001**	.000***	.008**	.363	.024**
		(5.841)	(3.184)	(6.819)	(2.842)	(3.491)	(4.193)	(2.672)	(.911)	(2.280)
Beta	**HCE**	.047	.042	.029	.021	.012	.035	.031	.004	.051
P value		.484	.532	.664	.770	.861	.591	.648	.954	.455
T statistic		(.702)	(.627)	(.435)	(.292)	(.175)	(.538)	(.458)	(.057)	(.749)
Beta	**SCE**	.014	.109	.026	096	.031	.020	.036	.122	.034
P value		.840	.125	.691	.182	.646	.760	.597	.105	.606
t statistic		(.202)	(1.540)	(.398)	(1.339)	(.460)	(.306)	(.529)	(1.627)	(.516)
Beta	**CEE**	.193	.204	.094	.151	.093	.145	.105	.146	.160
P value		.005**	.003**	.156	.026**	.171	.030**	.122	.036**	.025**
t statistic		(2.833)	(2.968)	(1.423)	(2.236)	(1.375)	(2.179)	(1.551)	(2.114)	(2.263)
Beta	**TA**	-.093	-.068	-.072	-.078	-.057	-.068	-.048	-.053	-.044
P value		.157	.305	.288	.243	.399	.307	.483	.435	.517
t statistic		(-1.421)	(1.028)	(-1.066)	(1.171)	(-.846)	(-1.023)	(-.703)	(-.781)	(-.648)
Beta	**NEmp**	.037	-.110	-.104	-.079	-.064	-.075	-.042	-.031	-.068
P value		.575	.100	.124	.241	.348	.261	.557	.658	.339
t statistic		(.562)	(1.651)	(-1.546)	(1.176)	(-.940)	(-1.127)	(-.589)	(-.444)	(-.958)

Beta P value t statistic	**LEV**	.094 .152 (1.437)	-.152 .018** (2.375)	-.102 .121 (-1.066)	-.164 .012** (2.538)	-.102 .124 (1.544)	-.142 .030** (-2.181)	-.107 .112 (1.593)	-.086 .194 (1.301)	-.105 .116 (-1.578)
ANOVA Reg(Sig)	**TOB**	.046**	.001**	.152	.015*	.330	.047**	.275	.148	.121
F Value	**TOB**	2.182	3.816	1.587	2.713	1.158	2.167	1.264	1.600	1.702
R Square	TOB	.055	.092	.040	.067	.030	.054	.033	.041	.043
Adjusted R Square	TOB	.030	.068	.015	.042	.004	.029	.007	.015	.018

Notes: This table provides the coefficients results for the intellectual capital components (HCE, SCE and CEE) and the control variables (number of employees, firm leverage and firm size) based on Tobin's Q.
***p<0.01, ** p<0.05, * p<0.1

Table 18 Model 2 VAIC Coefficients Results Tobin's Q (2010 -2018)

	VAIC Model	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Constant	1.157 .000*** (10.072)	1.586 .000*** (10.733)	1.584 .000*** (9.481)	1.758 .000*** (5.852)	2.434 .000*** (4.800)	2.180 .000*** (6.642)	2.246 .000*** (3.961)	1.770 .000*** (4.281)	2.069 .000*** (4.630)
Beta P value t statistic	**LEV**	.070 .284 (1.073)	-.173 .008** (-2.681)	-.103 .118 (-1.571)	-.163 .013** (-2.508)	-.105 .111 (-1.602)	-.144 .028** (-2.212)	-.114 .089* (-1.710)	-.091 .172 (-1.370)	-.111 .099* (-1.654)
Beta P value t statistic	**NEmp**	.041 .284 (1.073)	-.093 .161 (-1.406)	-.095 .157 (-1.419)	-.066 .324 (-.988)	-.054 .422 (-.805)	-.057 .394 (-.853)	-.023 .737 (-.336)	-.030 .667 (-.430)	-.028 .690 (-.399)

Beta P value t statistic	**TA**	-.108 .101 (-1.648)	-.086 .193 (-1.305)	-.079 .238 (-1.183)	-.090 .176 (-1.358)	-.067 .317 (-1.003)	-.082 .214 (-1.247)	-.062 .363 (-.912)	-.057 .403 (-.837)	-.071 .296 (-1.048)
Beta P value t statistic	**VAIC**	.055 .414 (.818)	.079 .221 (.227)	.043 .514 (.653)	.058 .375 (.889)	.021 .748 (.322)	.042 .521 (.642)	.044 .508 (.664)	.052 .428 (.795)	.039 .557 (.588)
ANOVA Regression (Sig)	**TOB**	.282	.009	.111	.033**	.282	.081	.265	394	.267
Adjusted R Square	**TOB**	.005	.041	.015	.028	.005	.019	.005	.000	005

Notes: This table provides the coefficients results for the sum of the intellectual capital components (VAIC) and the control variables (number of employees, firm leverage and firm size) based on Tobin.

*****p<0.01, ** p<0.05, * p<0.1**

Table 19 Model 1 Coefficients Results ROE (2010 -2018)

	Variables	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Constant	-15.263	5.477	-7.509	4.170	17.172	11.378	10.364	.229	10.784
		.082*	.625	.302	.668	.038**	.126	.109	.973	.001**
		(-1.749)	(.490)	(-1.035)	(.430)	(2.083)	(1.535)	(1.611)	(.034)	(3.466)
Beta	HCE	.020	.068	.053	.049	.021	.056	-.018	-.016	.071
P value		.750	.308	.373	.495	.757	.396	.801	.819	.261
t statistic		(.319)	(1.022)	(.893)	(.683)	(.310)	(.851)	(-.253)	(-.229)	(1.126)
Beta	SCE	.004	.040	.059	.116	-.001	-.008	.080	.072.	-.269
P value		.946	.578	.322	.116	.988	.903	.251	337	.000***
t statistic		(.068)	(.557)	(.993)	(1.577)	(-.015)	(-.122)	(1.150)	(.961)	(-4.349)
Beta	CEE	.260	.048	.255	.068	.087	.111	.015	.132	.223
P value		.000***	.489	.000***	.329	.199	.103	.830	.058*	.001***
t statistic		(4.014)	(.694)	(4.254)	(.979)	(1.288)	(1.637)	(.215)	(1.903)	(3.390)
Beta	TA	.014	-.019	.022	-.034	-.036	-.018	-.016	-.036	.091
P value		.817	.778	.716	.620	.595	.785	.823	.602	.152
t statistic		(.232)	(-.283)	(.364)	(-.496)	(-.533)	(-.273)	(-.224)	(-.522)	(1.438)
Beta	NEmp	.048	-.041	-.075	-.040	-.079	-.064	. .027	.021	-.031
P value		.444	.537	.218	.558	.243	.347	710	.763	.638
t statistic		.767	-.619	-1.234	-.587	1.171	-.942	.372	.301	-.471

Beta P value t statistic	**LEV**	.313 .000*** (.767)	.285 .000*** (-.619)	.377 000*** (-1.234)	.032 .632 (-.587)	.175 .008** (1.171)	.048 .465 (-.942)	-.051 .457 (.372)	.123 .066* (.301)	.194 .002** (-.471)
ANOVA Reg (Sig)	**ROE**	.000***	.002**	.000***	.461	.127	.585	.897	.258	.000***
F Value	**ROE**	6.477	3.637	9.865	.948	1.678	.782	.372	1.300	7.928
R Square	ROE	.147	.088	.208	.025	.043	.020	.010	.033	.174
Adjusted R Square	ROE	.124	.064	.187	-.001	.017	-.006	-.017	.008	.152

Notes: This table provides the coefficients results for the intellectual capital components (HCE, SCE and CEE) and the control variables (number of employees, firm leverage and firm size) based on ROE.
***p<0.01, ** p<0.05, * p<0.1

Table 20 Model 2 VAIC Coefficients Results ROE (2010 -2018)

VAIC Model	Variables	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Constant	2.392 .710 (.373)	11.785 .032* (2.156)	8.682 .148 (1.451)	13.101 .071* (1.817)	21.268 .003** (2.989)	15.274 .008** (2.669)	12.991 .019* (2.353)	8.325 .041* (2.056)	14.082 .000*** (5.442)
Beta P value t statistic	LEV	.280 .000*** (4.417)	.281 .000*** (4.442)	.374 .000*** (6.105)	.039 .551 (.596)	.172 .009** (2.638)	.048 .473 (.720)	-.060 .373 (-.893)	.117 .079* (1.763)	.178 .008** (2.698)
Beta P value t statistic	NEmp	.053 .411 (.823)	-.040 .540 (-.614)	-.050 .424 (-.801)	-.043 .521 (-.643)	-.068 .310 (-1.018)	-.047 .482 (-.704)	.027 .703 (.381)	.031 .654 (.448)	.043 .529 (.630)

Beta P value t statistic	TA	.902 -.008 (-.123)	.746 -.021 (-.325)	.984 .001 (.020)	.645 -.031 (-.461)	489 . -.046 (-.694)	.644 -.031 (-.462)	.844 -.014 (-.197)	.518 -.044 (-.647)	.525 .043 (.636)
Beta P value t statistic	VAIC	.026 .684 (.408)	.081 .202 (1.279)	.090 .145 (1.461)	.098 .138 (1.489)	.021 .749 (.320)	.057 .390 (.862)	.012 .855 (.183)	.012 .853 (.185)	-.037 .573 (-.564)
ANOVA Reg (Sig)	ROE	.001**	.000***	.000***	.502	.079*	.721	.922	.423	.043**
Adj. R Square		.067	.070	.131	-.003	.019	-.008	-.014	.000	.025

Notes: This table provides the coefficients results for the sum of the intellectual capital components (VAIC) and the control variables (number of employees, firm leverage and firm size) based on ROE.

***p<0.01, ** p<0.05, * p<0.1

Table 21 Model 1 Coefficients Results P/E (2010 -2018)

	Variables	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Constant	34.732	43.098	23.486	32.446	25.003	35.548	29.500	38.660	27.411
		.000***	.000***	.000***	.000***	.000***	.000***	.000***	.000***	.000***
		(4.359)	(4.178)	(6.549)	(9.473)	(15.779)	(8.865)	(5.766)	(6.367)	(8.530)
Beta	**HCE**	-.002	.012	-.038	-.018	-.114	-.085	-.065	.035	-.133
P value		.982	.863	.571	.794	.086*	.186	.308	.626	.050**
t statistic		(-.022)	(.173)	(-.568)	(-.262)	(-1.722)	(-1.327)	(-1.021)	(.488)	(-1.970)
Beta	**SCE**	.014	-.112	-.007	-.281	-.063	-.085	-.044	-.158	-.080
P value		.847	.132	.914	.000***	.340	.198	.487	.039**	.233
t statistic		(.193)	(-1.510)	(-.108)	(-3.963)	(-.956)	(-1.291)	(-.697)	(-2.080)	(-1.195)
Beta	**CEE**	-.073	-.074	-.065	-.148	.000	-.009	-.020	-.060	-.045
P value		.296	.299	.336	.027**	1.000	.896	.752	.386	.523
t statistic		(-1.047)	(-1.042)	(-.965)	(-2.232)	(.000)	(-.131)	(-.317)	(-.869)	(-.640)
Beta	**TA**	-.041	.010	-.065	-.066	-.103	-.013	-.112	.041	-.058
P value		.543	.888	.345	.314	.122	.847	.080*	.555	.398
t statistic		(-.609)	(.141)	(-.946)	(-1.009)	(-1.553)	(-.193)	(-1.761)	(.591)	(-.847)
Beta		-.036	-.065	-.013	.088	-.001	-.037	.422	-.069	-.047

P value t statistic	**NEmp**	.591 (-.537)	.347 (-.942)	.850 (-.190)	.183 (1.336)	.993 (-.008)	.572 (-.565)	.000*** (6.469)	.330 (-.977)	.511 (-.658)
Beta P value t statistic	**LEV**	-.015 .827 (-.219)	-.066 .325 (-.986)	.023 .726 (.351)	.025 .693 (.395)	-.145 .027** (-2.226)	-.248 .000*** (-3.861)	-.021 .738 (-.334)	062 .350 (.936)	.072 .280 (1.082)
ANOVA Reg (Sig)	**P/E**	.929	.632	.882	.001**	.061*	.004**	.000***	.444	.220
F Value	**P/E**	.315	.723	.394	4.098	2.040	3.241	8.010	.974	1.388
R Square	**P/E**	.008	.019	.010	.098	.051	.079	.176	.025	.036
Adjusted R Square	**P/E**	-.018	-.007	-.016	.074	.026	.020	.154	-.001	.010

Notes: This table provides the coefficients results for the intellectual capital components (HCE, SCE and CEE) and the control variables (number of employees, firm leverage and firm size) based on P/E.
***p<0.01, ** p<0.05, * p<0.1

Table 22 Model 2 VAIC Coefficients Results P/E (2010 -2018)

VAIC Model	**Variables**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
	Constant	31.048 .000*** (5.481)	28.798 .000*** (5.683)	21.450 .000*** (7.509)	24.265 .000*** (9.259)	25.019 .000*** (18.331)	33.736 .000*** (10.929)	28.490 .000*** (6.503)	28.676 .000*** (7.848)	26.156 .000*** (10.523)
Beta P value t statistic	**LEV**	-.005 .944 (-.070)	-.060 .362 (-.913)	.023 .728 (.348)	.006 .929 (.089)	-.145 .027** (-2.233)	-.245 .000*** (-3.824)	-.017 .785 (-.273)	.063 .346 (.944)	.072 .278 (1.086)
Beta	**NEmp**	-.037	-.060	-.018	.097	.005	-.029	.421	-.048	-.052

P value t statistic		.581 (-.552)	.378 (-.883)	.788 (-.270)	.149 (1.449)	.939 (.077)	.655 (-.447)	.000*** (6.602)	.484 (-.701)	.448 (-.760)
Beta P value t statistic	**TA**	-.033 .618 (-.499)	.009 .889 (.140)	-.060 .379 (-.882)	-.074 .267 (-1.113)	-.108 .103 (-1.636)	-.018 .786 (-.271)	-.113 .073* (-1.799)	.029 .673 (.422)	-.055 .417 (-.813)
Beta P value t statistic	**VAIC**	.001 .984 (.020)	-.024 .714 (-.367)	-.036 .591 (-.538)	-.139 .034** (-2.129)	-.127 .051* (-1.964)	-.100 .120 (-1.560)	-.079 .192 (-1.310)	-.028 .668 (-.429)	-.147 .026** (-2.240)
ANOVA Reg (Sig)	**P/E**	.969	.778	.832	.091*	.021**	.001**	.000***	.834	.107
Adjusted R Square	**P/E**	-.015	-.010	-.011	.017	.033	.058	.160	-.011	016

Notes: This table provides the coefficients results for the sum of the intellectual capital components (VAIC) and the control variables (number of employees, firm leverage and firm size) based on P/E.
***p<0.01, ** p<0.05, * p<0.1

5.7 IC Time Lag Coefficient Results

The tables below illustrate the impact of HCE, SCE and CEE of the FTSE 350 companies on performance indicators which are ROA, ROE, Tobin's and P/E after a two-year lag based on Model 3. As the investment or any changes in the policy and culture need some time to appear in the performance, the results of this section will help to provide a better understanding of the intellectual capital impact on performance. Also, the sum of HCE, SCE and CEE has been presented based on VAIC methodology.

Presenting the time lags up to five years for all the variables and VAIC methodology is beyond the scope of this study, although the summary of the sum of the impact is presented in a table at the end of this chapter. Therefore, performance after two years, which is, in some cases, significant, is presented in this study. According to the empirical results, HCE and CEE in 2013 were significant at 5% based on ROA in 2015.

Table 23 shows the impact of IC on ROA after a two-year lag. Based on the results, there is no significant impact.

Table 24 shows the impact of IC on Tobin's Q after a two-year lag. Based on the results, there is no significant impact.

Table 25 shows the impact of IC on ROE after a two-year lag, and the results show that the SCE in 2016 is significant at 5% based on ROE in 2018. Leverage in 2013 and 2015 are significant at 1% based on ROE in 2015 and 2017.

Table 26 shows no significant outcome for the impact of IC on P/E after a two-year lag.

Therefore, there is no conclusive evidence to show that human capital training or skills would have an impact on performance after one, two, three, four and five years.

Table 23 Model 3 Coefficients Results Lagged Two Years ROA (2010 -2018)

	Variables	**2016**	**2015**	**2014**	**2013**
	Constant	8.191	7.188	7.712	4.147
		.000***	.000***	.000***	.134***
		(4.068)	(3.602)	(3.714)	(1.504)
Beta		.064	.056	.072	.159

P value t statistic	**HCE**	.357 (.924)	.394 (.854)	.283 (1.077)	.026** (2.247)
Beta P value t statistic	**SCE**	-.028 .687 (-.403)	-.003 .963 (-.046)	.018 .791 (.266)	.042 .565 (.576)
Beta P value t statistic	**CEE**	.113 .097* (1.667)	.111 .102 (1.640)	.052 .442 (.770)	.142 .037** (2.096)
Beta P value t statistic	**TA**	-.028 .682 (-.410)	-.073 .276 (-1.093)	-.087 .201 (-1.283)	-.082 .221 (-1.226)
Beta P value t statistic	**NEmp**	-.046 .512 (-.656)	-.052 .445 (-.765)	-.051 .451 (-.755)	-.078 .248 (-1.158)
Beta P value t statistic	**LEV**	-.100 .141 (-1.478)	-.104 .116 (-1.578)	-.053 .427 (-.796)	-.076 .241 (-1.175)
ANOVA Reg. (Sig) Adj. R Square	**ROA18**	.327 .004			
ANOVA Reg. (Sig) Adj. R Square	**ROA17**		.227 .010		
ANOVA Reg. (Sig) Adj. R Square	**ROA16**			.499 -.003	
ANOVA Reg. (Sig) Adj. R Square	**ROA15**				.026** .036

Notes: This table provides the coefficients results for the intellectual capital components (HCE, SCE, CEE) and the control variables (number of employees, firm leverage and firm size) based on ROA after a two-year time lag. ***p<0.01, ** p<0.05, * p<0.1

Table 24 Model 3 Coefficients Results Lagged Two Years TOB (2010 -2018)

	Variables	2016	2015	2014	2013
	Constant	1.947	1.518	1.863	1.608
		.000***	.002**	.004**	.004***
		(3.632)	(3.142)	(2.936)	(2.931)
Beta	**HCE**	.011	.037	.016	.002
P value		.872	.571	.810	.973
t statistic		(.162)	(.568)	(.240)	(.034)
Beta	**SCE**	.031	.022	.023	.067
P value		.656	.749	.728	.361
t statistic		(.446)	(.321)	(.348)	(.916)
Beta	**CEE**	.092	.104	.062	.095
P value		.178	.124	.362	.166
t statistic		(1.352)	(1.542)	(.913)	(1.391)
Beta	**TA**	-.058	-.053	-.054	-.078
P value		.400	.428	.428	.251
t statistic		(-.844)	(-.793)	(-.793)	(-1.150)
Beta	**NEmp**	-.041	-.056	-.054	-.069
P value		.558	.406	.434	.311
t statistic		(-.587)	(-.832)	(-.784)	(-1.015)
Beta	**LEV**	-.131	-.106	-.061	-.138
P value		.052*	.109	.357	.037**
t statistic		(-1.955)	(-1.610)	(-.923)	(-2.100)
ANOVA Reg. (Sig)	**TOB18**	.207			
Adj. R Square		.037			
ANOVA Reg. (Sig)	**TOB17**		.316		

Adj. R Square			.005		
ANOVA Reg. (Sig) Adj. R Square	**TOB16**			.726 -.010	
ANOVA Reg. (Sig) Adj. R Square	**TOB15**				.130 .017

Notes: This table provides the coefficients results for the intellectual capital components (HCE, SCE, CEE) and the control variables (number of employees, firm leverage and firm size) based on Tobin's Q after a two-year time lag.

***p<0.01, ** p<0.05, * p<0.1

Table 24 shows that the model is significant. However, there is no significant impact of variables on Tobin's Q after two years except for Leverage which is significant in two years (2016, 2013).

Table 25 Model 3 Coefficients Results Lagged Two Years ROE (2010 -2018)

	Variables	**2016**	**2015**	**2014**	**2013**
	Constant	15.973	6.380	9.611	9.262
		.000***	.169	.119	.317
		(5.418)	(1.379)	(1.564)	(1.003)
Beta	**HCE**	-.001	-.028	-.007	.019
P value		.993	.661	.912	.790
t statistic		(-.009)	(-.440)	(-.111)	(.267)
Beta	**SCE**	-.168	-.039	-.003	-.072
P value		.013**	.553	.961	.317
t statistic		(-2.499)	(-.594)	(-.049)	(-1.004)
Beta	**CEE**	.101	.097	.023	.116
P value		.132	.146	.737	.085*
t statistic		(1.513)	(1.460)	(.336)	(1.729)
Beta	**TA**	.000	-.033	-.019	-.017
P value		.999	.612	.782	.793
t statistic		(-.001)	(-.508)	(-.278)	(-.263)

Beta P value t statistic	**NEmp**	.034 .620 (.496)	-.010 .877 (-.156)	.002 .982 (.022)	-.101 .130 (-1.519)
Beta P value t statistic	**LEV**	121 .068* (1.836)	.236 .000*** (3.665)	073 .273 (1.100)	-.017 .000*** (3.922)
ANOVA Reg. (Sig) Adj. R Square	**ROE18**	.016* .042			
ANOVA Reg. (Sig) Adj. R Square	**ROE17**		.010* .046		
ANOVA Reg. (Sig) Adj. R Square	**ROE16**			.963 -.020	
ANOVA Reg. (Sig) Adj. R Square)	**ROE15**				.003** .059

Notes: This table provides the coefficients results for the intellectual capital components (HCE, SCE, CEE) and the control variables (number of employees, firm leverage and firm size) based on ROE after a two-year time lag. ***p<0.01, ** p<0.05, * p<0.1

Table 25 shows that the leverage has a significant impact on ROE two years later. SCE (2016) and CEE (2018) are significant in one year each.

Table 26 Model 3 Coefficients Results Lagged Two Years P/E (2010 -2018)

	Variables	**2016**	**2015**	**2014**	**2013**
	Constant	. 25.951 .000*** (8.980)	26.295 .000*** (6.141)	26.870 .000*** (5.220)	32.170 .000*** (6.045)
Beta P value t statistic	**HCE**	-.127 .068* (-1.837)	.093 .162 (1.403)	-.068 .294 (-1.051)	-.088 .225 (-1.218)
Beta P value t statistic	**SCE**	.008 .906 (.118)	.008 .902 (.123)	-.032 .617 (-.501)	-.039 .593 (-.535)

Beta	**CEE**	-.009	.015	.074	.021
P value		.893	.823	.260	.763
t statistic		(-.135)	(.224)	(1.128)	(.302)
Beta	**TA**	-.050	.028	-.037	-.002
P value		.475	.677	.569	.973
t statistic		(-.716)	(.417)	(-.570)	(-.033)
Beta	**NEmp**	-.040	-.055	.253	-.054
P value		.576	.424	.000***	.431
t statistic		(-.560)	(-.801)	(3.836)	(-.790)
Beta	**LEV**	.005	.023	.016	-.074
P value		.936	.725	.808	.265
t statistic		(.081)	(.353)	(.243)	(-1.116)
ANOVA Reg. (Sig)	**P/E18**	.613			
Adj. R Square		-.007			
ANOVA Reg. (Sig)	**P/E17**		.810		
Adj. R Square			-.013		
ANOVA Reg. (Sig)	**P/E16**			.003**	
Adj. R Square				.060	
ANOVA Reg. (Sig)	**P/E15**				.533
Adj. R Square					-.004

Notes: This table provides the coefficients results for the intellectual capital components (HCE, SCE, CEE) and the control variables (number of employees, firm leverage and firm size) based on P/E after a two-year time lag. ***p<0.01, ** p<0.05, * p<0.1

Table 26 shows the model is significant; however, none of the variables is significant except HCE in 2016 and number of employees in 2014.

The following table presents the time lags from one up to five years to give a better insight into the impact of intellectual capital on performance with respect to time lag. The equation is similar to that of Model 3.

Table 27 Model 3 Summary of Coefficients Results Time Lag up to Five Years (2013-2018)

Performance	1-year Lag 2017	2-year lag 2016	3-year lag 2015	4-year lag 2014	5-year lag 2013
ROA 2018	SCE(.183**) CEE(.173**)	CEE(.113*)	None	None	None
Tobin 2018	CEE(.129*)	LEV(-.131*)	LEV(-.112*)	None	None
ROE 2018	CEE (.186**) LEV(.287***)	SCE(-.168**) LEV(.121*)	CEE(.111*) LEV(.197**)	None	None
P/E 2018	SCE(-.198**)	HCE(-.123*)	LEV(-.121*)	None	None
VAIC (ROA18)	None	None	None	None	None
VAIC (Tobin 18)	None	LEV (-.138**)	LEV(-.114*)	None	None
VAIC (ROE 18)	LEV(.279***)	LEV (.136**)	LEV(.198**)	None	None
VAIC (P/E 18)	None	VAIC (-.121*)	LEV(-.118*)	None	None

Note: This table provides a summary of the coefficients results for all the intellectual components (HCE, SCE, CEE), sum of IC components (VAIC) and the control variables (number of employees, firm leverage and firm size) based on ROA, Tobin, ROE and P/E after a one-, two-, three-, four- and five-year time lag. For the time lag, 2018 has been considered as the base line.

None: There is no impact of the variables on performance
***p<0.01, ** p<0.05, * p<0.1

Table 27 is the summary of all variables against four types of performance alongside VAIC methodology. All variables have been tested from a one-year lag to a five- lag, from 2018 to 2013. The complete table for a two-year time lag has been discussed previously. However, presenting all the tables is beyond the capability of this study.

As it has been presented, VAIC (P/E) is significant only for the two-year time lag. The reason is that HCE is significant in the P/E analysis. This result has been proven previously in the ROA and P/E tables (without time lag); whenever the HCE is significant, the VAIC is significant as well. This means that HCE is the most effective component of VAIC which has also been proven by other studies.

Table 28 Model 3 Summary of Coefficients Results Time Lag up to Five Years (2012-2017)

Performance	1-year Lag 2016	2-year Lag 2015	3-year Lag 2014	4-year Lag 2013	5-year Lag 2012
ROA 2017	CEE(.135**) LEV(-.137**)	None	None	None	None
Tobin 2017	LEV(-.135**)	None	LEV(-.125**)	None	None
ROE 2017	LEV(.345***)	LEV(236***)	LEV(.335**)	None	None
P/E 2017	HCE(.143**)	None	LEV(.324 **)	None	None
VAIC (ROA17)	LEV(-.145**)	None	None	None	None
VAIC (Tobin 17)	LEV(-.141**)	None	None	None	None
VAIC (ROE 17)	LEV(.340***)	None	None	None	None
VAIC (P/E 17)	VAIC(.123*)	None	None	None	None

Note: This table provides a summary of the coefficients results for all the intellectual components (HCE, SCE, CEE), sum of IC components (VAIC) and the control variables (number of employees, firm leverage and firm size) based on ROA, Tobin, ROE and P/E after a one-, two-, three-, four- and five-year time lag. For the time lag, 2017 has been considered as the base line.

None: There is no impact of the variables on performance.
***p<0.01, ** p<0.05, * p<0.1

Table 28 illustrates a summary of all variables and their impact on all four types of performance from 2017 to 2012. The table confirms the previous results regarding the significant impact of HCE on VAIC. According to these empirical results, VAIC is significant for a one-year lag (P/E), only because HCE is significant in the P/E analysis. No other components have such a significant impact on VAIC and also there is no impact of any components of VAIC methodology after two years; only Leverage repeated which is one of the control variables. Interestingly, VAIC components did not have any impact on ROA in contrast with the tables which test all variables in the same years; in fact, the companies are able to see the results of their investment and management in the same year.

5.8 Findings and Discussion

The objective of this empirical study is to answer the first research question of the study: "Does intellectual capital have a significant impact on FTSE 350 companies' financial performance?" To investigate this research question, three hypotheses were formulated with four sub hypotheses. Each sub-hypothesis is based on the IC components and financial indicators, which will test the impact of HCE, SCE and CEE and VAIC from 2010 to 2018 against the financial indicators.

The hypothesis here tested whether independent variables show profitability in companies' assets. The results of this study support H1a, H2a, H3a and H4a as follows.

According to Table 15 (Model 1), HCE shows significant profitability at 5% and 1% in most years, while CEE shows significant profitability at 5% and 1% in 8 years. However, SCE shows significant profitability in only 3 years (2012, 2016, 2017). Therefore, CEE makes a significant contribution to ROA, followed by HCE and SCE. None of the control variables shows significant profitability in all years, only leverage in 2010 and 2015.

The F value over 8 years is positive, and the adjusted R square is 80% and 95% in 2011 and 2012 respectively. This means that HCE and CEE can explain 80% to 95% of the performance indicated by ROA in 2011 and 2012. However, it reduced to 60% and 43% in 2017 and 2018. This finding supports earlier results from Ting and Lean (2009), who examined the relationship between IC and the financial performance of Malaysian financial institutions for the years 1999-2007.

In that study, the impact of IC and VAIC on ROA was significant. The results for the impact of IC on ROA are similar to Chen et al.'s (2014) findings; they investigated the effect of IC on changes in the productivity of insurance firms in Malaysia. Their analysis demonstrated a positive association between IC and ROA. Table 16 (Model 2) shows the impact of VAIC (the sum of the HCE, SCE and CEE) with the same control variable, which is similar to the results in Table 11and also supports Chen et al.'s (2014) finding in this regard.

The impact of HCE, SCE and CEE and VAIC from 2010 to 2018 have been tested based on Tobin Q, with the analysis showing different results. This study did not support H1b, H2b and H4b (which are the impact of HCE, SCE and VAIC on Tobin Q); however, it supported H3b (the impact of CEE on Tobin Q).

As the effects of IC on Tobin's Q have been tested, the results (Table 17, Model 1) show that although HCE and SCE show no impact on Tobin's Q, CEE indicated a significant impact (5%) over 6 years.

Among the control variables, only leverage shows a significant impact in some years which supports Williams's results in 2001; he investigated the impact of IC disclosure in the annual reports of 31 FTSE 100 listed companies from 1996-2000. However, this study is more related to the disclosure of IC rather than the impact of IC on performance. Chan (2009) mentioned that there is no association between VAIC and firm financial performance; however, physical asset plays a significant role in financial performance, which is similar to ROA findings.

The F value is positive; however, the adjusted R squared is very low (less than 1%). Also, leverage shows a significant impact at 5% as well.

Following this table, Table 18 (Model 2) illustrates the results for the impact of VAIC on Tobin's Q, which is not significant, although the leverage shows the significant impact only in 3 years (2011, 2013, 2015). This result did not support Matinfard and Khavari's (2015) study, which found that there is a positive relationship between intellectual capital and market valuation indicators, especially the components of physical and structural capitals in the Tehran Stock Exchange. Also, it is not consistent with Chen et al. (2005) and Wang et al. (2014).

Having said that, according to Abeysekera (2008), this measure cannot provide an accurate figure for individual intellectual assets. Its real value lies in trend analysis: if the q is falling, it is either the company is not managing its intellectual assets effectively or the investor sentiment has moved against it, and it is more relevant to tangible than intangible assets; this is likely to result in a false indication of a firm's IC value.

HCE, SCE, CEE and VAIC have been tested from 2010 to 2018 based on ROE. Table 19 (Model 1) shows the impact of IC on ROE: The result of this study did not support H1c, H2c and H4c (impact of HCE, SCE and VAIC on ROE); however, H3c has been supported by this study (impact of CEE on ROE). HCE and SCE show no significant impact on ROE; however, CEE shows a significant impact (5%) for three years (2010, 2012, 2018).

Leverage (control variable) shows a significant impact (1% and %5) in some years, meaning that capital employed has a significant impact on ROE for the FTSE 350.

The F value is positive; however, the adjusted R square is very low and even negative in some years. Following this table, Table 20 (Model 2) presents no significant impact of VAIC on ROE, although leverage shows a significant impact in some years.

This result supports Chan (2009), who indicated that there is a weak association between IC and ROE. On the other hand, this result is not consistent with Matinfard and Khavarani (2015), who proved that there is a positive and significant relationship between physical and structural capital and ROE.

The impacts of HCE, SCE and CEE and VAIC were tested from 2010 to 2018 based on P/E. the results of this study supported H1d, H2d, H3d and H4d as follows:

The results (Table 21, Model 1) illustrate the impact of IC on price per earning (P/E), indicating that the constant is significant at 1% in all years.

HCE shows a significant impact at 5% in 2018, followed by SCE in 2013 and 2017, while CEE shows a significant impact on P/E in 2013. The F value is positive, although the adjusted R squared is negative in most years, meaning that the explanation towards response is very low or negligible.
Consequently, the results in Table 22 (Model 2) show that the model is significant at 1%, although VAIC is significant in three years (2013, 2014 and 2018). Leverage is significant in two years (2014, 2015), and the number of employees is significant in 2016.

Since it is the first time that the impact of IC on P/E has been tested, there is no other study whose findings would support or reject this result up to this date.

ANOVA P/E is significant in some years (4 out of 9 years); however, the adjusted R Square is negative in some years. P/E is a valuable measurement for valuing a company to understand whether a company is overvalued or undervalued, and the P/E ratio is a good estimation for investors, as it is the ratio of a company's share price to the company's earnings per share.

Xu and Liu (2020), in their study, tested 415 Korean manufacturing firms by return on assets (ROA), return on equity (ROE), assets turnover ratio (ATO) and market to book ratio (MB). They argued that physical capital was the most influential factor in firm performance in emerging Asian markets.

According to their results, HCE and SCE have positive impacts on ROA and ROE, although they do not show a significant impact on ATO and MB. CEE was found to be the significant predictor of firm performance, except for MB, which is not consistent with this study except for the positive impact of HCE on ROA in both studies (Xu and Liu, 2020).

Considering these results, Namazi and Ebrahimi (2009) supported the positive relationship between intellectual capital and ROA in their studies.

In this study, the impact of all IC and control variables were tested by the four financial performance indicators not only after one year but also up to a five-year time lag in order to understand whether IC can have a significant positive impact on performance after some years. In most studies, this impact has been conducted solely in one year, although it is crucial to understand the extent to which IC can have an influence on any financial indicators after one year of operation of any development and training for employees or any investment on equipment or facilities may result in a better day-to-day operation of the work.

The results of time lag analysis have been summarised and discussed as follows:

There is no significant impact of independent and control variables on ROA after two years except on HCE and CEE in only one year. Thus, according to the empirical results, HCE and CEE in 2013 were significant at 5% based on ROA indicator in 2015 (Table 23, Model 3).

Table 24 (Model 3) shows time lag results based on Tobin Q: there is no significant impact of variables on Tobin's Q after two years except for leverage which is significant in two years (2016, 2013).

In Table 25 (Model 3), leverage shows a significant impact on ROE in a two-year time lag as well in addition to SCE (2016) and CEE (2018), which are significant in one year each.

Table 26 (Model 3) presents the results of testing variables against P/E: none of the variables is significant except HCE in 2016 and the number of employees in 2014.

Furthermore, the VAIC is significant whenever HCE is significant in time lag. The reason is that according to the result in the ROA and P/E tables (without time lags), whenever the HCE is significant, the VAIC is significant as well. This means that HCE is the most effective component of VAIC, which has also been proven by other studies such as Nadeem et al. (2017) and Xu and Liu (2020).

Although other studies have not conducted time lag analysis, by simply running analysis in the same year, this study has been provided an opportunity for researchers to pay attention to time as well.

In line with previous literature, this finding indicated that IC generally improved profitability. According to the results of this study, human capital, structural capital and capital employed had a significant impact on ROA and P/E.

Capital employed had an impact on Tobin's Q and ROE as well; consequently, VAIC had a significant impact based on ROA and P/E. Chen et al. (2005) and Nadeem et al. (2017) supported the impact of IC on ROA in their studies as well.

In addition, Stewart (1997) argued that a traditional performance measurement would ignore the value of human capital, and it is not adequate for performance measurement for large companies. Having said that, Kamath (2007) stated that HC has a major impact only on ROA in the Indian pharmaceutical sector, with no significant impact of IC in regard to productivity and market value.

Furthermore, Vishnu and Gupta (2014) presented similar evidence of a significant impact of HCE and SCE in the Indian pharmaceutical industry based on ROA and return on sales. These findings provide insights into the Indian knowledge-based sector like pharmaceuticals, where stakeholders still perceive firm performance in terms of tangible assets rather than intangible assets. In contrast, Chan's (2009) study found no significant impact of IC on the Hong Kong Stock Exchange's productivity, profitability and market valuation (Smriti and Das, 2018).

Although IC is still a new concept in emerging markets (especially in developing counties), Vishnu and Gupta (2014) conducted a study related to BRICS economies and argued that IC is significantly related to the overall financial performance of the firm with the exception of revenue growth (Nadeem et al., 2017).

Further, the results of the time lag showed that human structural capital and capital employed, which are measured as components of VAIC, have a significant positive impact on financial performance after two years; however, no impact has been proven beyond this period.

This result is supported by many scholars who argued that human capital significantly contributes to productivity enhancement and long-term growth of firm performance. According to human resource theory and Knowledge-based resources, knowledge is in the form of specific skills, such as technical, creative, coordinative and collaborative skills, which are developed in individuals. These skills can be transferred and shared at the company level and be utilised as knowledge-based resources which have, primarily, been created by a company's human capital (Radjenović and Krstić, 2017).

5.9 Hypotheses Test Results

The following tables are the summary of the hypothesis test results discussed previously.

Hypothesis 1:

Human capital efficiency has a significant impact on FTSE 350 companies' financial performance.

H1 contains four sub hypotheses which each test the impact of human capital efficiency on different performance (ROA, ROE, Tobin's Q and P/E). The results for H1a and H1d show that HCE has an impact on ROA and P/E; however, there is no impact on ROE and Tobin's Q. H1a: HCE has a significant impact (6 years out of 9) on ROA.

H1b: HCE has no significant impact on Tobin's Q.

H1c: HCE has no significant impact on ROE.

H1d: HCE has significant impact (2 years out of 9) on P/E.

Table 29 Human Capital Efficiency Hypotheses Results

1	**Human Capital Efficiency Hypotheses**	**Results**
H1a	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' ROA	Accepted
H1b	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' Tobin's Q	Rejected
H1c	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' ROE	Rejected
H1d	Human capital efficiency (HCE) has a significant impact on FTSE 350 companies' P/E	Accepted

Hypothesis 2:

Structural capital efficiency has a significant impact on FTSE 350 companies' financial performance.

H2 contains four sub hypotheses which each test the impact of structural capital efficiency on different performance (ROA, ROE, Tobin's Q and P/E). The results for H2a and H2d show that SCE has an impact on ROA and P/E; however, there is no impact on ROE and Tobin's Q. H2a: SCE has a significant impact (4 years out of 9) on ROA.

H2b: SCE has no significant impact on Tobin's Q.

H2c: SCE has a significant impact for only one year out of 9 on ROE.

H2d: SCE has a significant impact (2 years out of 9) on P/E.

According to Chen et al. (2005), Wang (2011), Bani et al. (2014), there is a positive relationship between intellectual capital and market valuation indicators (Tobin's Q) especially with regard to CEE and SCE.

Table 30 Structural Capital Efficiency Hypotheses Results

2	**Structural Capital Efficiency Hypotheses**	**Results**
H2a	Structural capital efficiency has a significant impact on FTSE 350 companies' ROA	Accepted
H2b	Structural capital efficiency has a significant impact on FTSE 350 companies' Tobin's Q	Rejected
H2c	Structural capital efficiency has a significant impact on FTSE 350 companies' ROE	Rejected
H2d	Structural capital efficiency has a significant impact on FTSE 350 companies' P/E	Accepted

Hypothesis 3:

Capital employed efficiency has a significant impact on FTSE 350 companies' financial performance.

H3 contains four sub hypotheses which each test the impact of capital employed efficiency on different performance (ROA, ROE, Tobin's Q and P/E). The results for H3a and H3d show that CEE has an impact on ROA and P/E; however, there is no impact on ROE and Tobin's Q. H3a: CEE has a significant impact (9 years out of 9) on ROA.

H3b: CEE has a significant impact (6 years out of 9) on Tobin's Q.

H3c: CEE has a significant impact (4 years out of 9) on ROE.

H3d: CEE has a significant impact on P/E for only one year.

Table 31 Capital Employed Efficiency Hypotheses Results

3	**Capital Employed Efficiency Hypotheses**	**Results**
H3a	Capital employed efficiency has a significant impact on FTSE 350 companies' ROA	Accepted
H3b	Capital employed efficiency has a significant impact on FTSE 350 companies' Tobin's Q	Accepted
H3c	Capital employed efficiency has a significant impact on FTSE 350 companies' ROE	Accepted
H3d	Capital employed efficiency has a significant impact on FTSE 350 companies' P/E	Accepted

Hypothesis 4:

VAIC has a significant impact on FTSE 350 companies' financial performance.

VAIC is the sum of the three components (HCE+SCE+CEE). H4 contains four sub hypotheses which each test the impact of VAIC on different performance (ROA, ROE, Tobin's Q and P/E). The results for H4a and H4d show that VAIC has an impact on ROA and P/E; however, there is no impact on ROE and Tobin's Q.

H4a: VAIC has a significant impact (7 years out of 9) on ROA.

H4b: VAIC has no significant impact on Tobin's Q.

H4c: VAIC has no significant impact on ROE.

H4d: VAIC has a significant impact (3 years out of 9) on P/E.

Table 32 VAIC Hypotheses Results

4	**VAIC Hypotheses**	**Results**
H4a	VAIC has a significant impact on FTSE 350 companies' ROA	Accepted
H4b	VAIC has a significant impact on FTSE 350 companies' Tobin's Q	Rejected
H4c	VAIC has a significant impact on FTSE 350 companies' ROE	Rejected
H4d	VAIC has a significant impact on FTSE 350 companies' P/E	Accepted

Hypothesis 5:

IC has a significant impact on FTSE 350 companies' financial performance after one or two years.

H5 contains four sub-hypotheses that tested whether IC components have a significant impact on the financial performance of the FTSE 350. In this study, the associations have been tested for up to five years; however, there is no association after three years. The greatest impact occurs after one and two years.

H5a: HCE in 2013 has a significant impact on ROA (2015); also, HCE in 2016 has a significant impact on P/E 2017 and 2018. However, no association has been found with Tobin's Q and ROE at any other time for up to five years. Therefore, this hypothesis was accepted.

H5b: SCE in 2016 has a significant impact on ROE (2018); also, SCE in 2017 has a significant impact on ROA and P/E 2018. However, no association has been found with Tobin's Q for any other time lag. Therefore, this hypothesis was accepted.

H5c: CEE in 2013 has a significant impact on ROA and ROE (2015); also, CEE in 2016 and 2017 have a significant impact on ROA (2018), meaning that there is an impact of CEE after one and two years on ROE. CEE in 2017 has a significant impact on Tobin's Q and ROE (2018). Therefore, CEE is a crucial component of IC and the only component which shows an association with at least one of the financial performance indicators from the first year for up to three years. There is no association in the four- and five-year time lags. Therefore, CEE is the only component that can have an impact on financial performance over time; therefore, this hypothesis was accepted.

H5d: VAIC in 2016 has a significant impact on P/E (2017 and 2018). However, there is no association with other performance indicators (ROA, ROE and Tobin) for up to five years. Therefore, this hypothesis was accepted

Namazi and Ebrahimi (2009), Madhoushi and Asghari Nejad Amiri (2009), Chen et al. (2005), Pubic (2000) and Matinfard and Khavari (2015) achieved certain similarities and differences in their results in comparison with this study.

Table 33 IC Time Lag Hypotheses Results

5	IC Time Lag Hypotheses	Results
H5a	HCE has a significant impact on FTSE 350 companies' financial performance after one or two years.	Accepted
H5b	SCE has a significant impact on FTSE 350 companies' financial performance after one or two years.	Accepted
H5c	CEE has a significant impact on FTSE 350 companies' financial performance after one or two years.	Accepted
H5d	VAIC has a significant impact on FTSE 350 companies' financial performance after one or two years.	Accepted

5.10 Chapter Summary

This Chapter has presented the first empirical model, which is based on the first research question: "Does intellectual capital have a significant impact on FTSE 350 companies' financial performance?" Five main hypotheses were formulated to test this relationship, which have been discussed in this chapter.

The impact of intellectual capital has been tested against four different financial performance indicators. IC itself was calculated through the VAIC methodology, which divides IC into three components (HCE, SCE and CEE), and the sum of these components as VAIC was measured and tested against financial performance indicators as well.

For further discussion, the impact of IC on performance was tested after one to five years in order to provide time for IC to prove their strategic impact on performance after several years if it is applicable.

The highlight of the result is the positive impact of HCE and CEE on financial performance. Consequently, VAIC shows a positive impact on performance as well. In terms of time lag, the relationships showed positive outcome in the same year and even after one and two years.

Therefore, according to results presented in the chapter, HCE CEE and SCE have a significant impact on ROA, which has been supported by Namazi and Ebrahimi (2009) in their study. Chan's (2009) study supported the impact of CEE on financial performance as well.

In summary, the results of the first empirical study present a positive and significant impact of intellectual capital on FTSE 350 companies' financial performance.

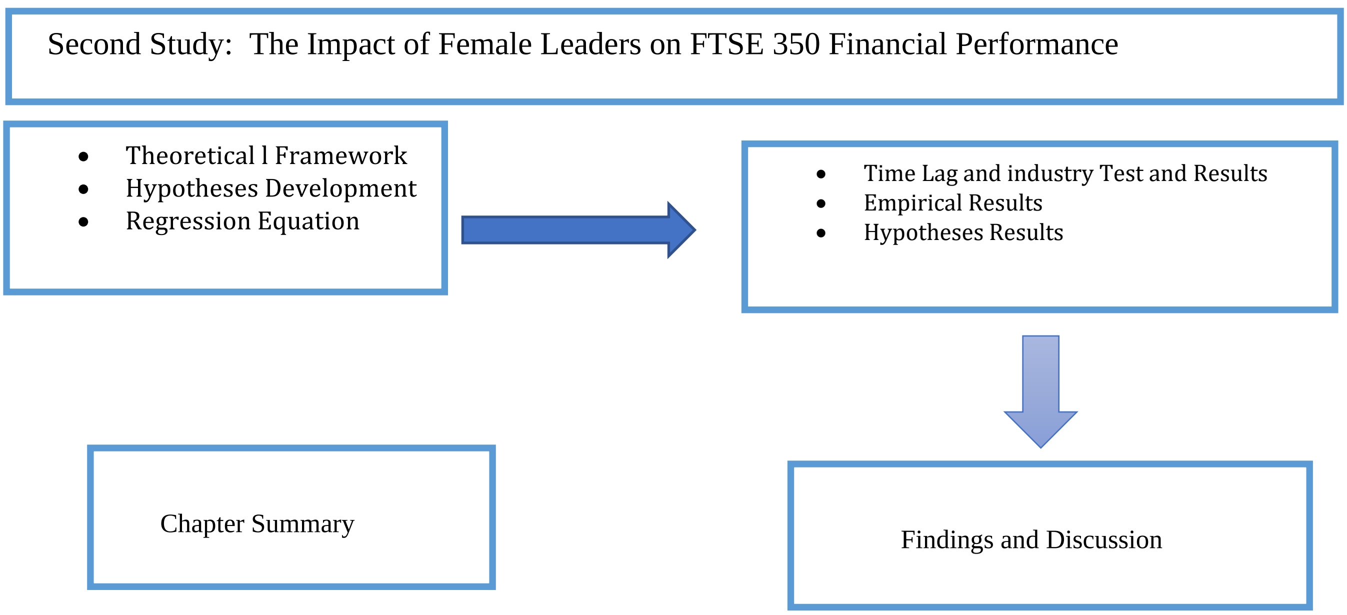
The next chapter will discuss the second empirical study, which is the impact of female leaders on FTSE 350 companies’ financial performance

6 Chapter 6

The Impact of Female Leaders on FTSE 350 Companies' Financial Performance

6.1 Introduction

The impact of female directors on firm performance can be seen in several theories, such as resource-dependence theory, agency theory, human capital theory, and stakeholder theory (Carter et al., 2003; Terjesen et al., 2009). This impact has been tested by some scholars in various countries: Liu et al. (2013) conducted a study in China, Chauhana and Kumar Dey (2017) conducted a study in India, and Pasaribu (2017) in the UK. Given that females are usually appointed as non-executive directors by most UK-listed firms (Gregory-Smith et al., 2013), the performance of firms may not easily be affected since the impact of the females on the boards is minimal due to their little impact on crucial decision-making. For this reason, in this study, female leaders have been investigated to discover their impact on the financial performance of the firms as they play a significant role in companies' crucial decision-making. Therefore, in this chapter, the empirical results of this relationship will be discussed. The following diagram presents an overview of the chapter.



6.2 Theoretical Framework

There are three theories to support the second empirical conceptional framework. The first is the agency theory which is the most influential theory in governance studies, as most of the governance codes are supported by it. Basically, the theory involves two groups (shareholders and managers) and the nature of humans, who are self-interested, opportunistic, and co-operate with others when it benefits them (Daily et al., 2003).

According to Clarke (2004), there are two studies regarding corporate governance (Jensen and Meckling, 1976; Fama and Jensen, 1983). Jensen and Meckling (1976) have challenged the separation between finance and management. They argue that managers would be able to control and allocate funds from investors. Corporate governance makes sure that the misallocation of shareholders' funds is reduced. This problem arises when wrong selection is made, in which directors claim that they have the required expertise and knowledge during the time they are being appointed; however, the shareholders cannot confirm this.

Having said that, Fama and Jensen (1983) argued for the distinction between risk-taking and decision-making functions. When it comes to particular issues, shareholders entrust decision-making to managers, in spite of the fact that managers may decide to protect their own interests. Thus, the work of corporate governance is to know whether controlling and monitoring managers could be effective or if there is any moral problem. As a matter of fact, an agency problem occurs when (a) managers and shareholders have different goals, or (b) when the shareholders find it difficult to assess the behaviour of managers.

The second theory is resource-based theory, introduced by Salancik, and Pfeffer (1978). It is an alternative theory that focuses on finding and securing resources to improve the wealth of the shareholders. Hillman et al. (2000) stated that the agency-based approach could not lead to an understanding of the significance of the resource-dependence responsibility. These firms face external uncertainties; thus, it would be the responsibility of the directors to make available resources such as expertise, skills and information necessary to deal with uncertainties and increase firm survival. Conventionally, there exists a range of non-traditional alternatives and perspectives to certain problems within a diverse board. This theory supports the studies conducted on board diversity.

The stakeholders of the firm are individuals or groups who have commercial contact with a firm, whether it is temporary or permanent (Bloomfield, 2013). The most important stakeholder is the shareholder (Jensen, 1986). Shareholders are placed above other stakeholders because they provide the capital, and they claim any free cash flow after other stakeholders have been paid. The function of governance is to protect the rights of shareholders (right to vote, appointment and dismissal of directors).

The biggest beneficiaries of the firm's responsibility and accountability are the shareholders (Banks, 2004). Two aspects are mostly considered in stakeholder theory. Firstly, it is difficult to measure the performance of directors; hence their effectiveness cannot easily be judged (Clarke, 1998). Zhang and Rezaee (2009) stated that various measures could be used for listed firms.

These measures include financial measures such as market, earnings, stock price, share, and social measures such as customer satisfaction, employment, fair-trade with suppliers, as well as ethical measures such as business code of conduct, business culture, and environmental measures such as the preservation of natural resources and anti-pollution. Secondly, the satisfaction of the interests of the stakeholders is not just morally important but also a commercial necessity, especially in an industry where strategic and competitive advantage is crucial (Clarke, 1998). As a result, there is a growing need to create a good relationship with workers, suppliers, customers, and investors. Thus, managers are faced with a more complex body of customers in stakeholder theory than in agency theory.

6.3 Hypotheses Development

The impact of females on the boards can be looked at from the perspective of a number of academic disciplines, such as management, organisational psychology, finance, and sociology (Terjesen et al., 2009). Carter et al. (2003, 2010) introduced five theories: resource dependence theory, agency theory, the business case approach, the social psychology approach, and the human capital theory.

The business case approach was introduced by Robinson and Dechant (1997). This approach argues that board diversity can improve the performance of a firm in many ways: first, it would provide positive results in terms of ethnicity and race for firms that want to expand their market.

Therefore, board diversity can help lead to an understanding of the potential and current market; second, board diversity would motivate people to be creative and innovative because of the different races, ages, beliefs and genders; third, problem-solving and decision-making would be enhanced due to the different perspectives and experiences that would be available to the board; fourth, the leadership would be effective because of the understanding of the uncertainties and complexities of the firm environment; finally, a diverse board can lead to a better global relationship due to knowledge of global competition and (inter)cultural awareness.

The people who introduced agency theory, Jensen and Meckling (1976), argued that managers do not act in the interests of the shareholders but in their own interests. As a result of this, the directors, the middlemen between shareholders and managers, are now responsible for controlling and monitoring the actions of managers in order to support shareholders' best interests (Fama and Jensen, 1983; Hermalin and Weisbach, 2003).

Pfeffer (1978), who introduced resource dependence theory, argued that the aim of the board is to have access to resources, develop them and align them with the interests of the shareholders. As part of its controlling and monitoring duties, the board would also advise and address external dependencies, for instance, providing expertise and knowledge.

Hillman et al. (2000) explained that a diverse board can enhance problem-solving and decision-making with its unique resources. Diverse perspectives and non-traditional alternatives to certain problems will be beneficial to a diverse board. Hillman et al. (2007) stated that diversity on a board provides equal opportunities for potential and current employees. According to previous studies (Peterson and Philpot, 2007; Adams and Ferreira, 2009), there is a great chance of appointing female directors to certain committees such as auditing committees.

Stakeholder theory recommends that the board of directors should maintain a good relationship with stakeholders. The proponents of this theory argue that companies should reflect their external environment. For example, if the society is multi-cultural with many ethnicities and races, the companies should adopt the same pattern. The same should happen for gender diversity, and in some countries, there might even be a law with regard to this. However, Rose (2007) argued that such a law might not be needed for listed firms, as they differ from democratic organisations. This is because altering the composition of the board may change the nature of some businesses, as they have different strategic goals and plans to achieve those goals.

The human capital theory is related to the characteristics of directors, such as experience, education, and skills. Singh et al. (2008) reported that some female directors in FTSE 100 firms tend to have MBA degrees. Some of them also have academic titles such as Dr or Prof. or other titles with their names.

Female qualifications are generally the same as men in general; however, their experience in business cannot be compared with that of men (Terjesen et al., 2009). Singh and Vinnicombe (2004) stated that the lack of experience in executive positions is the major reason why big firms listed in the UK tend to hire men as directors instead of women.

Since the theories behind gender diversity on the board are no longer in use, the direct impact of females on performance is not straightforward. The positive impact of female directors was suggested by resource-based theory and the business case approach; however, there is no sign of the positive impact of female directors from the other theories.

The following tables will present two main hypotheses which have been developed to test the impact of female directors and leaders on the two performance indicators (ROA and Tobin's Q). Each hypothesis contains nine sub-hypotheses that will separately test the role of females in the boardroom while examining the impact of their age and nationality

The following research question underpins the second empirical study:

Second Research Question.

Do female directors have a significant impact on FTSE 350 companies' financial performance?

Hypothesis 1:

Female directors have a significant impact on FTSE 350 companies' financial performance (ROA).

H1 contains 9 sub-hypotheses as follows:

Table 34 Female Leaders Hypotheses

	Female Hypotheses (ROA)
H1	Female directors have a significant impact on FTSE 350 companies' financial performance.
H1A	Female directors have a significant impact on FTSE 350 companies based on the industry.
H1B	Female chairs have a significant impact on FTSE 350 companies.

H1b	Female chairs have a significant impact on FTSE 350 companies based on the industry.
H1C	Female CEOs have a significant impact on FTSE 350 companies.
H1c	Female CEOs have a significant impact on FTSE 350 companies based on the industry.
H1D	Female executives and non-executives have a significant impact on FTSE 350 companies.
H1d	Female executives and non-executives have a significant impact on FTSE 350 companies based on the industry.
H1E	Female age has a significant impact on FTSE 350 companies.
H1F	Female nationality has a significant impact on FTSE 350 companies.

Hypothesis 2:

Female directors have a significant impact on FTSE 350 companies' financial performance (Tobin Q).

H2 contains 9 sub-hypotheses as follows:

Table 35 Female Leaders Hypotheses (Tobin's Q)

	Female Leaders Hypotheses (Tobin's Q)
H2	Female directors have a significant impact on FTSE 350 companies' financial performance.
H2A	Female directors have a significant impact on FTSE 350 companies based on the industry.
H2B	Female chairs have a significant impact on FTSE 350 companies.
H2b	Female chairs have a significant impact on FTSE 350 companies based on the industry.
H2C	Female CEOs have a significant impact on FTSE 350 companies.
H2c	Female CEOs have a significant impact on FTSE 350 companies based on the industry.
H2D	Female executives and non-executives have a significant impact on FTSE 350 companies.
H2d	Female executives and non-executives have a significant impact on FTSE 350 companies based on the industry.
H2E	Female age has a significant impact on FTSE 350 companies.
H2F	Female nationality has a significant impact on FTSE 350 companies.

For testing the hypotheses, similar to the first study, regression analysis has been used for the female study (Brooks, 2008), as well as multivariate analysis, which is the most commonly used technique as found in previous studies. This research examines the effect of multiple variables relating to directors on firm performance as a dependent variable. As such, multiple regression is considered to be suitable for this research.

The panel dataset used in this study includes both cross-sectional and time-series elements. It takes up data from the same firms or individuals and studies them over a certain period of time. In comparison to cross-sectional and time-series data, panel dataset can provide the researcher with more beneficial information by addressing several problems. Besides, the use of panel dataset allows for less collinearity and a higher degree of freedom. The panel datasets also allow for improved efficiency of estimates and a broader view of interpretation (Baltagi et al., 2007).

The following framework presents the impact of female directors and leaders on FTSE 350 companies. The fraction of female directors on each board will be considered as an independent variable. Some of the board characteristics, such as board size, nationality diversity and director's age, have also been considered as independent variables. ROA and Tobin's Q are the performance indicators for the companies. Firm size, the number of employees and firm industry have been considered as control variables in this framework.

-Independent Variables: Board of Directors:

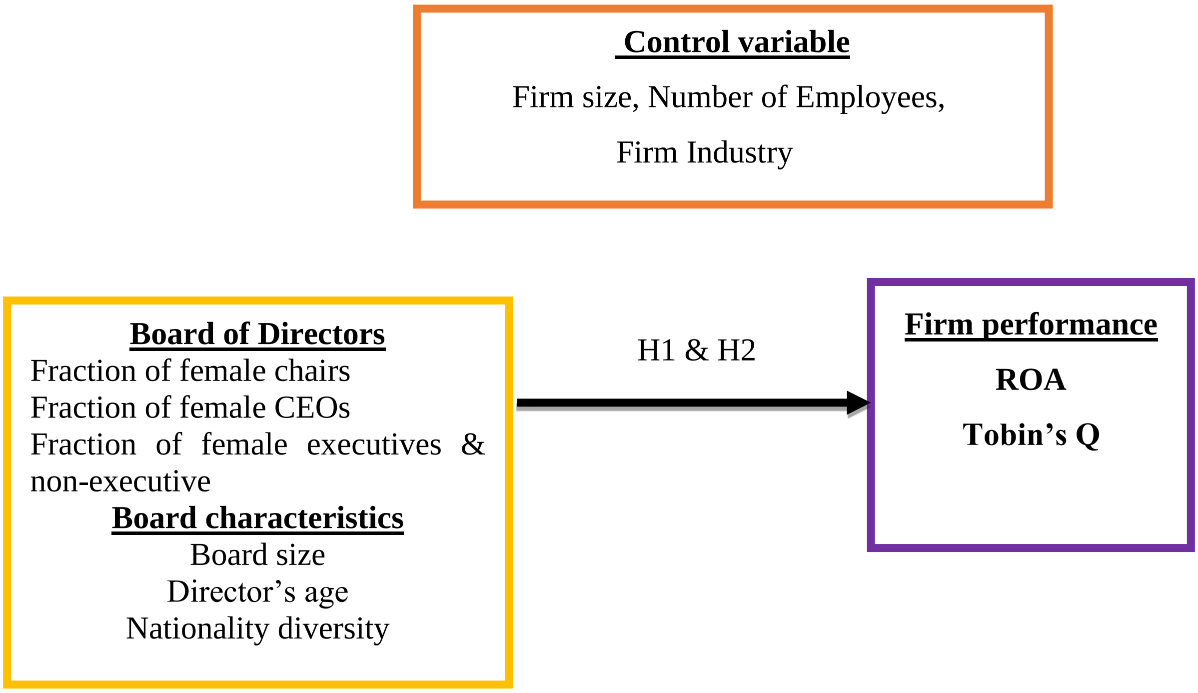
Fraction of female chair, Fraction of female CEO, Fraction of Female Executive and Non-Executive

Board Characteristics: Board size, Nationality diversity and Director's age

-Dependent Variables: Return on Assets, Tobin's Q

-Control Variables: Firm Size, Number of Employees, Firm Industry

Figure 6 Female Leaders and Performance Conceptual Framework



6.4 Regression Model

The proposed regression model is defined by the following equations, which will examine the impact of female directors and leaders (female chairs, female CEOs, female executives and female non-executives) on the ROA and Tobin's Q. Firm size, the number of employees and firm industries have been considered as control variables for this empirical study.

The regression is between the ROA and Tobin's Q (dependent variable) and the independent variables, which are the percentage of female directors and leaders. SPSS software was used for analysis since it was the most used software at the time of analysis. However, most studies use STATA, which is more convenient for running panel data. Furthermore, the data has been tested up to a time lag of five years for further investigation regarding female performance results. This test has been performed separately without considering industry and based on two more performance indicators, namely ROE and P/E. For data collection and preparation please refer to Ch. 4 (4.9).

The Female Leaders and Performance Equation

Performance $=\alpha+\beta_1 FCh_{it} + \beta_2 FExe_{it} + \beta_3 FNExe_{it} + \beta_4 BSize_{it} + \beta_5 FCEO_{it} + \beta_6 FPer_{it} + \beta_7 FIndus_{it} + + \beta_8 FSize_{it} + \beta_9 NEmp_{it} + ε̨$

where Performance in the first model is a measure of performance taken as ROA, and Tobin's Q for firm (i) at time (t), and μ i,t is the error term. The rest of the elements are as follow:

FCh = Percentage of female chairs

FExe= Percentage of female executives

FNExe= Percentage of female non- executives

FPer= Percentage of female directors

FIndus= Firm industry type

FSize= Firm size

NEmp= Number of employees

FCEO= Percentage of female CEOs

ε̨= error

The following table explains and summarises the variables used in this research, the definition of each variable and the measurement of each variable.

Table 36 Summary of Female Leaders Study Variables

Independent variable		
Variable	**Definition**	**Measurement**
FCh	Female chair	Female as a chair, 1 if chair is a female and 0 otherwise
FCEO	Female CEO	Female as CEO, 1 if CEO is a female and 0 otherwise
FExe	Female executive	Percentage of female executives on the board
FNExe	Female non-executive	Percentage of female non-executives on the board
FPerc	Female director percentage	Percentage of female directors on the board
Board characteristics		
BSize	The number of directors on the board	The natural log of number of directors on the board

Control variable		
FSize	Firm size	Total assets owned by the firm: measured as the natural logarithm of total assets of the firm
NEmp	Human capital	The human assets of the firm: measured as the natural logarithm of the number of employees in the firm
FIndus	Firm industry	1: Service companies, 2: consumer discretionary, 3: industrials
Financial performance		
ROA	Return on Asset	Measured as percentage of net income to total assets
Tobin's Q	Tobin's Q	Measured as the market value of equity capital and the book value of firm's debt divided by the book value of total assets

6.5 *Time Lag and Industry Test and Results*

In order to understand the impact of independent variables on dependent variables, a time lag from one to three years were utilised in this study. Hence, all intendent variables, which are female directors and leaders, were tested against each performance indicator such as ROA, ROE, Tobin and P/E from one up to three years; the results presented here represent the summary of all these analyses.

Table 37 Summary of Female Leaders and Performance Time Lag (2014-2017)

Performance	1-year Lag 2016		2-year lag 2015			3-year lag 2014	
ROA 2017	FSize -.322*** (-4.221)	No Female leaders' impact	FSize -.270** (-3.086)	No Female leaders' impact		FSize -.285** (-3.200)	
Tobin 2017	FSize -.301*** (-3.935)	No Female leaders' impact	FSize -.245** (-2.786)	No Female leaders' impact		FSize -.256** (-2.849)	
ROE 2017	LEV .357*** (5.532)	No Female leaders' impact	FSize -.159* (-1.794)	LEV .265*** (3.938)		FSize -.163* (-1.752)	

P/E 2017	FCh .366** (2.449)	FCEO -.383** (-2.566)	FDir -.124 (-1.884)	FDir -.159** (-2.302)	None

Notes: This table provides the coefficients results for female leaders and control variable (leverage, number of employees and firm size) based on four different performance indicators after a one- to three-year time lag.

No female leaders' impact: the results show no impact of female leaders (CEOs, chairs, executives, non-executives and directors) in the performance for the first, second or third years.

None: There is no impact of variables on performance.

***p<0.01, ** p<0.05, * p<0.1

Table 38 Summary of Female Leaders and Performance Time Lag (2013-2016)

Performance	**1-year Lag** **2015**		**2-year lag** **2014**			**3-year lag** **2013**	
ROA 2016	FDir .117* (1.743)	FSize -.287** (-3.252)	FSize -.308** (-3.416)	No Female leaders' impact		FCEO -.254* (-1.808)	FSize -.362*** (-4.065)
Tobin 2016	FSize -.240** (-2.719)	No Female leaders' impact	FSize -.252* (-2.797)	No Female leaders' impact		FSize -.254** (-2.848)	No Female leaders' impact
ROE 2016	LEV .255*** (3.764)	No Female leaders' impact	None			LEV -.144* (-2.115)	No Female leaders' impact
P/E 2016	FDir -.170** (-2.470)	FSize -.179* (-1.967)	FDir -.120* (-1.819)	FNEx .176* (2.492)	No Female leaders' impact	FDir .161** (2.387)	

Notes: This table provides the coefficients results for female directors and control variable (leverage, number of employees and firm size) based on four different performance indicators after a one- to three-year time lag.

No female leaders' impact: the results show no impact of female leaders (CEOs, chairs, executives, non-executives and directors in the performance for the first, second or third years.

None: There is no impact of the variables on performance.

***p<0.01, ** p<0.05, * p<0.1

The impact of female directors is significant after one year based on ROA and has negative significance after the first and second years based on P/E; however, female directors have positive significance after the third year. In this study, only ROA and Tobin are the main financial indicators for all the investigations; ROE and P/E have been added for the time lag to test the impact of female leaders on other indicators.

Table 39 Impact of Female Leaders on Industries

	2010	2011	2012	2013	2014	2015	2016	2017
% Female	16.039	27.563	42.315	49.862**	-12.459	49.662*	8.473	25.922
Female Chair	2.627	111.125	13.647	64.231	-84.975**	29.580	-27.890	39.756
Female Ex	21.746	18.584	-38.309*	13.556	-5.498	23.956	-3.424	7.652
Female Non-Exe	11.145	-1.242	-51.021**	10.048	-3.819	4.139	-30.033	-8.683
B Size	-1.013	10.287*	23.758**	12.535*	3.774	12.270*	6.820	9.775
N. Emp	-1.124	0.772	-0.732	-0.022	-3.666	-0.981	-3.186*	-1.277
F Size	-2.627	-2.872**	-3.910*	-2.054	-1.003	-3.664*	-1.921	-2.756
Services	-13.000***	-13.824***	-5.752	-4.926	2.208	2.286	-0.756	-4.823
Industrials	-13.086***	-12.426***	-6.378	-0.740	8.001	-0.270	0.231	-2.386
C Dis	-7.341	-12.207***	-3.836	-3.642	9.433	3.927	0.260	0.030
R Square	0.36*	0.40**	0.37*	0.30**	0.30**	0.43**	0.32**	0.35

Note: This table is a descriptive statistic of the impact of female leaders (chair, CEO, female executives and non-executives) on three main industries (services, industrials, consumer discretionary).

***p<0.01, ** p<0.05, * p<0.1

Table 39 presents that female chair category is significant in only one year (2014) and there is no other significant impact from female leaders during these years. The percentage of females is significant in two years, 2013 and 2015. The female chair category has a negative significance in 2014 and the female non-executive category has a significant impact in 2012. The female director's category has a negative significance impact on the service, industrials and consumer discretionary industries in 2010 and 2011.

The R squared varied between 30% and 40% regarding the impact of female directors on industries.

Table 40 Female Leaders in FTSE 350

Year	Female Directors (%)	Female Chairs (%)	Female CEOs (%)	Female Executives (%)	Female Non-Executives (%)
2010	24.4	7.9	8.5	8.7	24.1
2011	23.7	7.9	8.1	9.1	23.7
2012	23.3	7.8	7.7	8.3	33.4
2013	24.2	7.9	7.9	8.4	24.5
2014	24.2	8.1	8.2	8.8	23.8
2015	24.2	8.1	7.8	7.7	24.1
2016	23.9	8.3	7.8	8.1	24.7
2017	23.9	8.0	8.0	8.4	25.4

Notes: This table provides the percentage of female leaders in each year.

Table 40 demonstrates the percentage of female directors in FTSE 350 companies (non-financial and highly regulated companies) between 2010 and 2017. The fraction of females is the total number of female directors divided by the total number of directors. Female NED is the total number of female non-executive directors divided by the total number of NED directors.

Female Exec is the total number of female executive directors divided by the total number of executive directors. No female director is the fraction of firms with no female director.

Female CEO is the fraction of firms with a female CEO. Female chair is the fraction of firms with a chairwoman.

The table indicates the development of female directors in the UK non-financial listed firms. There is no tendency to show that the firms appointed more female directors. A previous study (Passaribu, 2017) demonstrated that the fraction of female directors increased gradually, from 5.0% to 8.8% during the period 2004 to 2012.

In this study, there is no significant increase in the number of directors except the number of chairwomen, which increased gradually from 2010 to 2017.

Even though more women were appointed as board chairs, the proportion of females who were hired as executive directors, CEOs and even non-executive directors stagnated. These results are relatively similar to previous studies (Ahern and Dittmar, 2012; Gregory-Smith et al., 2013), in which the increase in female participation on boards is more likely through non-executive roles rather than executive roles. In other words, there is still a gender bias problem in the appointment of executive directors.

Table 41 Female Leaders Percentage Based on Industry

Female leaders / Industry Type	Females on the Board	Female CEOs	Female Chairs	Female Executives	Female Non-Executives
Consumer Discretionary	24%	4%	5%	15%	10%
Consumer Staples	25%	2%	6%	15%	16%
Health Care	23%	3%	1%	12%	17%
Communication Services	24%	5%	2%	16%	12%
Materials	22%	2%	5%	13%	12%
Industrials	22%	3%	7%	20%	11%

Notes: This table provides the percentage of female leaders based on the six main industries.

Table 41 illustrates the percentage of females in each industry for all the years combined. The percentage of female directors is more or less the same across the industries ranging from 22% in materials and industrials to 23% in healthcare, 24% in consumer discretionary and communication services, and 25% in consumer staples. However, the percentage of female CEOs in consumer staples and materials is the lowest (2%), and in communication services, it is at its highest (5%); other industries are between these figures.

Female chairs occupied only 1% of the healthcare industry, which is the lowest, followed by communication services at 2%. Consumer discretionary and materials were at 5% and the highest percentage related to consumer staples and industrials at 6% and 7% respectively. The percentages of female executives and non-executives are between 10% and 20% across the industries. Consumer discretionary has the lowest percentage of non-executives (10%), and healthcare has the highest percentage (17%), although healthcare shows the lowest percentage of executives (12%) among all the industries. Industrials has the highest percentage of female executives at 20%.

Table 42 Impact of Female Leaders on Industries (ROA)

Industry type / Female Leaders	Industrials	Consumer Staples	Health Care	Consumer Discretionary	Communication Services	Materials
% Females on Board	33.85***	20.00**	18.00	-2.26	-6.37	-3.09
% Female Chairs	10.72	-13.68	7.67	60.53	39.50**	-39.45
% Female CEOs	-2.61	2.99	3.66	-7.37	-1.52	-17.22**
% Female Executives	-1.10	-11.54*	8.56	-0.99	-8.45	10.92
% Female Non-Executives	12.11**	-11.73	11.54	-8.72	-14.46	-40.04*

Notes: This table demonstrates the impact of female leaders (presented with percentages) on the financial performance (ROA) based on industries.
***p<0.01, ** p<0.05, * p<0.1

Table 42 demonstrates the impact of female directors on ROA based on each industry for all years. The results show that female directors, in general, have a significant impact on ROA in industrials and consumer staples. In addition, it shows that female chairs have a significant impact on communication services and that female non-executives have a significant impact on industrials, although they have a negative significance for materials. Besides, female non-executives have a negative significance for consumer staples.

Table 43 Impact of Female Leaders on Industries (Tobin's Q)

Industry Type / Female leaders	Industrials	Consumer Staples	Health Care	Consumer Discretionary	Communication Services	Materials
% Females on Board	4.93***	1.54	1.25	-1.30	0.33	1.50
% Female Chairs	0.93	-28.09**	7.12	8.14***	4.22	-6.00***
% Female CEOs	-0.24	-0.44	-0.33	-0.55	-0.02	-1.17***
% Female Executives	0.45	9.08**	0.44	-0.46	0.39	3.58
% Female Non-Executives	1.12	19.67*	5.67	3.31**	-0.49	1.38

Notes: This table shows the impact of female leaders (presented with percentages) on the financial performance (Tobin's Q) based on industries.
***p<0.01, ** p<0.05, * p<0.1

Table 43 illustrates the impact of female directors on Tobin based on industries for all years. Similar to ROA, female directors, in general, have a significant impact on Tobin's Q for industrials. The female chair percentage has positive significance for consumer discretionary and negative significance for consumer staples and materials. Female non-executives have a positive significance in consumer staples and consumer discretionary.

6.6 Empirical Results

The Pearson correlation was used to test the correlations amongst the variables for the female directors and firm performance. The correlation coefficients have been checked for the presence of high collinearity amongst variables using the Pearson correlations. The tables below present the Pearson correlation with the ROA; and Tobin's Q from 2010-2017 separately per year and the percentages of female leaders.

Table 44 Female Leaders Pearson Correlation Matrix

		1	2	3	4	5	6	7	8
1	**% Females on the board**	1	.909	.851	.783	.727	.623	.278	600
2	**% Female CEOs**	.909	1	.888	.816	.750	.639	.237	.628
3	**% Female Chairs**	.851	.888	1	.883	.819	.703	.322	.599
4	**% Female Executives**	.783	.816	.883	1	.867	.780	.442	.633
5	**% Female Non-Executives**	.727	.750	.819	.867	1	.863	.576	.649
6	**% Female Other Roles**	.623	.639	.703	.780	.863	1	.691	.588
7	**Board Size**	.278	.273	.322	.442	.576	.691	1	.362
8	**Human Capital**	.600	.628	.599	.633	.649	.588	.362	1

Notes: This table provides the Pearson correlation for the female leaders' variables.

Table 44 presents the correlation matrix for all the independent variables employed in this study. Refer to the previous table for detailed variable descriptions.

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Table 45 Female Leaders Coefficients Results ROA (2010 -2017)

	Variables	2010	2011	2012	2013	2014	2015	2016	2017
Beta P value t statistic	**Constant**	4.817 .000*** 4.233	4.379 .000*** 5.337	5.824 .000*** 6.631	43.293 .000*** 5.601	46.577 .000*** 4.921	35.952 .000*** 5.038	35.572 .000*** 5.805	34.142 .060* 5.302
Beta P value t statistic	**F Chair**	-.103 .218 -1.238	-.093 .250 -1.154	-.083 .275 -1.097	.094 .203 1.278	.130 .079* 1.765	.023 .764 .301	-.064 .364 -.909	.019 .402 .343
Beta P value t statistic	**F CEO**	.080 .366 .908	-.005 .955 -.057	-.021 .784 -.275	-.072 .357 -.923	-.026 .744 -.327	.117 .136 1.497	.061 .423 .803	.028 .313 .377
Beta P value t statistic	**F Exe**	-.186 .035** -2.135	-.062 .456 -.747	-.078 .308 -1.023	.050 .512 .657	-.069 .374 -.892	.026 .740 .332	.033 .668 .430	.068 .281 .039
Beta P value t statistic	**F NExe**	-.080 .344 -.950	-.052 .518 -.647	-.023 .732 -.256	-.001 .986 -.018	.003 .969 .038	.026 .728 .349	-.060 .400 -.844	-.589 -.654 .256
Beta P value t statistic	**F Dir**	-.016 .856 -.182	.000 1.000 .001	.044 .575 .563	-.075 .334 -.969	-.116 .136 -1.500	-.129 .101 -1.648	-.004 .954 -.058	-.033 -.731 .234
Beta P value t statistic	**Dir Age**	-.014 .213 -1.244	-.010 .373 -.891	.012 .275 1.091	-.008 .475 -.714	-.007 .549 -.599	-.014 .216 -1.238	-.004 .701 -.384	-.173 .129 .038
Beta P value t statistic	**TA**	-.277 .007** -2.739	-.377 .000*** -3.770	-.473 .000*** -5.289	-.462 .000*** -4.801	-.384 .000*** -3.902	-.337 .001** -3.316	-.406 .000*** -4.084	.020 .832 1.057
Beta P value t statistic	**NEmp**	.015 .891 .137	.014 .888 .141	.088 .337 .963	.080 .409 .827	.000 .999 .002	.001 .990 .012	.095 .333 .971	.945 .244 .784
Beta P value	**UK Natio**	-.027 .877	-.036 .838	.055 .744	.152 .373	.236 .166	.011 .945	.085 .496	.027 .466

t statistic		-.155	-.205	.327	.894	1.392	.069	.682	.687
Beta P value t statistic	**EU Natio**	.076 .644 .463	-.159 .304 -1.032	.111 .460 .741	.008 .956 .056	.012 .937 .079	.096 .515 .652	-.035 .749 -.320	.078 .774 .362
Beta P value t statistic	**Rest Natio**	.022 .885 .145	.021 .892 .136	-.003 .986 -.018	.237 .113 1.594	.229 .126 1.537	-.003 .985 -.019	.116 .326 .986	.074 .457 .885
	FValue	2.312	.964	2.384	3.445	3.509	3.360	2.945	2.998
	R-Square	.122	.056	.110	.175	.181	.174	.137	.165
	Adjusted R- Square	.082	-.002	.064	.124	.129	.122	.091	.093

Notes: This table provides the coefficient results for female leaders based on ROA in general without considering any industry in FTSE 350 companies from 2010 to 2017. ***p<0.01, ** p<0.05, * p<0.1

Table 45 illustrates the impact of female directors on ROA from 2010 to 2017. According to the empirical results, there is no significant impact of female leaders and directors on ROA except for female chairs in 2014 and female executives in 2010. There is no significant impact regarding director age, the number of employees and director nationality.

Nonetheless, total assets are significant all year round apart from the last year.

Before proceeding to regression analysis, the association between independent variables was tested to determine if any predictors can create multicollinearity issues. Since none of the correlations from the table above exceeds 0.7, this suggests there are no multicollinearity problems, so all independent variables can be used in the analysis.

Table 46 Female Leaders Coefficients Results Tobin's Q (2010 -2017)

	Variables	2010	2011	2012	2013	2014	2015	2016	2017
Beta P value t statistic	**Constant**	23.919 .002** 3.146	29.283 .000*** 3.968	30.819 .000*** 4.913	8.770 .000*** 8.830	7.670 .000*** 6.898	6.615 .000*** 6.176	5.978 .000*** 8.691	4.541 .000*** 7.302
Beta P value t statistic	**F Chair**	-.065 .418 -.812	-.040 .618 -.499	-.107 .154 -1.431	.145 .034** 2.134	.024 .752 .317	.005 .947 .067	-.058 .382 -.876	.124 .225 .643
Beta P value t statistic	**F CEO**	.179 .037** 2.110	.028 .737 .337	-.059 .447 -.763	.013 .855 .183	-.051 .508 -.664	.136 .073* 1.803	.050 .480 .708	.074 .224 .774
Beta P value t statistic	**F Exe**	-.131 .117 -1.575	-.025 .757 -.310	-.061 .426 -.797	.003 .963 .047	-.049 .514 -.654	.109 .146 1.459	.011 .875 .157	.032 .775 .137
Beta P value t statistic	**F NExe**	-.007 .935 -.081	-.015 .845 -.195	-.011 .765 -.109	-.003 .965 -.044	-.018 .802 -.251	-.043 .556 -.590	.038 .566 .576	-.554 -.085 .425
Beta P value t statistic	**F Dir**	-.051 .539 -.615	-.051 .539 -.615	.119 .133 1.508	-.039 .583 -.551	.024 .752 .317	-.076 .317 -1.003	.056 .431 .789	-.033 -.441 .679
Beta P value t statistic	**Dir Age**	-.015 .165 -1.388	-.004 .713 -.368	-.004 .739 -.334	-.003 .760 -.305	-.003 .790 -.266	-.014 .193 -1.301	-.005 .663 -.435	-.002 .559 .674
Beta P value t statistic	**TA**	-.141 .144 -1.469	-.261 .008** -2.685	-.296 .001** -3.343	-.669 .000*** -7.480	-.468 .000*** -4.892	-.410 .000*** -4.185	-.448 .000*** -4.844	.337 .002** -3.056
Beta P value t statistic	**NEmp**	-.037 .716 -.364	-.015 .845 -.195	.017 .847 .193	.151 .096* 1.675	-.005 .962 -.047	-.013 .898 -.128	-.034 .710 -.373	.078 .442 .349

Beta P value t statistic	**UK Natio**	.002 .991 .011	-.108 .551 -.598	.064 .701 .384	-.066 .669 -.428	-.029 .858 -.179	.112 .464 .734	.007 .955 .057	.045 .445 .781
Beta P value t statistic	**EU Natio**	.099 .534 .623	-.130 .422 -.805	.062 .673 .422	-.164 .232 -1.201	-.085 .552 -.596	.144 .314 1.011	-.007 .949 -.064	.008 .479 .045
Beta P value t statistic	**Rest Natio**	.114 .427 .797	-.091 .570 -.569	-.049 .744 -.327	.063 .648 .458	.087 .549 .600	.074 .573 .565	-.058 .596 -.531	.064 .335 .554
	F Value	2.024	2.536	4.131	7.253	4.970	4.990	6.211	7.008
	R- Square	.142	.152	.195	.317	.242	.240	.251	.445
	Adjusted R-Square	.090	.092	.148	.274	.193	.192	.211	.341

Notes: This table provides the coefficient results for female leaders based on Tobin's Q in general without considering any industry in FTSE 350 companies from 2010 to 2017. ***p<0.01, ** p<0.05, * p<0.1

Table 46 indicates the impact of female leaders on Tobin's Q from 2010 to 2017. According to the empirical results, there is no significant impact of female leaders and directors on Tobin except for female CEOs in 2015. Besides, there is no significant impact regarding director age, which supported Davis (1979), who found no connection between directors' age and performance. Nevertheless, Bertrand and Schoar (2003), in a more recent study, mentioned that older executives are more conservative in their work, which may have an effect on the performance of the firm.

Similarly, director nationality did not have any significant impact either. This result is not in line with Choi et al. (2013), who suggested that hiring foreign directors can increase Tobin's Q due to the enhanced decision-making and problem-solving.

Also, the number of employees had no significant impact on the firm performance, which does not support the findings of Teixeira (2002) and Dang (2015), who claimed that increasing the quantity of the human capital of the firm will have an impact on financial performance because employees are going to affect organisational processes such as learning and transformation.

Nonetheless, total assets measured as the firm size was significant in all years, which would support Short & Keasey (1999), who claimed that large organisations could generate more funds, mitigate financial constraints, and use the available funds to invest in profitable projects more than smaller firms do.

This result is beneficial for both financial indicators (ROA and Tobin's Q), as it shows the importance of the role of industry and shows female directors' significant impact on financial performance.

Furthermore, results (Tables 38 & 39) illustrate that female directors' impact on ROA and Tobin varies based on industries. Without considering the industry, therefore, there is no significant impact.

6.7 Hypotheses Test Results

The tables below present the results of the impact of female directors on ROA and Tobin's Q for FTSE 350 companies:

Hypothesis 1:

Female leaders have a significant impact on FTSE 350 companies' financial performance based on ROA.

H1 contains 9 sub-hypotheses as follows:

Table 47 Female Leaders Hypotheses Results (ROA)

	Female Hypotheses (ROA)	**Results**
H1	Female leaders have a significant impact on FTSE 350 companies' financial performance.	Rejected
H1A	Female directors have a significant impact on FTSE 350 companies with respect to the industry.	Accepted
H1B	Female chairs have a significant impact on FTSE 350 companies.	Rejected
H1b	Female chairs have a significant impact on FTSE 350 companies with respect to the industry.	Accepted
H1C	Female CEOs have a significant impact on FTSE 350 companies.	Rejected
H1c	Female CEOs have a significant impact on FTSE 350 companies with respect to the industry.	Accepted
H1D	Female executives and non-executives have a significant impact on FTSE 350 companies.	Rejected
H1d	Female executives and non-executives have a significant impact on FTSE 350 companies with respect to the industry.	Accepted
H1E	Female age has a significant impact on FTSE 350 companies.	Rejected
H1F	Female nationality has a significant impact on FTSE 350 companies.	Rejected

Hypothesis 2:

Female leaders have a significant impact on FTSE 350 financial performance in general without considering industry impact based on Tobin's Q indicator.

H2 contains 9 sub hypotheses as followings:

Table 48 Female Leaders Hypotheses Results (Tobin's Q)

	Female Hypotheses (Tobin's Q)	**Results**
H2	Female leaders have a significant impact on FTSE 350 companies' financial performance.	Rejected
H2A	Female directors have a significant impact on FTSE 350 companies with respect to the industry.	Accepted

H2B	Female chairs have a significant impact on FTSE 350 companies.	Rejected
H2b	Female chairs have a significant impact on FTSE 350 companies with respect to the industry.	Accepted
H2C	Female CEOs have a significant impact on FTSE 350 companies.	Rejected
H2c	Female CEOs have a significant impact on FTSE 350 companies with respect to the industry.	Accepted
H2D	Female executives and non-executives have a significant impact on FTSE 350 companies.	Rejected
H2d	Female executive and non-executives have a significant impact on FTSE 350 companies with respect to the industry.	Accepted
H2E	Female age has a significant impact on FTSE 350 companies.	Rejected
H2F	Female nationality has a significant impact on FTSE 350 companies.	Rejected

6.8 Findings and Discussion

The objective of the second empirical study is to investigate the impact of female leaders on FTSE 350 companies' financial performance from 2010 to 2017. In general, based on this empirical result, female leaders have not shown a significant impact on ROA and Tobin's Q; however, when they have been tested based on the industries, they showed positive or negative impact in different sectors.

The results show that there is no significant impact of female leaders and directors on ROA except for female chairs in 2014 and female executives in 2010. There is no significant impact regarding director age, the number of employees and director nationality.

Nonetheless, total assets are significant all year round apart from the last year. Total assets include tangible and intangible assets; therefore, leaders had a positive impact on the total assets of all companies in the mentioned period. Therefore, hypothesis results are as follows: first hypothesis H1 examined the impact of female directors on ROA for FTSE 350 companies without considering the industry as a control variable.

The results show no significant impact. However, when data are tested based on the industry (H1A), the impact of females on the board in industrials and consumer staples is significant; however, in consumer discretionary, communication services and materials, there is a negative impact. It might be due to females' communal characteristics, which help in better communication and customer service.

H1B shows the impact of female chairs in FTSE 350 companies, which is not significant; however, it is significant depending on the industry. In H1b, female chairs are significantly positive when it comes to communication services and negative in materials and consumer staples.

H1C shows that the impact of female CEOs is not significant in general; however, female CEOs have negative significance in materials based on the industry in H1c.

H1D shows that female executives and non-executives do not have a significant impact on performance in general. However, they have a significant impact based on the industry (H1d); Thus, female executives show significant impact only in consumer staples and female non-executives in industrials. Female non-executives are negatively significant in materials.

According to the results, female executives and non-executives contribute in a significantly positive way in a few industries, such as consumer staples and consumer discretionary, female directors in industrials and consumer staples and female chairs only in communication services based on ROA results. On the other hand, female directors are significant in industrials, female executive in consumer staples and female non-executives in consumer staples and consumer discretionary. These results support the findings of some scholars such as Nguyen and Faff (2007), Campbell and Mínguez-Vera (2008), Lückerath-Rovers (2013), Liu et al. (2014) and Nguyen et al. (2015). Moreover, Chapple and Humphrey (2014) stated that female directors can bring benefits to certain industries such as consumer goods and basic materials industries. On the other hand, female directors were negatively significant in consumer discretionary, communication services and materials, which supports the works of Adams and Ferreira (2009) and Ahern and Dittmar (2012), who argue that female directors have a negative impact on financial performance in general.

Female chairs, female CEOs, female executives and non-executives have no impact on industrials; besides, female CEOs have no impact on industrials, consumer staples, consumer discretionary and communication services, which support findings from other scholars such as Hussein and Kiwia (2009), Miller and Triana (2009), Farrell and Hersch (2005).

As Mukarram et al. (2018) stated, board gender diversity has a positive impact on the market performance in the high-tech sector. However, female directors have a negative impact on the non-high-tech sector market, as supported by previous studies such as Adams and Ferreira (2009), who argue that there is a negative impact of female directors on firm performance for large US-listed companies from 1996–2003.

Another US study (Carter et al., 2010) found no significant effect of gender diversity on Tobin's Q for firms included on the S&P 500 index. Besides, Bohren and Strom (2010) stated that there is a significant negative impact of female directors on Tobin's Q for Norwegian companies.

H1E and H1F show that the director's age and nationality do not have any significant impact on ROA. Pasaribu (2017), who conducted the only study available for top UK companies regarding the impact of female directors on firm financial performance, found that the impact of females on boards is high in the utilities and telecommunications sectors. Nonetheless, the number of female directors is low in automobiles and parts, chemicals, basic resources, and the oil and gas sectors (Pasaribu, 2017).

The result for H1A supports the previous study (e.g., Liu et al., 2013), which proved that, according to the tokenism principle for female directors, as a minority, they do not contribute positively to performance, although they show a positive correlation in some parts (Liu et al., 2013). Having said that, executive directors such as CEOs, operation directors, marketing directors and finance directors are more engaged in the everyday running of the business, while non-executive directors are more engaged with the monitoring jobs. This proves that executive directors have more impact on firm performance than non-executive directors.

Consequently, with respect to the industry, the results show that firms with more female directors as executive directors or non-executive directors may show different consequences on firm performance depending on the roles being undertaken by women.

H2 contains nine sub-hypotheses: H2 examined the impact of female directors on Tobin's Q for FTSE 350 companies without considering industry as a control variable. The results show no significant impact. Nevertheless, when data are tested in line with industry (H2A), the impact of females on the board in industrials is significant; however, it is negative in consumer discretionary, consumer staples, communication services and materials.

H2B shows the impact of female chairs for FTSE 350 companies, which is not significant; however, it is significant based on industry in H2b. Female chairs are significant in consumer discretionary and negatively significant in consumer staples and materials. The factor is non-significant in communication services and industrials.

H2C shows that the impact of female CEOs is not significant in general; however, female CEOs are negatively significant in materials in H2c.

H2D shows that female executives and non-executives do not have a significant impact in general (except in 2010); however, they are significant based on industry (H2d). Thus, female executives are significant in consumer staples and not significant in other industry types. Also, female non-executives are significant in consumer staples and consumer discretionary and not significant in other industry types.

H2E and H2F show that the director's age and nationality do not have any significant impact on Tobin's Q.

Furthermore, time lag has been conducted in order to investigate the impact of top female leaders on financial performance not only in the same year but also up to five years. The results are interesting. As has been presented in 6.5 after one year in the 2014 to 2017 table, female CEOs have a significant negative impact after one year and even two years on P/E (-.383**), female directors have a significantly negative outcome in the second year (-.159**). In light of that, there is no impact of top female leaders on ROA, Tobin's Q and ROE after this time lag period. Leverage showed a significant outcome (.357***) on ROE after one year; however, firm size is negatively significant in year one, second and third year.

These results support another study of US Fortune-listed firms conducted by Carter et al. (2003), who claim that having females on the boards of firms would have an impact on Tobin's Q. However, Smith et al. (2006) and Rose (2007) in Denmark give various evidence for a positive impact of females on boards, depending on the measure of performance.

Finally, using the data from 1,939 firms for 1996–2003, Adams and Ferreira (2009) mention that the effect of gender diversity on firm performance (Tobin's Q) is negative because they tend to over-monitor the board, although in weak-governance firms, they can add value.

Erhardt et al. (2003) and Carter et al. (2003) showed a positive association between female leaders and firm performance in the US. Campbell and Minguez-Vera (2007) proved the positive impact of female directors on Tobin's Q in Spain. Similarly, Luckerath-Rovers (2013) presented that female leaders can improve ROE for Dutch listed firms.

More comprehensive studies were conducted by Liu et al. (2013) and Strom et al. (2014) in developing countries where gender diversity is not a major topic for companies in the same way that it is predominant in developed countries. After addressing the endogeneity problem, both studies showed that female directors can influence firm performance in China (Liu et al., 2013) and 73 other developing countries (Strom et al., 2014).

However, a few studies found that there was hardly a positive and direct relationship between female leaders and firm performance. Adams and Ferreira (2009) and Jurkus et al. (2011), for example, proved that there has not been a direct and positive relationship between female leaders and firm performance after addressing the endogeneity problem. Similarly, Carter et al. (2010) reported an inconsistency when attempting to link female directors with firm ROA and Tobin's Q.

A similar experience occurred in a non-US-based studies. Ahern and Dittmar (2012) presented the effect of this regulation in Norway after the rules were introduced. They showed that the market reacted negatively after the imposition of the law, and it had a negative influence on Tobin's Q as firms had to conduct board restructuring.

Smith et al. (2006) and Rose (2007) discussed the ambiguity of female directors' impact on Danish firms' performance. Certain characteristics of board members are the main reason why board diversity did not increase firm value, for instance, due to female qualifications and insider female directors who had been elected by staff.

In the UK, Ryan and Haslam (2005) and Haslam et al. (2010) reported that there was no association between the presence of female leaders and firm performance for FTSE100 firms. In a recent study, Gregory-Smith et al. (2013) found no evidence that the presence of females on the boards would be associated with efficient firm performance for FTSE 350 firms during the period 1996–2010.

As a consequence of the mixed empirical evidence, some studies conducted further examinations by adding certain conditions or states that can make female leaders have positive impacts on firm performance. For instance, Adams and Ferreira (2009) and Jurkus et al. (2011) use the internal and external governance of firms as moderating variables respectively. Female leaders may cause an over-monitoring problem when firms have strong governance.

The following tables are the summary of the results of this chapter

Table 49 Summary of Impact of Female Leaders on Industries Based on ROA

Industry Type	F Chair	F CEO	F Exe	F Non-Ex	F Dir
Industrials	None	None	None	None	**Significant**
Consumer Staples	**Negative**	None	**Significant**	**Significant**	**Significant**
Consumer Discretionary	None	None	**Significant**	**Significant**	**Negative**

Communication	Significant	None	None	None	**Negative**
Materials	**Negative**	**Negative**	None	None	**Negative**

Notes: This table provides a summary of the results of the impact of female leaders on ROA: Significant shows a significant impact of female leaders, Negative shows a negatively significant impact of female leaders and None means there is no impact of female leaders on the mentioned industry.

Table 50 Summary of Impact of Female Leaders on Industries Based on Tobin's Q

Industry Type	F Chair	F CEO	F Exe	F Non-Ex	F Dir
Industrials	None	None	None	None	**Significant**
Consumer Staples	**Negative**	None	**Significant**	**Significant**	None
Consumer Discretionary	**Significant**	None	None	**Significant**	**Negative**
Communication	None	None	None	None	None
Materials	**Negative**	**Negative**	None	None	None

Notes: This table provides a summary of the results of the impact of female leaders on Tobin's Q: Significant shows a significant impact of female leaders, Negative shows a negatively significant impact of female leaders and None means there is no impact of female leaders on the mentioned industry.

6.9 Chapter Summary

Empirically, this chapter has focused on the second empirical study, which is the impact of female leaders on FTSE 350 companies' financial performance. The relevant conceptual framework has been presented along with the hypotheses and the results of the regression. Female leaders and directors have been at the centre of attention of both academics and practitioners.

The highlights of the results are as follows: there is no impact of female leaders such as CEO, chair and executive and non-executive on FTSE 350 companies' performance indicators (ROA and Tobin's Q). Having said that, female leaders show a significant positive or negative impact based on industry type.

For instance, based on ROA, female chair illustrates a significant positive impact in the communication industry. Likewise, female executives and non-executives show a significant impact in consumers' staple and consumers' discretionary industries, while female directors also show a significant impact on industrial and consumers' staple industries.

Tobin's Q provides different results than ROA. For instance, a female chair who showed significant impact on the communication's industry based on ROA showed no impact on this industry based on Tobin. However, they show a significant impact on consumer discretionary. Besides, female executives and non-executive present a significant impact on consumer staples and consumer discretionary industries.

Hence, it is crucial for companies operating in these industries to pay attention to their recruitment diversity since there is a direct relationship between female leaders and performance.

The next chapter will discuss the impact of female leaders on firms' intellectual capital.

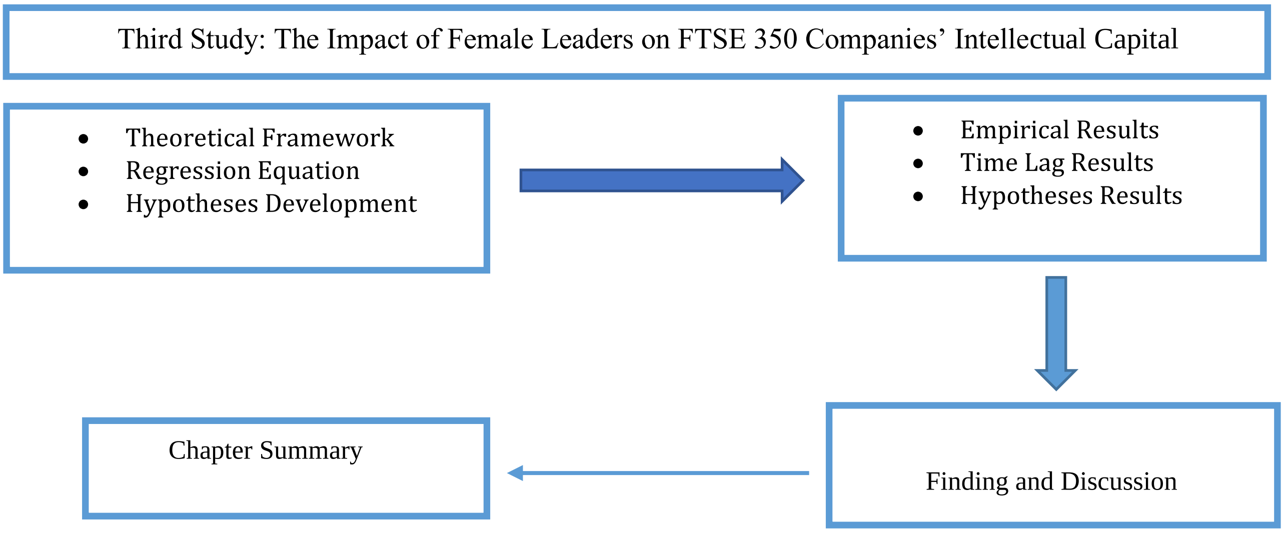
7 Chapter 7

The Impact of Female Leaders on FTSE 350 Companies' Intellectual Capital

7.1 Introduction

There is limited research regarding the impact of female leaders on intellectual capital because both areas are still new to scholars and practitioners. The only known study was conducted by Nadeem et al. (2010), who supported this relationship. Several theories underpinned this relationship, such as resource-based theory, agency theory and shareholder theory. According to these theories, board diversity can enhance firm performance (Hillman et al., 2007) and gender diversity helps the firm to achieve positive social acceptance as it is looked on as supporting family life, female empowerment and flexibility in the workplace (Francoeur et al., 2008). Although it is a requirement by the government to recruit more females on the board, their impact on intellectual capital is not clear yet. Even the limited studies conducted in this regard is related mostly to intellectual capital disclosure rather than efficiency. Therefore, the following empirical study has been formulated based on the third research question: Do female leaders have a significant impact on FTST 350 companies' intellectual capital? Thus, the theoretical background and hypotheses development will be discussed following empirical, and hypotheses results alongside the findings and discussion.

Following figure will present this chapter structure:



7.2 Theoritical Background & Hypotheses Development

The aim of the third empirical study is to investigate the impact of female leaders on the intellectual capital of the FTSE 350 companies, based on which the third research question has been formulated: Do female leaders have a significant impact on FTST 350 companies' intellectual capital? The third study has been supported by resource-based view, agency theory and shareholder theory.

These theories have been discussed in relation to the first and second empirical studies in chapters five and six. There is a relationship between board diversity and IC according to resource-based view theory. For a company to achieve a competitive advantage, the board of directors should focus on their valuable resources. Intangible resources are the key factors of a firm success and can be created and retained through interaction with stakeholders (Branco and Rodrigues, 2006).

The EU Corporate Governance Framework (2011) suggests that board members of a company should contain diverse skills, expertise, opinions and experiences to create value for the firm. Additionally, board gender diversity enables the board to maintain a wide range of skills and competencies and enhances creativity and transparency (Quintana-García and Benavides-Velasco, 2016).

While it has been discussed in the first empirical study, previous literature emphasised the positive impact of IC efficiency on firm performance and market value (Anifowose et al., 2018; Chen et al., 2005; Nimtrakoon, 2015; Sardo and Serrasqueiro, 2017; Scafarto et al., 2016). In the existing literature, there is a limited number of studies regarding the impact of female leaders on intellectual capital except Nadeem et al. (2019) to the best the author's knowledge

Moreover, in the second empirical study, it was mentioned that board gender diversity enhances firm performance, provides access to a previously ignored talent pool, provides conformity in the market, and improves board decision making. Additionally, it improves board monitoring and the efficiency of both human and structural resources, sustains better cooperation with stakeholders and eventually improves firm performance (Low et al., 2015). Nonetheless, there are a few studies on the impact of female directors on the intellectual capital of the companies (Nadeem et al., 2019). Therefore, the aim of this section is to highlight this gap in knowledge, which will be investigated by formulating the following hypotheses.

The hypotheses have been formulated based on resource-based theory and agency theory since agency theory explains how a wrong selection of directors would affect the firm. Also, shareholders entrust decision-making to managers, while the managers may decide to protect their own interests. Therefore, it is important to examine the impact of female leaders and directors on the intellectual capital (and its components), which will be examined in the context of the FTSE 350 companies from 2010 to 2017.

Thus, four main hypotheses have been developed based on the literature and background review discussed in the previous chapters (5.2 & 6.2). The first three hypotheses tested the impact of female directors and leaders on intellectual capital components separately (HCE, SCE and CEE), and the last one will test the impact of female directors and leaders on the sum of these components (VAIC).

The following research question underpins the third empirical study:

Third Research question.

Do female directors have a significant impact on FTSE 350 companies' intellectual capital?

Hypothesis 1:

Female Leaders have a significant impact on IC (HCE)

H1 contains 4 sub-hypotheses as follows:

Table 51 Female Leaders and HCE Hypotheses

1	**Female Leaders and IC Hypotheses (HCE)**
H1	Female directors have a significant impact on FTSE 350 companies' HCE
H1a	Female chairs have a significant impact on FTSE 350 companies' HCE
H1b	Female CEOs have a significant impact on FTSE 350 companies' HCE
H1c	Female executives have a significant impact on FTSE 350 companies' HCE
H1d	Female non-executives have a significant impact on FTSE 350 companies' HCE

Hypothesis 2:

Female Leaders have a significant impact on IC (SCE)

H2 contains 4 sub-hypotheses as follows:

Table 52 Female Leaders and SCE Hypotheses

2	Female Leaders and IC Hypotheses (SCE)
H2	Female directors have a significant impact on FTSE 350 companies' SCE
H2a	Female chairs have a significant impact on FTSE 350 companies' SCE
H2b	Female CEOs have a significant impact on FTSE 350 companies' SCE
H2c	Female executives have a significant impact on FTSE 350 companies' SCE
H2d	Female non-executives have a significant impact on FTSE 350 companies' SCE

Hypothesis 3:

Female Leaders have a significant impact on IC (CEE)

H3 contains 4 sub-hypotheses as follows:

Table 53 Female Leaders and CEE Hypotheses

3	Female Leaders and IC Hypotheses (CEE)
H3	Female directors have a significant impact on FTSE 350 companies' CEE
H3a	Female chairs have a significant impact on FTSE 350 companies' CEE
H3b	Female CEOs have a significant impact on FTSE 350 companies' CEE
H3c	Female executives have a significant impact on FTSE 350 companies' CEE
H3d	Female non-executives have a significant impact on FTSE 350 companies' CEE

Hypothesis 4:

Female Leaders have a significant impact on IC (VAIC)

H4 contains 4 sub-hypotheses as follows:

Table 54 Female Leaders and VAIC Hypotheses

4	**Female Leaders and IC Hypotheses (VAIC)**
H4	Female directors have a significant impact on FTSE 350 companies' VAIC
H4a	Female chairs have a significant impact on FTSE 350 companies' VAIC
H4b	Female CEOs have a significant impact on FTSE 350 companies' VAIC
H4c	Female executives have a significant impact on FTSE 350 companies' VAIC
H4d	Female non-executives have a significant impact on FTSE 350 companies' VAIC

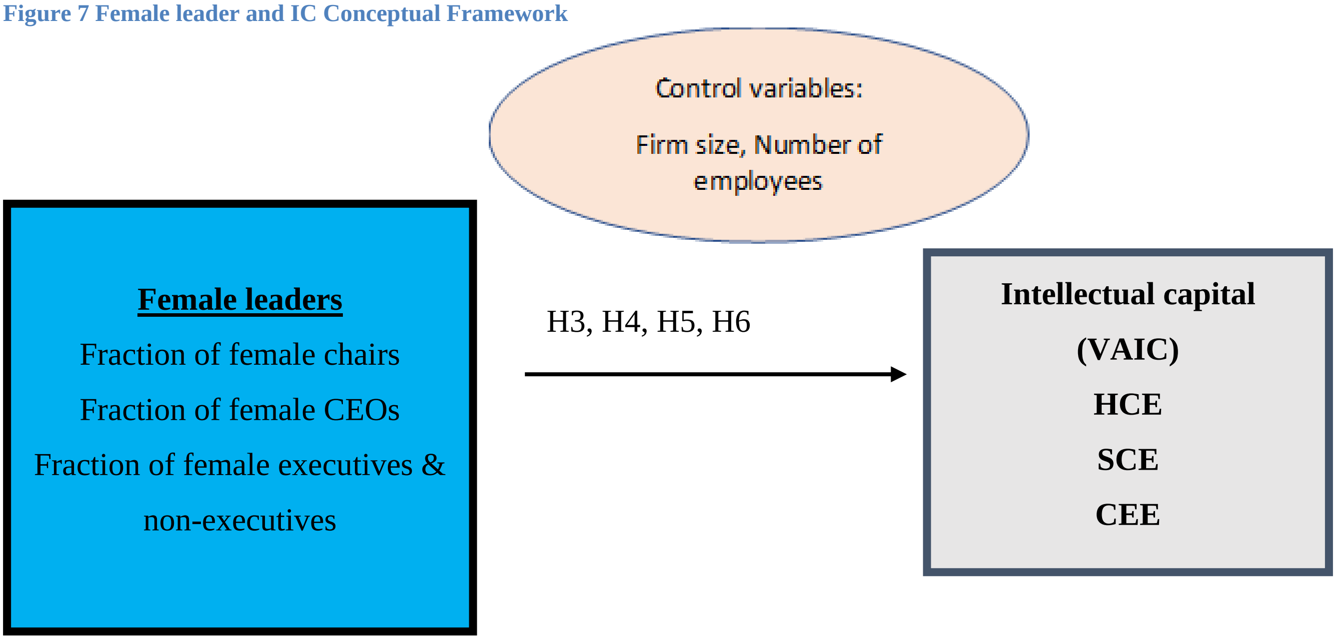
The following framework presents the relationships among variables in this study:

Independent Variables: Female Leaders

Dependent Variables: Intellectual Capital (HCE+SCE+CEE)

Control Variables: Firm Size, Number of Employees

Figure 7 Female leader and IC Conceptual Framework



7.3 Regression Model

The following model will test the impact of female directors and leaders on the intellectual capital of the FTSE 350 companies. The variables will be explained in Table 47.

The impact of female directors on FTSE 350 companies IC

$$IC = \alpha + \beta_1 FPer + B_2 \text{FCh} + \beta_3 FExe + \beta_4 FNex + \beta_5 FCEO + \beta_6 BSize + \beta_7 NEmp$$

$+\varepsilon$

where IC as a dependent is intellectual capital and the rest of the elements are as follow:

FCh = Percentage of female chairs

FExe= Percentage of female executives

FNExe= Percentage of female non-executives

FPer= Percentage of female directors

FIndus= Firm industry type

FSize= Firm size

NEmp= Number of employees

FCEO= Female CEO

ε = error

The following table presents the summary of variables applied in this study

Table 55 Summary of Female Leaders and IC Study Variables

Independent variable		
Variable	**Definition**	**Measurement**
FCh	Female chair	Female as a chair, 1 if chair is a female and 0 otherwise
FCEO	Female CEO	Female as CEO, 1 if CEO is a female and 0 otherwise
FExe	Female executive	Percentage of female executives on the board
FNExe	Female non-executive	Percentage of female non-executives on the board
FPerc	Female director percentage	Percentage of female directors on the board
Control variable		
FSize	Firm size	Total assets owned by the firm: measured as the natural logarithm of total assets of the firm

NEmp	Human capital	The human assets of the firm: measured as the natural logarithm of the number of employees of the firm
Dependent variables (IC)		
HCE	Human capital efficiency (HCE)	Company's VA/ all the expenditures for employees HCE = VA/HC • Value added (VA): Output-Input= Total Income-Total Expenses • HC: Human capital
SCE	Structural capital efficiency (SCE)	Structural capital /Value added SCE = SC/VA • SC = VA – HC
CEE	Capital employed efficiency (CEE)	Company's VA / book value of the net assets of company CEE = VA/CE • CE= Physical and financial capital employed
VAIC	Value-added intellectual coefficient (VAIC)	VAIC = HCE + SCE + CEE

7.4 Empirical Results

The primary reason for testing these hypotheses is to understand whether female leaders and directors will have a positive impact on the intellectual capital of the FTSE 350 companies. To achieve the results for this empirical study, the hypotheses have been examined using SPSS for a dataset from 2010 to 2017. Besides, a five-year time lag has been applied to test whether the female impact will appear up to five years after being appointed. The data used for this empirical study is the same as data provided for the first and second studies (See 4.9), and the sample of data is provided in the Appendix.

Table 60 presents the summary of the impact of female directors and leaders on IC components separately and the VAICs.

Table 56 Summary of Female Leaders and IC Coefficient Results 2010-2017

Dependent	HCE	SCE	CEE	VAIC
2017	None	**FCEO (.243)*** **FExe (-.114*)** **NEmp(-.250***)** **TA (.143**)**	**FNExe (-.132*)** **NEmp (.163**)** **TA (-.147**)**	None
2016	**NEmp(-.116*)**	None	**NEmp (.177*)** **TA (-.162*)**	None
2015	**FCh (2.159**)**	**NEmp(-1.815*)**	**FNEx (-1.933*)** **NEmp(.126*)** **TA (-.123*)**	**FCh(.293**)** **FExe (.121*)** **FNEx (-.126*)**
2014	None	None	**NEmp(.118*)**	None
2013	None	**FDir (-.146**)** **NEmp(-.121*)** **TA (.144**)**	**NEmp (.152**)** **TA (-.150**)**	None
2012	None	None	None,	None
2011	None	**NEmp(-.170**)**	**NEmp(.165**)** **TA (-.141**)**	None
2010	**NEmp(.159**)**	**TA (.120*)**	**FCh (-.411**)** **F CEO (.276*)** **FNEx (-.129*)** **TA (-.126*)**	**NEmp (.169**)**

Notes: The table demonstrates the impact of female directors and leaders on intellectual capital components (HCE, SCE and CEE) and VAIC. Control variables are firm size, total assets and number of employees.
None: There is no impact of variables on performance. Coefficients are provided in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 56 shows the impact of female directors on IC and its components (HCE, SCE and CEE) in the same year. According to the results, female CEOs (243*) have a significant positive impact on SCE, while female executives (-.114*) have a significant negative impact on SCE. Also, female non-executives (-.132*, -1.933*, -.129*) have a significant negative impact on CEE in 2010, 2015 and 2017 respectively.

Although results show no impact for HCE for any female directors and leaders, the number of employees (-.250***) shows a significant negative impact. Total assets (firm size) indicate a significant positive impact in regard to SCE. They show opposite results regarding CEE

(NEmp) shows a significant positive impact, while total assets show a significant negative impact from 2010 to 2017).

Therefore, female directors prove a negative impact on capital employed and structural capital of the FTSE 350 companies over some years.

The following session presents the female impact on intellectual capital with regard to the time lag.

7.5 Time lag Results

The time lag from one year up to five years has been applied in the two previous studies. For this study, testing time is crucial. Companies need to understand how female leaders and directors would affect the HCE, SCE and CEE after some years of running the company, as leaders' strategy, policies, and decision-making always affect the performance.

Nevertheless, leaders affecting intellectual capital is almost a very recent topic, particularly in the discussion of female leaders and intellectual capital about which there is only one known study (Nadeem et al., 2019) e. Hence, a time lag of up to five years has been applied here in order to have a better insight into this relationship.

Questions such as "what would have happened in the global financial crisis if companies had more females on the board" have drawn the attention of some scholars such as Adams and Funk (2012). This is because female executives are more risk-averse in investment decision-making than their male counterparts (Huang and Kisgen, 2013; Levi et al., 2014). Moreover, female directors are thought to be more cautious and pay more attention to details when compared to male directors (Adams and Ferreira, 2009).

As Nadeem et al. (2017) state, there is no significant evidence of a positive impact of female directors in terms of IC efficiency and ROA in China. The results do not endorse resource-dependency and agency theories in the context of the Chinese market. However, as Liu et al. (2014) argue, gender diversity-related government rules and regulations in China are still very poor compared to those of developed markets such as the US and the UK.

The reason for this might be related to the increase in the appointment of females to boards in western countries because of the legislation already mentioned in the earlier chapters. For example, the Davies Report on gender diversity in the UK shows that the number of female directors on the boards of FTSE 350 firms has doubled since 2011 (Adams and Funk, 2012).

Accordingly, Nadeem et al. (2019) claim that female directors are associated with improved IC efficiency. In other words, female directors are efficient at employing firms' IC resources that would consequently improve the firm value and competitive advantage.

Due to the increasing female representation on boards, firms are curious to know the business case for female representation on boards. In this regard, our empirical study has reached a similar conclusion as previously discussed by Nadeem et al. (2019).

The time lag results are present in the following three tables. Since there has not been any impact in years four and five, there are no results to present. Hence, the tables cover solely the three-year time lag, which shows the relationships.

Table 57 presents the impact of female leaders on IC after one, two and three years from 2015 to 2018.

Table 58 presents the impact of female leaders on IC after one, two and three years from 2014 to 2017.

Table 59 presents the impact of female leaders on IC after one, two and three years from 2013 to 2016.

Table 57 Female Leaders and IC Time Lag Coefficient Results (2015 -2018)

F Directors	**1-year Lag Significance 2016**	**2-year lag Significance 2017**	**3-year lag Significance 2018**
F Chair 2015	**HCE (.394**) VAIC (.396**)**	None	**HCE (.401**) VAIC (.390**)**
F CEO	**HCE (-.274*) VAIC (-.284*)**	None	**HCE (-.239*) VAIC (-.246*)**
F Exe	None	None	None
F NExe	None	**CEE (-.136*)**	None

F Dir	None	**None**	None
NEmp	**CEE (.127*)**	**SCE (-.188**)** **CEE (.154**)**	**CEE (.229***)**
TA	**CEE (-.139**)**	**SCE (.113*)** **CEE (-.138**)**	**CEE (-.167**)**

Notes: The table demonstrates the impact of female directors and leaders on intellectual capital components (HCE, SCE and CEE) and the sum of the IC components (VAIC) for up to a three-year time lag. Control variables are firm size, total assets and number of employees,

None: No impact of variables has been shown. Coefficients are provided in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 57 illustrates the data for a one- to five-year time lag. According to the results, after a one-year (in 2016) and three-year (in 2018) time lag, female chairs have a significant impact on HCE (.394**) and consequently on the VAICs (.396**).

After one-year (in 2016) and year two (in 2018), female CEOs have a negatively significant impact on HCE (-.274*) and consequently on the VAICs (-.284*).

After two years (in 2017), female non-executives have a negatively significant impact on CEE (-.136*).

Over some years, there has been no impact of female leaders on IC, which has been shown as "None" in the table.

Table 58 Female Leaders and IC Time Lag Coefficient Results (2014-2017)

F Directors	**1-year lag Significance 2015**	**2-year lag Significance 2016**	**3-year lag Significance 2017**
F Chair 2014	None	None	None
F CEO	None	None	None
F Exe	None	None	None
F NExe	**HCE (-.122*)** **VAIC (-.137*)**	None	None
F Dir	None	None	None
NEmp	**SCE (-.124*)** **CEE (.136**)**	**CEE (.166**)**	**SCE (-.192**)** **CEE (.168**)**
TA	**CEE (-.127*)**	**CEE (-.147**)**	**SCE (.115*)** **CEE (-.142**)**

Notes: The table demonstrates the impact of female directors and leaders on VAIC components (HCE, SCE and CEE) for up to a three-year time lag. Control variables are firm size and number of employees.
None: No impact of variables has been shown. Coefficients are provided in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 58 is similar to the previous one; however, it shows a different time lag. As the results present, female directors, chairs, CEOs and executives have no impact on intellectual capital after a one-, two- and three-year time lag from 2014 to 2017.

Female non-executives have a negative impact on HCE (-.122*) and consequently on the VAICs (-.137*) after one year in 2015.

The number of employees shows negative significance on SCE (-.124*, -.192**) after one-year and three-year time lags and positive impact on CEE (.136**, .166**, CEE .168**) after one, two- and three-year time lags.

Total assets show negative significance on CEE (-.127*, -.147**, -.142**) after one-, two- and three-year time lags, and positive significance only after a three-year time lag on SCE (.115*).

Therefore, female leaders, according to these results, show a negative impact on structural capital and capital employed after a time lag of some years. Interestingly, the number of employees negatively affected SCE but positively affected CEE. In other words, by retaining female leaders on board number of employees and total assets of companies would be affected negatively after one to three years.

Table 59 Female Leaders and IC Time Lag Coefficient Results (2013-2016)

F Directors	**1-year lag Significance 2014**	**2-year lag Significance 2015**	**3-year lag Significance 2016**
F Chair 2013	None	None	None
F CEO	None	None	None
F Exe	None	**VAIC (.119*)**	None
F NExe	None	**CEE (-.146*)** **VAIC (-.123*)**	None
F Dir	None	None	None
NEmp	None	**SCE (-.121*)** **CEE (.116*)**	**CEE (.119*)**
TA	**CEE (-.115*)**	**CEE (-.126*)**	**CEE (-.139**)**

Notes: The table demonstrates the impact of female directors and leaders on VAIC components (HCE, SCE and CEE) for up to a three-year time lag. Control variables are firm size and number of employees.

None: No impact of variables has been shown. Coefficients are provided in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 59 is similar to the previous one with a different time lag. According to the results, female directors, chairs and CEOs, illustrates no impact on intellectual capital after a one-, two- and three-year time lag from 2013 to 2016.

Female non-executives have a negative impact on CEE (-.146*) and consequently on the VAICs (-.123*) after two years in 2015. Surprisingly, female executives had a significant impact on the VAICs (.119*) after two years in 2015. Normally the VAIC show significance, whether positive or negative, if one of its components shows significance. However, here none of the components showed significance in 2015 after a two-year time lag.

Table 60 Female Leaders and IC Time Lag Coefficient Results (2012 -2015)

F Directors	1-year lag Significance 2013	2-year lag Significance 2014	3-year lag Significance 2015
F Chair 2012	None	None	None
F CEO	None	None	None
F Exe	None	None	None
F NExe	None	None	**HCE (-2.259**)** **CEE (-.141*)** **VAIC (-.177**)**
F Dir	**HCE (.185**)** **VAIC (.181**)**	**HCE (.110*)** **VAIC (.114*)**	None
NEmp	**SCE (-.136**)** **CEE (.139**)**	None	**SCE (-.126*)** **CEE (.116*)**
TA	**SCE (.141**)** **CEE (-.137**)**	None	**CEE (-.123*)**

Notes: The table demonstrates the impact of female directors and leaders on VAIC components (HCE, SCE and CEE) for up to a three-year time lag. Control variables are firm size and number of employees.

None: No impact of variables is shown. Coefficients are provided in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 60 is similar to the previous one; however, it has a different time lag. As it is shown in the results, female chairs, CEOs and executives show no impact on intellectual capital after a one-, two- and three-year time lag from 2012 to 2015. However, female non-executives have a negatively significant impact on HCE, CEE and consequently the VAIC after one-year (in 2013) and year-two (in 2014).

7.6 Findings and Discussion

Table 57 presents the impact of female directors and leaders on the intellectual capital of the FTSE 350 companies from 2010 to 2017. According to the results ,female chair has a significant impact on HCE (2.159**) in 2015 and negative on CEE (-.411**) in 2017, while female CEO showed a positive impact on both components SCE (.243*) and CEE (.276*). However, female executives showed a negative impact on SCE (-.114*), while female non-executives showed a negative impact on CEE (-.132*) in 2017, 2015 (-1.933*) and 2010 (-.129*). Consequently, female chair (.293**) and executive (.121*) showed a positive impact on VAIC, while female non-executive showed negative impact (-.126) only in 2015.

Thus, female leaders did not present any significant impact through the years except for one or two years which is not sufficient to reach far-reaching conclusions. However, this is the first study to investigate the impact of female leaders on IC of the companies after one, two and three years.

Nadeem et al. (2019), which remains the only known study conducted in the UK in this area as yet mentioned that board gender diversity has a positive impact on HCE, SCE and CEE, while board gender diversity has a significant positive association with IC efficiency.

Further analysis showed that board gender diversity has also been positively associated with HCE, SCE and CEE. These findings imply that female directors on corporate boards devise policies in favour of accumulating and leveraging the IC resources of firms.

The results indicate that firm size (total assets) has a significant negative impact on CEE from 2010 to 2017; however, it has a significant positive impact on SCE (2010, 2011 and 2017). Also, the number of employees presents a significant negative impact on SCE (2011, 2013, 2015 and 2017) and a positive impact on CEE (2011, 2013, 2014, 2015, 2016 and 2017).

Therefore, statistically, female directors have a negative impact on SCE and CEE and almost no impact on HCE for the FTSE 350 companies, although they demonstrate a negative and positive impact on the number of employees and total assets in terms of SCE and CEE.

On the other hand, time lag results are more in line with the Nadeem et al. (2019), as per our results, after a one-year (in 2016) and three-years (in 2018) time lag, Female chairs show a significant impact on HCE (.394**) and consequently on the VAICs (.396**).

After one year (in 2016) and two years (in 2018), Female CEOs have a negatively significant impact on HCE (-.274*) and consequently on the VAICs (-.284*).

After two years (in 2017), female non-executives have a negatively significant impact on CEE (-.136*). Consequently, female leaders show no significant impact on IC from 2015 to 2018. Similarly, the next table presenting time lag from 2014 to 2017, showing that female directors, chairs, CEOs and executives have no impact on intellectual capital after a one-, two- and three-year time lag from 2014 to 2017.

Female non-executives have a negative impact on HCE (-.122*) and consequently on the VAICs (-.137*) after one year in 2015. The number of employees shows negative significance on SCE (-.124*, -.192**) after one-year and three-year time lags and positive impact on CEE (.136**, .166**, CEE .168**) after one, two- and three-year time lags.

Total assets show negative significance on CEE (-.127*, -.147**, -.142**) after one-, two- and three-year-time lags, and positive significance on SCE only after a three-year time lag (.115*).

Therefore, female leaders, according to these results, show a negative impact on structural capital and capital employed after some years' time lag. The number of employees negatively affected SCE but positively affected CEE. In other words, by retaining female leaders on board, the number of employees and the total assets of companies would be affected negatively after one to three years.

These findings are important for firms aiming to enhance their non-financial value and competitive advantage through their IC resources. Female directors are more cautiousand, compared to male directors, they pay more attention to details (Adams and Ferreira, 2009). Furthermore, women possess a unique cognitive style which is particularly needed to create harmony and are also considered to provide better sources of information dissemination (Earley and Mosakowski, 2000).

Hence, gender diversity can enhance the overall performance of the human capital resources of the firm. Broadbridge et al. (2006) and Kravitz (2003) have argued that gender-diverse boards are able to resolve complicated problems and have more efficient communication.

Daily et al. (1999) argued that female representation on boards improves human capital within an organisation by offering valuable services, such as insights into strategic issues and providing positive feedback on consumers and business partners. Besides, firms with more females on boards are inclined to be more generous (Dunn, 2012).

The results of this study are not in line with some studies which argue that having females on board enriches the work atmosphere and improves reputation in front of other managers (Dunn, 2012). Francoeur et al. (2008) argue that, despite the positive relationships between firm value and the number of women on the board, women remain underrepresented in boards in many countries such as the UK, the US and Canada.

Based on resource-based theory, some of the resources that directors provide to the company relate to their human capital, which is defined as the expertise, know-how and experiences of the employees. Therefore, a woman's human capital can be a crucial factor and justify her appointment for the benefit of gender diversity (Dunn, 2012). However, in this study, female directors and leaders do not have a constantly significant impact on firms' financial performance from 2010 to 2017.

In terms of time lag table 57 illustrates that female chairs have a significant impact on HCE and VAIC after one- and three-year operations; however, female CEOs have a significant negative impact over time (after one and three years), and female non-executives have a significant negative impact on CEE over time.

Having said that, the results vary when different years have been tested for the time lag. For instance, in Table 58, female non-executives have a negative impact on CEE and VAIC after two years, and in Table 60, they have a significant negative impact on HCE, CEE and VAIC.

Thus, in the results from the impact of female directors on IC after one, two and three years, the table shows that female chairs have a significant impact on HCE and VAIC after one and three years. However, female CEOs have a significant negative impact on HCE and VAIC after one and three years. Female non-executives have a significant negative impact on CEE after two years and three years (in 2017 and 2018); the rest did not have any significant impact in the time lag study. Having said that, the results vary in different years; thus, we are unable to draw a conclusion, so further studies are expected in order to reach more comprehensive conclusions.

Consequently, due to the inconsistency of the results in terms of positive impact (one or two years out of seven), it can be concluded that female directors and leaders do not have a positive impact on the intellectual capital of the FTSE 350 companies.

Since this is the first study to concentrate on female leaders specifically and time lag, further research needs to be conducted in the UK and even other countries to reach broader conclusions regarding the impact of female leaders on intellectual capital. The reason that female leaders have a negative impact on CEE was discussed by some scholars. They argued that CEO gender can affect the risk-taking process as female CEOs are more risk-averse and less overconfident. They are different in incentives structures, unemployment risk, and social norms compared to the male peers. Females tend to reduce corporate risk-taking to a level that fits their preferences once they have become CEOs. Indeed, the experimental economics and psychology literature has documented gender-related differences in preferences and risk tolerance (Faccio et al., 2016).

The results are also consistent with the probability that less overconfident agents reduce risk after they become CEOs. In the behavioural literature, females are less overconfident than males, and male executives tend to be more confident than females. Thus, female executives are reluctant to be involved in acquisitions and debt compared to their male counterparts (Huang and Kisgen, 2013).

The reason behind this can be discussed in the deeper level based on the human capital theory (Becker, 1964), which explains that women lack adequate human capital for a high-raking position. The same firm's rewards, such as training and development or promotion and pay, are not offered to females by the gatekeepers, who are mostly male (Oakley, 2000, Terjesen et al., 2009).

Besides, according to the social identity theory, individuals tend to surround themselves with people more similar to them in terms of values and demographics. For instance, male executives probably prefer to hire male over female directors (Tejfel and Turner, 1986).

7.7 Hypotheses Test Results

Based on the empirical results presented in the previous section, the following tables demonstrate the results of the after mentioned hypotheses:

Hypotheses 3:

Female Leaders have a significant impact on FTSE 350 companies' IC (HCE)

H3 contains 4 sub-hypotheses as follows:

Table 61 Female Leaders and (HCE) Results

	Female Leaders and IC Hypotheses (HCE)	**Results**
H3	Female directors have a significant impact on FTSE 350 companies' HCE	Rejected
H3a	Female chairs have a significant impact on FTSE 350 companies' HCE	Accepted
H3b	Female CEOs have a significant impact on FTSE 350 companies' HCE	Accepted
H3c	Female executives have a significant impact on FTSE 350 companies' HCE	Rejected
H3d	Female non-executives have a significant impact on FTSE 350 companies' HCE	Rejected

Hypotheses 3A:

Female Leaders have a significant impact on FTSE 350 companies' IC (HCE) after 1 to 3 years' time lag.

H3A contains 4 sub-hypotheses as follows:

Table 62 Female Leaders and (HCE) Results Time Lag (1 to 3 years)

	Female Leaders and IC Hypotheses (HCE)	**Results**
H3A	Female directors have a significant impact on FTSE 350 companies' HCE in regard to the time lag	Accepted
H3Aa	Female chairs have a significant impact on FTSE 350 companies' HCE	Accepted
H3Ab	Female CEOs have a significant impact on FTSE 350 companies' HCE	Rejected
H3Ac	Female executives have a significant impact on FTSE 350 companies' HCE	Rejected
H3Ad	Female non-executives have a significant impact on FTSE 350 companies' HCE	Rejected

Hypotheses 4:

Female Leaders have a significant impact on FTSE 350 companies' IC (SCE)

H4 contains 4 sub-hypotheses as follows:

Table 63 Female Leaders and (SCE) Results

	Female Leaders and IC Hypotheses (SCE)	**Results**
H4	Female directors have a significant impact on FTSE 350 companies' SCE	Rejected
H4a	Female chairs have a significant impact on FTSE 350 companies' SCE	Rejected
H4b	Female CEOs have a significant impact on FTSE 350 companies' SCE	Accepted
H4c	Female executives have a significant impact on FTSE 350 companies' SCE	Rejected
H4d	Female non-executives have a significant impact on FTSE 350 companies' SCE	Rejected

Hypotheses 4A:

Female Leaders have a significant impact on FTSE 350 companies' IC (SCE) after 1 to 3 years' time lag.

H4A contains 4 sub-hypotheses as follows:

Table 64 Female Leaders and (SCE) Results Time Lag (1 to 3 years)

	Female Leaders and IC Hypotheses (SCE)	Results
H4A	Female directors have a significant impact on FTSE 350 companies' SCE in regard to the time lag	Rejected
H4Aa	Female chairs have a significant impact on FTSE 350 companies' SCE	Rejected
H4Ab	Female CEOs have a significant impact on FTSE 350 companies' SCE	Accepted
H4Ac	Female executives have a significant impact on FTSE 350 companies' SCE	Rejected
H4Ad	Female non-executives have a significant impact on FTSE 350 companies' SCE	Rejected

Hypotheses 5:

Female Leaders have a significant impact on FTSE 350 companies' IC (CEE).

H5 contains 4 sub-hypotheses as follows:

Table 65 Female Leaders and (CEE) Results

	Female Leaders and IC Hypotheses (CEE)	Results
H5	Female directors have a significant impact on FTSE 350 companies' CEE	Rejected
H5a	Female chairs have a significant impact on FTSE 350 companies' CEE	Rejected
H5b	Female CEOs have a significant impact on FTSE 350 companies' CEE	Accepted
H5c	Female executives have a significant impact on FTSE 350 companies' CEE	Rejected
H5d	Female non-executives have a significant impact on FTSE 350 companies' CEE	Rejected

Hypotheses 5A:

Female Leaders have a significant impact on FTSE 350 companies' IC (CEE) after 1 to 3 years' time lag

H5A contains 4 sub-hypotheses as follows:

Table 66 Female Leaders and (CEE) Results Time Lag (1 to 3 years)

	Female Leaders and IC Hypotheses (CEE)	Results
H5A	Female directors have a significant impact on FTSE 350 companies' CEE in regard to the time lag	Rejected
H5Aa	Female chairs have a significant impact on FTSE 350 companies' CEE	Rejected
H5Ab	Female CEOs have a significant impact on FTSE 350 companies' CEE	Rejected
H5Ac	Female executives have a significant impact on FTSE 350 companies' CEE	Rejected
H5Ad	Female non-executives have a significant impact on FTSE 350 companies' CEE	Rejected

Hypotheses 6:

Female Leaders have a significant impact on FTSE 350 companies' IC (VAIC).

H6 contains 4 sub-hypotheses as follows:

Table 67 Female Leaders and (VAIC) Results

	Female Leaders and IC Hypotheses (VAIC)	Results
H6	Female directors have a significant impact on FTSE 350 companies' VAIC	Rejected
H6a	Female chairs have a significant impact on FTSE 350 companies' VAIC	Accepted
H6b	Female CEOs have a significant impact on FTSE 350 companies' VAIC	Rejected
H6c	Female executives have a significant impact on FTSE 350 companies' VAIC	Rejected
H6d	Female non-executives have a significant impact on FTSE 350 companies' VAIC	Rejected

Hypotheses 6A:

Female Leaders have a significant impact on FTSE 350 companies' IC (VAIC) after 1 to 3 years' time lag

H6A contains 4 sub-hypotheses as follows:

Table 68 Female Leaders and (VAIC) Results Time Lag (1 to 3 years)

	Female Leaders and IC Hypotheses (VAIC)	Results
H6A	Female directors have a significant impact on FTSE 350 companies' VAIC in regard to the time lag	Rejected
H6Aa	Female chairs have a significant impact on FTSE 350 companies' VAIC	Accepted
H6Ab	Female CEOs have a significant impact on FTSE 350 companies' VAIC	Rejected
H6Ac	Female executives have a significant impact on FTSE 350 companies' VAIC	Rejected
H6Ad	Female non-executives have a significant impact on FTSE 350 companies' VAIC	Rejected

Female Chair presents a significant impact on IC throughout the year of operating and it proves that higher position has a direct relation with their positive impact on companies' performance.

7.8 Chapter Summary

This chapter contributes significantly towards female leaders and intellectual capital by the third empirical study, which has been formulated based on the third research question:

Do female leaders have a significant impact on FTSE 350 companies' intellectual capital?

This study has been developed based on the gap in the literature as well as empirical studies.

Although it is crucial for companies to understand this relationship as it would affect the company's performance, there is a limited study in this regard.

According to the results of this empirical study, top female leaders do not have a significant impact on companies' intellectual capital, except in one or two years which could not prove the impact.

Having said that, once one- and two-year time lags have been applied, female chairs and directors illustrate a significant impact on HCE in the FTSE 350 companies, and no further impact has been proven after the third year.

In other words, female leaders might need some time to apply their policies and strategies to achieve positive results regarding intellectual capital components such as HCE, SCE and CEE. However, there is a lack of investigation even for the leaders in general regardless of their gender.

Nevertheless, some scholars conclude that CEO gender can affect the risk-taking process as female CEOs are more risk-averse aversion and less over-confident. Females tend to reduce corporate risk-taking to a level that fits their preferences once they have become CEOs.
Since this is almost the first empirical study in this domain, it would be a platform for further investigation to reach a consistent result for practitioners, considering their duties in recruiting and appointing candidates in the top positions.

Moreover, further longitudinal and cross-sectional empirical studies might be required to compare the impact of leaders on intellectual capital performance based on their gender to reach indisputable conclusions in this regard.

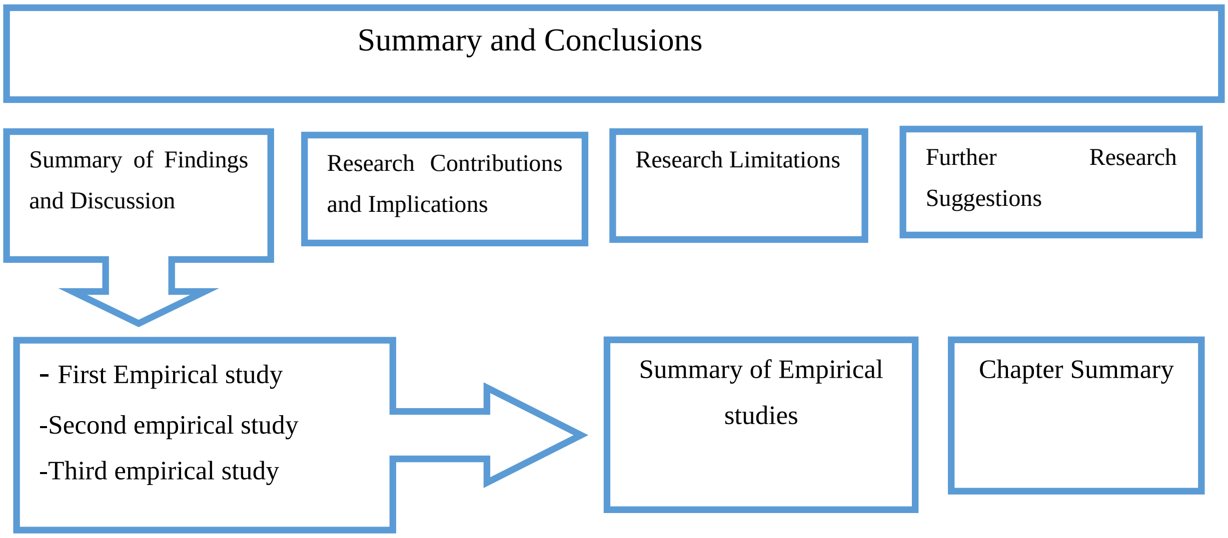
The next chapter will present the summary of three empirical studies, the study's contribution to knowledge and suggestions for further studies.

8 Chapter 8 Summary and Conclusions

8.1 *Introduction*

This chapter presents the summary of three empirical studies which have been formulated based on the three research questions. The chapter highlights the main findings, concluding with the contributions and limitations of the study while suggesting directions for further studies.

The following diagram demonstrates the chapter structure:



8.2 *Summary of Findings and Discussion*

The primary aim of this research was to investigate the impact of intellectual capital and female leaders on the financial performance of FTSE 350 companies. Therefore, three empirical models have been conducted based on the three research questions.

This study was conducted based on the gap in the literature review, since the results of the previous studies regarding the impact of intellectual capital and female leaders on performance are not consistent. They showed various results in various countries, industries and even firm sizes.

For this study, large UK companies have been selected as there are few empirical studies regarding the UK, despite that it is one of the most important financial centres in the world.

The first empirical model investigated the impact of intellectual capital on FTSE 350 companies' financial performance, which is a very recent and controversial topic due to the varying results.

The second empirical study examined the impact of female leaders on FTSE 350 companies with regard to the government regulations which require companies to appoint more females on company boards.

The empirical results illustrated diverse outcomes, although female leaders demonstrated a positive impact with regard to the industry. Consequently, the third empirical study investigated the impact of female leaders on intellectual capital in order to understand the extent of the impact of female leaders on each IC component since IC can act as a mediator between leaders and performance.

The results of the three studies are beneficial and interesting as well: female leaders proved a significant positive impact on human capital efficiency. This can underpin the reason of the first empirical study results, in which intellectual capital presented a significant positive impact on financial performance indicators such as ROA and Price per Earning.

Having said that, further studies are required to investigate this relationship based on other factors such as industries, different countries, and perhaps comparing developing counties with developed countries and other macroeconomic factors in order to reach more nuanced conclusions.

8.2.1 First empirical Model

Research Question 1:

Does intellectual capital have a significant impact on FTSE 350 companies' financial performance?

The first empirical model, based on the first research question, tested the impact of intellectual capital on financial performance. In this model, intellectual capital has been measured based on VAIC methodology (Pulic, 2000), for which we consider three components of the VAIC instead of the traditional measurement.

Therefore, intellectual capital has been measured via VAIC methodology, which is a summary of three components: human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE).

Four different financial measurements (ROA, ROE, Tobin's Q and P/E) were considered for financial performance indicators to test the impact of intellectual capital on FTSE 350 companies' financial performance.

Control variables included the number of employees, total assets as firm size and leverage of the firm, which have been applied based on several previous studies.

The results demonstrated that VAIC and all three components have a significant impact on ROA and P/E; however, they do not have any significant impact on Tobin and ROE.

Time lag results showed that HCE and VAIC have a significant impact on ROA after a one-year time lag although no other variables were significant in this regard.

As a result, the first research question has been answered positively with this empirical test, thereby supporting the theory behind it.

Both knowledge-based theory and resource-based theory discuss the impact of human capital, know-how, knowledge and their expertise on a firm's financial performance. Having said that, according to VAIC theory, although the capital employed is not part of the definition of intellectual capital, it is one of the components of the VAIC model for measuring IC.

All these three VAIC components were significant in this study. Chen et al. (2005) and Nadeem et al. (2017) supported the impact of IC on ROA in their studies as well. Besides, Stewart (1997) argued that a traditional performance measurement would ignore the value of human capital, and it is not adequate for performance measurement for large companies.

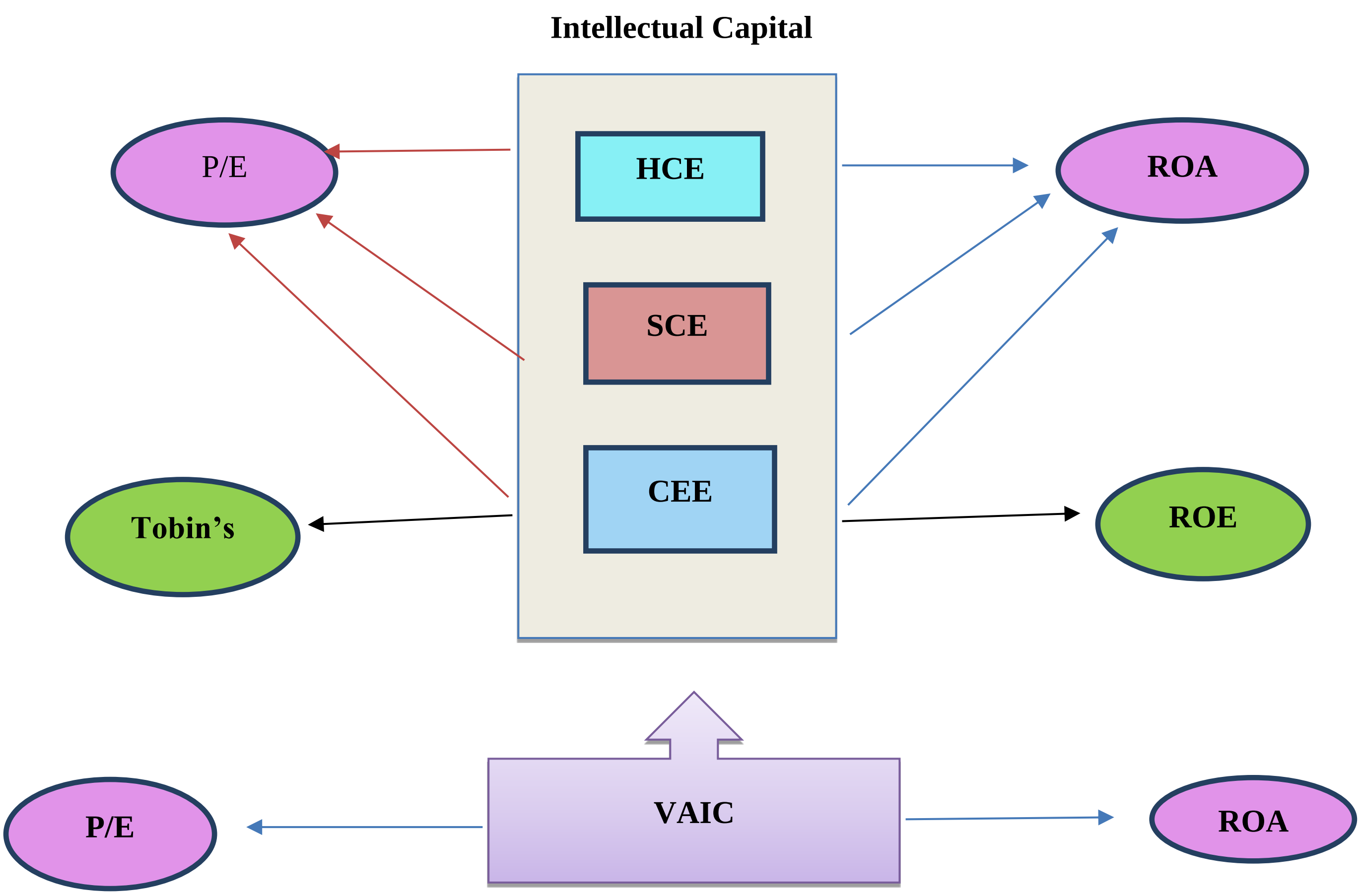
Having said that, Kamath (2008) stated that HC has a major impact only on ROA in the Indian pharmaceutical sector, with no significant impact on IC in regard to productivity and market value.

Furthermore, Vishnu and Gupta (2014) presented similar evidence of a significant impact of HCE and SCE in the Indian pharmaceutical industry based on ROA and return on sales. These findings provide insights into the Indian knowledge-based sector like pharmaceuticals, where stakeholders still perceive firm performance in terms of tangible assets rather than intangible assets. In contrast, Chan's (2009) study found no significant impact of IC on the Hong Kong Stock Exchange's productivity, profitability and market valuation (Smriti and Das, 2018).

Although IC is still a new concept in emerging markets (especially in developing counties), Vishnu and Gupta (2014) conducted a study related to BRICS economies and argued that IC is significantly related to the overall financial performance of firms with the exception of revenue growth (Nadeem et al., 2017).

The following diagram illustrates the impact of intellectual capital components (HCE, SCE and CEE) and VAIC on financial performance indicators.

Figure 8 The Impact of Intellectual Capital on FTSE 350 Financial Performance



Note: Each arrow presents the positive and significant impact of the independent variables on dependent variables.

Figure 6 is the summary of the first empirical model results. The arrows show the significant impact of every component for the value-added intellectual coefficients (HCE, SCE, CEE) with the financial performance indicators. The VAICs have been tested against four different performance indicators (ROA, ROE, Tobin's Q and P/E). All the components had a significant impact on ROA and P/E. Consequently, the VAICs have a significant impact on ROA and P/E as well. Only CEE had a significant impact on ROE and Tobin's Q; therefore, the VAICs did not have any significant impact on ROE and Tobin

8.2.2 Second empirical Model

Research Question 2:

Do female directors have a significant impact on FTSE 350 companies' financial performance?

The second empirical study, based on the second research question, tested the impact of female directors on financial performance.

In this model, the percentage of female leaders on the board was calculated to test the two financial performance indicators (ROA and Tobin's Q). According to results, female leaders do not present a significant impact neither on ROE and P/E nor on the control variables including firm size, number of employees and industry.

The impact of female directors was tested in two ways: the first model considered different industries according to some scholars who argue that female leaders are more effective in consumers industries.

The second model analysis was conducted without considering industries to understand whether female leaders have a significant impact on FTSE 350 companies.

According to the results, the second research question, relating to the impact of female leaders on firm financial performance, was answered positively with respect to industry.

In other words, in two sectors, namely industrials and consumer staples, female directors had a significantly positive impact, although there is no impact of top female leaders such as CEOs, chairs and executives in any of the other industries.

Besides, female leaders have no significant impact on FTSE 350 companies in general. As researchers admit, there are diverse results regarding the impact of female directors on a firm's financial performance.

In this study, based on ROA, a) female directors have a significant impact on industrials and consumer staples; b) female chairs have a significant impact on communication services; and c) female non-executives have a significant impact on industrials.

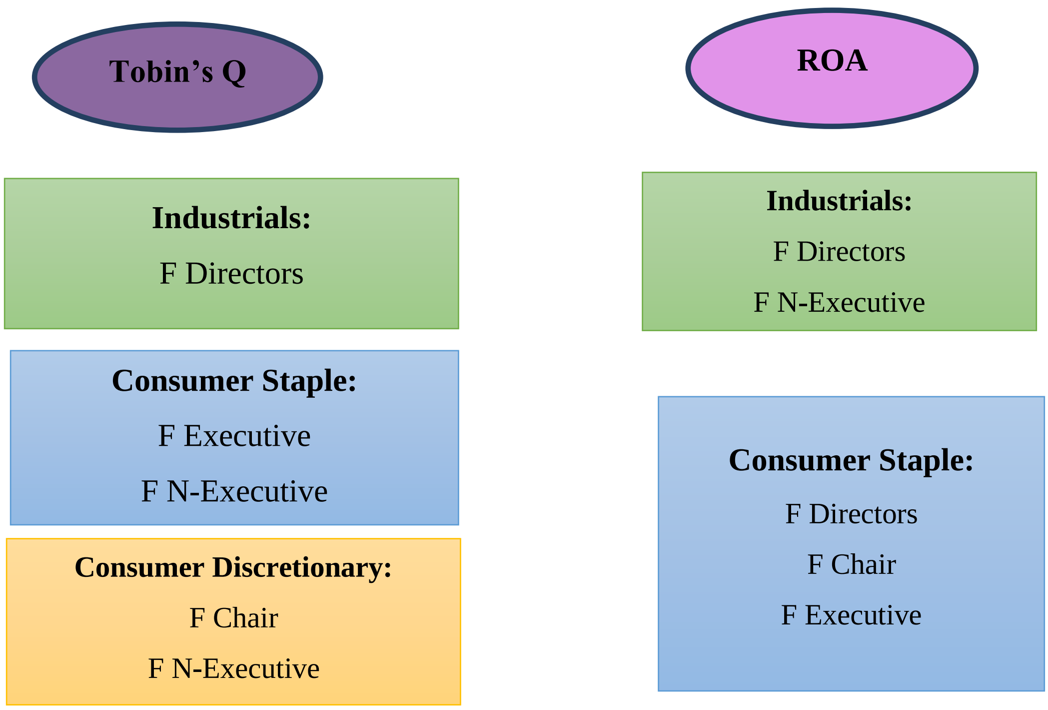
The results are slightly different based on Tobin's Q: female directors also have a significant impact on industrials; however, female chairs have a significant impact on consumer discretionary. Finally, while female executives show a significant impact on consumer staples, female non-executives have a significant impact on consumer discretionary.

Furthermore, female leaders have a correlation with either ROA or Tobin's Q or even in one of the industry sectors. Nevertheless, Adams and Ferreira (2009) argue that compared to male directors, female directors have better board attendance records and are more likely to join monitoring committees.

Haslam et al. (2010) said that in the FTSE 100 companies, female directors are not significantly associated with accounting performance but are negatively associated with stock market performance. Furthermore, on Norwegian boards, female directors have a negative impact on firm performance as well (Levi et al., 2014)

The following figure presents the impact of female leaders on financial performance base on industries.

Figure 9 The Impact of Female Directors on FTSE 350 Financial Performance



Note: This figure is the summary of the second empirical study's results. It has been shown that:

- Based on ROA, Female Directors and Female Non-Executive have a significant impact on Industrials.
- Female Directors, Chair and Executives have a significant impact on consumer Staple.
- Based on Tobin, Female Directors showed a significant impact on Industrials.
- Female Executive and Non-Executives have a significant impact on consumer staples.

- Female chairs and female non-executive have a significant impact on consumer discretionary.

8.2.3 Third Empirical Model

Research Question 3:

Do female directors have a significant impact on FTSE 350 companies' intellectual capital?

The third empirical study is based on the third research question.

According to the results, female directors did not present a positive and consistent impact on intellectual capital; in one or two years, they had a positive or negative impact on SCE and CEE; however, the results were not consistent from 2010 to 2017, and for the one-year time lag, they had a significant positive impact on HCE and consequently on the VAICs.

However, they had a significant negative impact on SCE and CEE in certain years with the time lag. Female chairs had a significant impact on HCE and the VAICs. Also, female CEOs had a significant impact only on CEE.

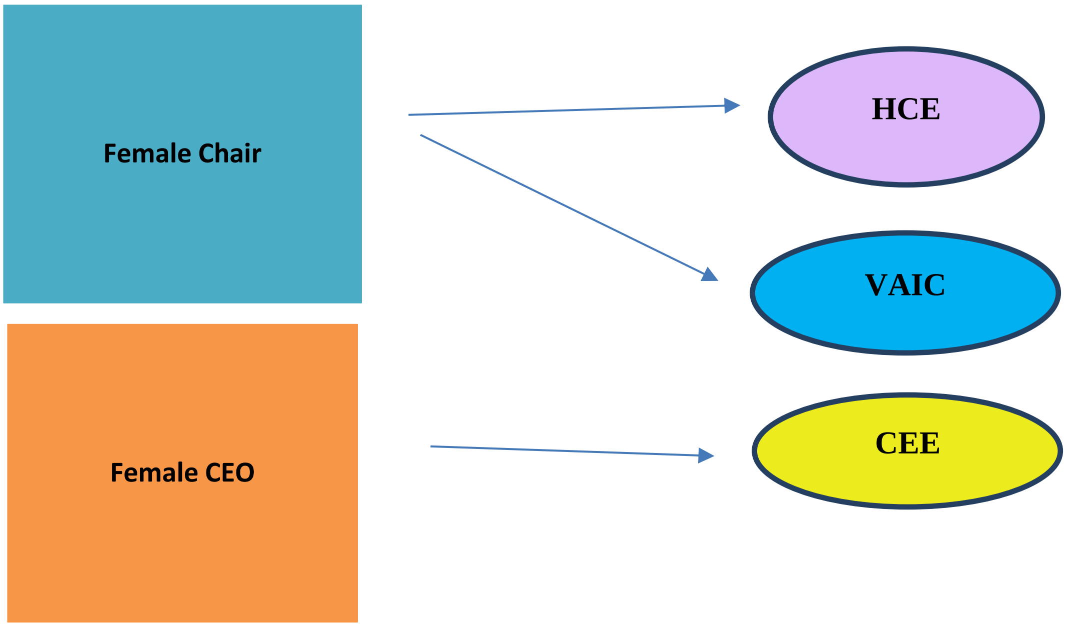
Some scholars support this research. According to Ritter et al. (2019), in some studies, it has been proven that gender diversity has a positive effect on innovation in developed countries, meaning that they facilitate innovation because of diversified knowledge accumulation and improved decision-making.

Another study (Devicienti et al., 2019) argued that female leaders' attitudes and values are different from their male counterparts. Female leaders are more attentive and display more consideration to their subordinates and, in particular, to their individual needs.

Thus, female leaders are more other-oriented and benevolent than male directors. They play an important role in fulfilling employees' needs, working time arrangements and increasing the work-life balance of employees. Therefore, female leaders have a positive impact on the human capital of companies.

The following is a summary of the impact of female leaders on intellectual capital:

Figure 10 The Impact of Female leaders on FTSE 350 Intellectual Capital



Note: Each arrow presents the positive and significant impact of the independent on dependent variables.

This figure is the summary of the third empirical model's results. The arrows show a significant impact of female chairs on HCE and VAIC and female CEOs have a significant impact on CEE. No further impact has been proven by this study.

8.3 Summary of all Empirical Studies

The following figure summarises all three empirical results, which have already been discussed in previous chapters (5.8, 6.8 and 7.6). The results demonstrated that all the three components of the VAIC have a significant impact on ROA and P/E; however, they do not have any significant impact on Tobin and ROE.

Predominantly, intellectual capital has a significant positive impact on the financial performance (Return on Assets and Price per Earning) of the FTSE 350 companies. Since ROA is accounting-based measurement and P/E is a market-based measurement, and IC showed a significant impact on both, it is crucial for companies to comprehend the value of their resources.

Besides, time lag results have shown that HCE and VAIC have a significant impact on ROA after one year. This finding emphasises the importance of human capital as one of the IC components.

Furthermore, female directors/leaders showed a positive impact on performance on FTSE 350 companies' financial performance both on ROA and Tobin in respect of the sector, namely industrials and consumer staples.

However, there is no impact of top female leaders such as CEOs, chairs and executives in any other industries. Thus, it is crucial for practitioners in these industries (Industrials & Consumer Staples) to consider more females while recruiting for top positions.

Additionally, top female leaders illustrate a significant positive impact on companies' HCE, CEE and the VAICs as well. In a nutshell, it can be concluded that having female leaders in top positions not only positively affects financial performance but also affects companies' intellectual capital.

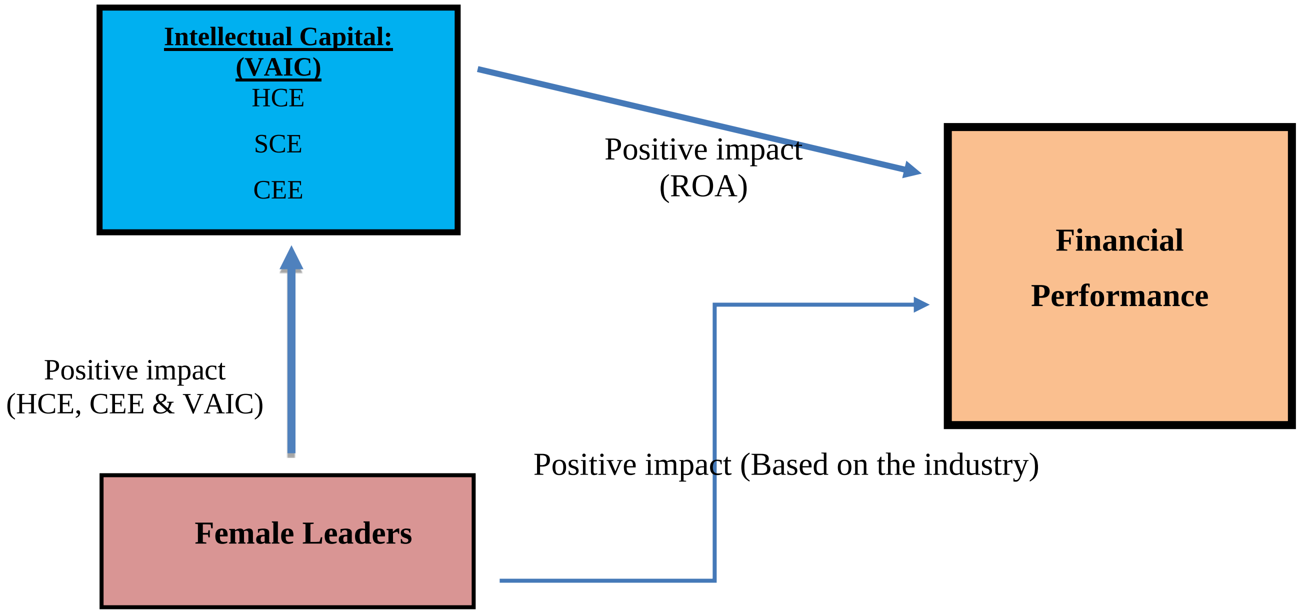
Consequently, this might be the reason for a positive impact of IC on ROA and P/E, meaning that board gender diversity is positively associated with two IC components (HCE & CEE) on the one hand and firm performance (respect to the industry) on the other hand. These findings imply that female directors on corporate boards devise policies in favour of accumulating and leveraging the IC resources of firms.

Moreover, human capital contributes significantly in productivity enhancement and the long-term growth of firm performance. According to human resource theory and knowledge-based resources, knowledge is in the form of specific skills, such as technical, creative, coordinative and collaborative skills, which are developed in individuals. These skills can be transferred and shared at the company level and be utilised as knowledge-based resources which have, primarily, been created by a company's human capital.

Hence, the outcomes of this study reveal that female leaders have a significant positive impact on the human capital and capital employed in certain sectors. In other words, not all sectors are sensitive to gender diversity in terms of their profitability and productivity. Stated differently, it is the nature of the industry which determines whether human capital can affect financial performance. For instance, the importance of human capital skills and knowledge would be different in a high-tech industry compared to a consumer discretionary industry, or a consumer staple industry compared to materials or industrials sector.

The following figure presents the summary of the results of the three studies.

Figure 11 Summary of Findings of three studies



Note: This figure is a summary of all the findings which show three relationships:

- IC → Financial Performance: presents the impact of intellectual capital and its components, Human capital efficiency (HCE), Structural capital efficiency (SCE) and Capital employed efficiency (CEE) and sum up of these components as Value added Intellectual Coefficient (VAIC) on companies' financial performance.
- Female leaders → Financial Performance: presents the impact of female leaders on companies' financial performance.
- Female Leaders → Intellectual Capital: presents the impact of female leaders on IC components and VAIC.

8.4 Research Contributions and Implications

The study contributes to the literature on IC and financial performance and gender diversity by focusing on top female leaders. This study was conducted after the financial crisis that started in 2008. Post-financial crisis research and outcomes are crucial for practitioners in order to understand the value of leadership and IC in their companies to prevent any possible failure.

Traditionally, some companies would focus more on their tangible assets rather than intangible ones. Thus, the main contribution of this study is the recognition of the importance of intangible assets and their features for companies' financial performance. Thus, the contribution of his study is presented under the following categories: Academic, Practitioners and Government policy:

Practitioners and Government Policy contribution: Due to the three empirical studies which have been conducted here, policymakers and corporate governance will have a clearer understanding of the new rules for appointing the required percentage of females to company boards. This study also provides a deep understanding of the impact of female leaders on companies with respect to the sector and industry in which they perform well.

Furthermore, this study investigated the effect of female leaders on human and structural capital and capital employed of the companies in order to shed light on the recruitment of resources and gender diversity. Hence, employers understand how to invest in their resources and how to create the culture to meet organisational goals as well as the personal goals of their employees. Equality would deepen the literature in this regard and provide insights for academics as well.

This study is advantageous to human resource managers in particular and managers of every kind of sector and industry in general, helping them to be aware of their intellectual capital measurement and enhancing their investment according to their resources.

Female leaders on their own represent a debatable topic in corporate governance, and the investigation of their impact on IC has provided a new insight into managing companies in order to deploy all kinds of resources effectively, an issue which had been ignored previously. Human resource managers who are responsible for employee training, development and retention are required to understand the impact of human capital on financial performance. There is also a need to train line managers who are in direct relation with employees. They need to be aware of organisational culture and structure to apply fit views and recruit the right people to fit with the organisational goals.

Academic contribution: Since the failure of world-class companies such as Enron, as Nadeem et al. (2019) state, scholars have shown an interest in investigating not only the impact of female leaders on financial performance but also their impact on IC as well. The question is, what would happen to companies and their intellectual capital if their leaders were female. Therefore, researchers have studied a lot of companies around the world, with diverse outcomes.

It has been more than two decades since firms have come under regulation to increase female representation on boards in response to various stakeholders' demands. For this reason, academic scholars and regulators have started to assess the impact of female directors or gender diversity in the boardroom.

Previous studies have focused entirely on the impact of gender diversity on firms' financial performance and risk management. However, there is a lack of investigation with regard to the impact of female directors on firms' non-financial performance.

As mentioned by Nadeem et al. (2019), IC has become a source of firm value and competitive advantage in the knowledge-economy era; thus, the non-financial implications of gender diversity must be investigated, which was one of the main objectives of this study.

During the industrial era, physical assets such as machinery, property and equipment were considered the only source of wealth for firms. Nevertheless, the focus from physical assets has shifted to knowledge-based resources such as human capital, structural capital and relational capital.

Firms now look at skills, experience, knowledge and communication as strategic resources. This revolution meets the need to efficiently manage and leverage the IC resources of firms in order to enhance firm value and competitive advantage.

While previous studies have paid attention to the impact of IC efficiency on firm value with positive results, the antecedents of IC efficiency are less known. Therefore, this study fills this void by providing empirical evidence on the impact of gender diversity on IC efficiency. Based on UK-listed firms, this study found that female leaders have a positive impact on IC efficiency, especially HCE and CEE.

These findings indicate that female directors would synergise and leverage firms' IC resources. These results are crucial for firms aiming to fortify their non-financial value and competitive advantage through their IC resources.

The following table summarises the research questions, empirical results findings and contribution of the study.

Table 69 Research Contribution

Research question	Findings	Contribution
Does intellectual capital have a significant impact on FTSE 350 companies' financial performance?	This was tested through the first empirical study: IC and VAIC show a significant impact on ROA and P/E of large companies.	- The literature regarding the impact of intellectual capital (IC) on the UK's large companies' performance has been enhanced. - The practice of IC for UK companies' financial performance has been investigated, and it was found that IC has a significant impact on UK's large companies' financial performance.
Do female leaders have a significant impact on FTSE 350 companies' financial performance?	This was tested through the second empirical study: females, in general, do not have a significant impact on FTSE 350 companies' financial performance. However, female leaders showed a significant impact on financial performance depending on the sector.	- The literature regarding the board of directors, female leaders, and gender diversity has been enhanced. - The practice of female leaders on the UK's top companies' financial performance has been investigated, and it was found that female leaders have a significant impact on the financial performance of some sectors such as industrials and consumer staples.
Do female leaders have a significant impact on FTSE 350 companies' intellectual capital?	This was tested through the third empirical study: female chairs have a significant impact on HCE and the VAICs. Female CEOs have a significant impact on CEE.	- Investigating the impact of female leaders on IC planning and practice in UK's large companies. - A novel model that allows the leaders and managers of large companies to have a profound comprehension of the impact of female leaders on human capital. The policies and capital investment of top UK companies have been developed, and after investigation, it was found that female leaders have a significant impact on HCE and CEE of large companies.

8.5 Research Limitations

This study is beneficial in terms of the domains of IC and female directors. Although there are a few studies conducted in the mentioned domain, neither the impact of IC on FTSE 350 companies' financial performance nor the impact of female leaders on IC have previously been investigated prior to this study.

Nevertheless, this study was faced with some dilemmas and constraints. The very first one was the IC measurement based on VAIC methodology, which is still being challenged by some scholars. However, it is the best measurement so far as it is compatible with quantitative research and secondary data collection.

The second restriction was the database itself. Due to some restrictions, access to other databases to collect all data for all 350 companies was not possible. Hence, some sectors such as banking and investment firms were deleted for their incomplete data throughout the years. Although if we could take into account all 350 companies, it would be beneficial, particularly for the third study, which is almost a new study and would provide a deep insight into the impact of female leaders on IC in all sectors and industries.

Moreover, each empirical chapter has its own limitation. Regarding the first empirical study, it would have been more valuable to add industry variables to investigate how intellectual capital and its components affect financial performance in different sectors.

To some extent, utilising other software might make the results clearer and more straightforward.

In regard to the second study, there are other female positions that should be considered for analysis, such as Female Finance director, which does not exist in the database utilised in this study.

Practically, the third study has run more smoothly as the researcher gained the skill and knowledge throughout the research over the years. However, due to its novel concept, there was not adequate previous studies and empirical studies to support discussion in the third study.

8.6 Further research suggestions

With all the constraints that every study encounter, this research will open a new path for future researchers in the IC and female leaders' research, with insights from different disciplines, which have been performed in this study (such as female leaders and intellectual capital)

Having said that, research on the impact of intellectual capital (not as IC disclosure impact) is still taking its first steps, and we must strive to investigate it more effectively, as intellectual capital is a prerequisite for having a sustainable and successful business in the knowledge management era.

This study has focused on the impact of female leaders and IC in large companies in the UK, which has provided holistic insight. Further studies could conduct research based on each sector separately to have a deep analysis.

Furthermore, further research could include R&D expenditure and intellectual property in their IC calculation as they contribute massively towards the success of business (Chang, 2007).

This study applied the VAIC methodology to calculate IC, which required secondary data; in further studies, it might be beneficial to combine or compare the information with some other qualitative data to provide deep knowledge from inside companies about the way companies have been managed. Although the secondary data are more objective and reliable, the value of interviews with high-ranking leaders, managers or even lower-cadre employees themselves as a source of human assets is undeniable. This would allow researchers to obtain a deeper understanding of the strategies, policies and other intangible assets of the businesses to measure the level of their IC. This study might be the first study to test the impact of female leaders on intellectual capital; however, it would be beneficial to test the impact of female leaders on IC based on industries in larger or even smaller companies.

For further research, it would be effective to combine IC with other domains such as finance, hospitality, psychology, computer science, music engineering, university industries and so forth, or female director studies could even be tested in different areas to get more insight into this domain as well.

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Appendices

Following parts present the sample of data set for the empirical studies:

Please note due to the large amount of data only two or three years are presented

Regression Analysis, SPSS, Intellectual Capital and Performance study

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA18
  /METHOD=ENTER HCE18 SCE18 CEE18 LEV18 TA18 NEmp18.
```

Regression

Notes

Output Created		12-NOV-2018 17:31:37
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA18 /METHOD=ENTER HCE18 SCE18 CEE18 LEV18 TA18 NEmp18.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.05
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp18, SCE18, HCE18, LEV18, TA18, CEE18[b]	.	Enter

a. Dependent Variable: ROA18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.261[a]	.068	.043	15.72067	.068	2.748	6	226	.013

a. Predictors: (Constant), NEmp18, SCE18, HCE18, LEV18, TA18, CEE18

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4075.489	6	679.248	2.748	.013[b]
	Residual	55853.530	226	247.140		
	Total	59929.019	232			

a. Dependent Variable: ROA18

b. Predictors: (Constant), NEmp18, SCE18, HCE18, LEV18, TA18, CEE18

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	5.993	2.213		2.708	.007
	HCE18	.520	.279	.124	1.865	.063
	SCE18	-1.521	1.326	-.075	-1.147	.253

CEE18	7.451	2.565	.203	2.905	.004
LEV18	-.019	.012	-.104	-1.587	.114
TA18	1.397E-8	.000	.024	.363	.717
NEmp18	-2.016E-5	.000	-.083	-1.184	.238

a. Dependent Variable: ROA18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER HCE18 SCE18 CEE18 LEV18 TA18 NEmp18.
```

Regression

Notes

Output Created		12-NOV-2018 17:32:20
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER HCE18 SCE18 CEE18 LEV18 TA18 NEmp18.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.05
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp18, SCE18, HCE18, LEV18, TA18, CEE18[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

					Change Statistics	
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change
1	.208[a]	.043	.018	4.06653	.043	1.702

Model Summary

	Change Statistics		
Model	df1	df2	Sig. F Change
1	6	226	.121

a. Predictors: (Constant), NEmp18, SCE18, HCE18, LEV18, TA18, CEE18

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	168.894	6	28.149	1.702	.121[b]
	Residual	3737.283	226	16.537		
	Total	3906.176	232			

a. Dependent Variable: TOB18

b. Predictors: (Constant), NEmp18, SCE18, HCE18, LEV18, TA18, CEE18

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.305	.572		2.280	.024
	HCE18	.054	.072	.051	.749	.455
	SCE18	.177	.343	.034	.516	.606
	CEE18	1.502	.663	.160	2.263	.025
	LEV18	-.005	.003	-.105	-1.578	.116
	TA18	-6.458E-9	.000	-.044	-.648	.517
	NEmp18	-4.217E-6	.000	-.068	-.958	.339

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE18
  /METHOD=ENTER HCE18 SCE18 CEE18 LEV18 TA18 NEmp18.
```

Regression

Notes

Output Created	12-NOV-2018 17:32:59

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER HCE18 SCE18 CEE18 LEV18 TA18 NEmp18.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp18, SCE18, HCE18, LEV18, TA18, CEE18[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.417[a]	.174	.152	22.09955	.174	7.928

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	226	.000

a. Predictors: (Constant), NEmp18, SCE18, HCE18, LEV18, TA18, CEE18

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23232.644	6	3872.107	7.928	.000[b]
	Residual	110376.140	226	488.390		
	Total	133608.785	232			

a. Dependent Variable: ROE18

b. Predictors: (Constant), NEmp18, SCE18, HCE18, LEV18, TA18, CEE18

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.784	3.111		3.466	.001
	HCE18	.441	.392	.071	1.126	.261
	SCE18	-8.108	1.865	-.269	-4.349	.000
	CEE18	12.222	3.605	.223	3.390	.001
	LEV18	.052	.017	.194	3.139	.002
	TA18	7.782E-8	.000	.091	1.438	.152
	NEmp18	-1.127E-5	.000	-.031	-.471	.638

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
```

```
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT PE18
/METHOD=ENTER HCE18 SCE18 CEE18 LEV18 TA18 NEmp18.
```

Regression

Notes

Output Created		12-NOV-2018 17:33:31
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER HCE18 SCE18 CEE18 LEV18 TA18 NEmp18.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.06
	Memory Required	6356 bytes

Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp18, SCE18, HCE18, LEV18, TA18, CEE18[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change
1	.189[a]	.036	.010	22.82747	.036	1.388

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	6	226	.220

a. Predictors: (Constant), NEmp18, SCE18, HCE18, LEV18, TA18, CEE18

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4339.171	6	723.195	1.388	.220[b]
	Residual	117767.131	226	521.094		
	Total	122106.302	232			

a. Dependent Variable: PE18

b. Predictors: (Constant), NEmp18, SCE18, HCE18, LEV18, TA18, CEE18

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	27.411	3.214		8.530	.000
	HCE18	-.798	.405	-.133	-1.970	.050
	SCE18	-2.302	1.926	-.080	-1.195	.233
	CEE18	-2.382	3.724	-.045	-.640	.523
	LEV18	.018	.017	.072	1.082	.280
	TA18	-4.738E-8	.000	-.058	-.847	.398
	NEmp18	-1.626E-5	.000	-.047	-.658	.511

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA18
  /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
```

Regression

Notes

Output Created		12-NOV-2018 17:35:15
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA18 /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, HCE17, LEV17, CEE17, TA17, SCE17[b]	.	Enter

a. Dependent Variable: ROA18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change
1	.231[a]	.053	.028	15.84328	.053	2.125

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	6	226	.051

a. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3200.901	6	533.484	2.125	.051[b]
	Residual	56728.117	226	251.009		
	Total	59929.019	232			

a. Dependent Variable: ROA18

b. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.774	2.703		.656	.512
	HCE17	.072	.280	.018	.258	.797
	SCE17	10.808	4.415	.183	2.448	.015
	CEE17	4.759	1.888	.173	2.520	.012
	LEV17	-.005	.009	-.038	-.576	.565
	TA17	-2.403E-8	.000	-.043	-.630	.530
	NEmp17	-7.432E-6	.000	-.030	-.433	.665

a. Dependent Variable: ROA18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
```

Regression

Notes

Output Created	12-NOV-2018 17:35:56

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.05
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, HCE17, LEV17, CEE17, TA17, SCE17[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.193[a]	.037	.012	4.07938	.037	1.454

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	226	.195

a. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	145.226	6	24.204	1.454	.195[b]
	Residual	3760.951	226	16.641		
	Total	3906.176	232			

a. Dependent Variable: TOB18

b. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.091	.696		1.567	.118
	HCE17	.007	.072	.007	.093	.926
	SCE17	1.344	1.137	.089	1.182	.238
	CEE17	.908	.486	.129	1.868	.063
	LEV17	-.003	.002	-.098	-1.485	.139
	TA17	-8.272E-9	.000	-.057	-.842	.401
	NEmp17	-2.641E-6	.000	-.042	-.598	.550

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
```

```
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT ROE18
/METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
```

Regression

Notes

Output Created		12-NOV-2018 17:36:27
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.05
	Memory Required	6356 bytes

Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, HCE17, LEV17, CEE17, TA17, SCE17[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.344[a]	.118	.095	22.83106	.118	5.053

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	226	.000

a. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15804.590	6	2634.098	5.053	.000[b]
	Residual	117804.194	226	521.257		
	Total	133608.785	232			

a. Dependent Variable: ROE18

b. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.286	3.895		1.357	.176
	HCE17	-.153	.403	-.026	-.380	.705
	SCE17	9.210	6.363	.104	1.447	.149
	CEE17	7.664	2.721	.186	2.817	.005
	LEV17	.056	.012	.287	4.525	.000
	TA17	-1.351E-8	.000	-.016	-.246	.806
	NEmp17	1.481E-5	.000	.040	.599	.550

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
```

Regression

Notes

Output Created		12-NOV-2018 17:37:03
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
Resources	Processor Time	00:00:00.08
	Elapsed Time	00:00:00.05
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, HCE17, LEV17, CEE17, TA17, SCE17[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

					Change Statistics	
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change
1	.209[a]	.044	.018	22.72858	.044	1.728

Model Summary

	Change Statistics		
Model	df1	df2	Sig. F Change
1	6	226	.115

a. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5357.360	6	892.893	1.728	.115[b]
	Residual	116748.941	226	516.588		
	Total	122106.302	232			

a. Dependent Variable: PE18

b. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	32.864	3.878		8.475	.000
	HCE17	-.162	.402	-.029	-.404	.687
	SCE17	-16.728	6.334	-.198	-2.641	.009
	CEE17	-.990	2.709	-.025	-.366	.715
	LEV17	.000	.012	.003	.039	.969
	TA17	-2.246E-8	.000	-.028	-.410	.682
	NEmp17	-2.509E-5	.000	-.071	-1.020	.309

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA17
  /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
```

Regression

Notes

Output Created	12-NOV-2018 17:38:37

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA17 /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, HCE17, LEV17, CEE17, TA17, SCE17[b]	.	Enter

a. Dependent Variable: ROA17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change
1	.291[a]	.085	.060	16.25840	.085	3.488

Model Summary

Model	Change Statistics: df1	df2	Sig. F Change
1	6	226	.003

a. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5531.241	6	921.873	3.488	.003[b]
	Residual	59739.806	226	264.335		
	Total	65271.047	232			

a. Dependent Variable: ROA17

b. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

Coefficients[a]

Model		Unstandardized Coefficients: B	Std. Error	Standardized Coefficients: Beta	t	Sig.
1	(Constant)	-.163	2.774		-.059	.953
	HCE17	.161	.287	.039	.560	.576
	SCE17	12.940	4.531	.210	2.856	.005
	CEE17	5.695	1.938	.198	2.939	.004
	LEV17	-.014	.009	-.102	-1.581	.115
	TA17	-4.474E-8	.000	-.076	-1.142	.255
	NEmp17	-2.818E-6	.000	-.011	-.160	.873

a. Dependent Variable: ROA17

```
REGRESSION
  /MISSING LISTWISE
```

```
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT TOB17
/METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
```

Regression

Notes

Output Created		12-NOV-2018 17:39:00
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB17 /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.06
	Memory Required	6356 bytes

Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, HCE17, LEV17, CEE17, TA17, SCE17[b]	.	Enter

a. Dependent Variable: TOB17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.202[a]	.041	.015	4.01777	.041	1.600

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	226	.148

a. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	154.992	6	25.832	1.600	.148[b]
	Residual	3648.206	226	16.143		
	Total	3803.198	232			

a. Dependent Variable: TOB17

b. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.624	.685		.911	.363
	HCE17	.004	.071	.004	.057	.954
	SCE17	1.822	1.120	.122	1.627	.105
	CEE17	1.012	.479	.146	2.114	.036
	LEV17	-.003	.002	-.086	-1.301	.194
	TA17	-7.562E-9	.000	-.053	-.781	.435
	NEmp17	-1.930E-6	.000	-.031	-.444	.658

a. Dependent Variable: TOB17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE17
  /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
```

Regression

Notes

Output Created		12-NOV-2018 17:40:12
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE17 /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.02
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, HCE17, LEV17, CEE17, TA17, SCE17[b]	.	Enter

a. Dependent Variable: ROE17

b. All requested variables entered.

Model Summary

					Change Statistics	
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change
1	.183[a]	.033	.008	39.47439	.033	1.300

Model Summary

	Change Statistics		
Model	df1	df2	Sig. F Change
1	6	226	.258

a. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12153.258	6	2025.543	1.300	.258[b]
	Residual	352159.477	226	1558.228		
	Total	364312.735	232			

a. Dependent Variable: ROE17

b. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.229	6.735		.034	.973
	HCE17	-.159	.698	-.016	-.229	.819
	SCE17	10.574	11.001	.072	.961	.337
	CEE17	8.952	4.704	.132	1.903	.058
	LEV17	.040	.021	.123	1.848	.066
	TA17	-4.959E-8	.000	-.036	-.522	.602
	NEmp17	1.288E-5	.000	.021	.301	.763

a. Dependent Variable: ROE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE17
  /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
```

Regression

Notes

Output Created	12-NOV-2018 17:40:38

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE17 /METHOD=ENTER HCE17 SCE17 CEE17 LEV17 TA17 NEmp17.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, HCE17, LEV17, CEE17, TA17, SCE17[b]	.	Enter

a. Dependent Variable: PE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change
1	.159[a]	.025	-.001	35.58988	.025	.974

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	6	226	.444

a. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7399.905	6	1233.318	.974	.444[b]
	Residual	286260.574	226	1266.640		
	Total	293660.480	232			

a. Dependent Variable: PE17

b. Predictors: (Constant), NEmp17, HCE17, LEV17, CEE17, TA17, SCE17

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	38.660	6.072		6.367	.000
	HCE17	.307	.629	.035	.488	.626
	SCE17	-20.635	9.918	-.158	-2.080	.039
	CEE17	-3.684	4.241	-.060	-.869	.386
	LEV17	.018	.019	.062	.936	.350
	TA17	5.068E-8	.000	.041	.591	.555
	NEmp17	-3.763E-5	.000	-.069	-.977	.330

a. Dependent Variable: PE17

```
REGRESSION
  /MISSING LISTWISE
```

```
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT ROA17
/METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
```

Regression

Notes

Output Created		12-NOV-2018 17:42:02
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA17 /METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	6356 bytes

Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp16, SCE16, CEE16, LEV16, HCE16, TA16[b]	.	Enter

a. Dependent Variable: ROA17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.224[a]	.050	.025	16.59552	.050	1.975

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	225	.070

a. Predictors: (Constant), NEmp16, SCE16, CEE16, LEV16, HCE16, TA16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3264.271	6	544.045	1.975	.070[b]
	Residual	61967.545	225	275.411		
	Total	65231.816	231			

a. Dependent Variable: ROA17

b. Predictors: (Constant), NEmp16, SCE16, CEE16, LEV16, HCE16, TA16

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	6.947	2.080		3.341	.001
	HCE16	.174	.298	.040	.584	.560
	SCE16	1.038	1.886	.037	.550	.583
	CEE16	3.593	1.797	.135	1.999	.047
	LEV16	-.020	.010	-.137	-2.050	.042
	TA16	-5.122E-8	.000	-.066	-.963	.337
	NEmp16	-8.741E-6	.000	-.035	-.499	.618

a. Dependent Variable: ROA17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB17
  /METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
```

Regression

Notes

Output Created		12-NOV-2018 17:42:34
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB17 /METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.04
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp16, SCE16, CEE16, LEV16, HCE16, TA16[b]	.	Enter

a. Dependent Variable: TOB17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.192[a]	.037	.011	4.03439	.037	1.428

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	225	.205

a. Predictors: (Constant), NEmp16, SCE16, CEE16, LEV16, HCE16, TA16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	139.482	6	23.247	1.428	.205[b]
	Residual	3662.168	225	16.276		
	Total	3801.650	231			

a. Dependent Variable: TOB17

b. Predictors: (Constant), NEmp16, SCE16, CEE16, LEV16, HCE16, TA16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.659	.506		3.282	.001
	HCE16	.024	.072	.023	.333	.740
	SCE16	.182	.459	.027	.397	.692
	CEE16	.636	.437	.099	1.455	.147
	LEV16	-.005	.002	-.135	-2.006	.046
	TA16	-9.437E-9	.000	-.050	-.730	.466
	NEmp16	-2.017E-6	.000	-.033	-.473	.636

a. Dependent Variable: TOB17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE17
  /METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
```

Regression

Notes

Output Created	12-NOV-2018 17:43:52

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE17 /METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.04
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp16, SCE16, CEE16, LEV16, HCE16, TA16[b]	.	Enter

a. Dependent Variable: ROE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.356[a]	.127	.104	37.59279	.127	5.455

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	225	.000

a. Predictors: (Constant), NEmp16, SCE16, CEE16, LEV16, HCE16, TA16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46252.824	6	7708.804	5.455	.000[b]
	Residual	317973.992	225	1413.218		
	Total	364226.816	231			

a. Dependent Variable: ROE17

b. Predictors: (Constant), NEmp16, SCE16, CEE16, LEV16, HCE16, TA16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.999	4.711		.212	.832
	HCE16	-.293	.674	-.028	-.434	.664
	SCE16	.085	4.273	.001	.020	.984
	CEE16	6.208	4.071	.098	1.525	.129
	LEV16	.118	.022	.345	5.385	.000
	TA16	-5.210E-8	.000	-.028	-.432	.666
	NEmp16	-2.461E-5	.000	-.042	-.620	.536

a. Dependent Variable: ROE17

```
REGRESSION
  /MISSING LISTWISE
```

```
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT PE17
/METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
```

Regression

Notes

Output Created		12-NOV-2018 17:44:28
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE17 /METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.04
	Memory Required	6356 bytes

Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp16, SCE16, CEE16, LEV16, HCE16, TA16[b]	.	Enter

a. Dependent Variable: PE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	Change Statistics: F Change
1	.158[a]	.025	-.001	35.67474	.025	.956

Model Summary

Model	Change Statistics: df1	Change Statistics: df2	Change Statistics: Sig. F Change
1	6	225	.456

a. Predictors: (Constant), NEmp16, SCE16, CEE16, LEV16, HCE16, TA16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7298.312	6	1216.385	.956	.456[b]
	Residual	286354.649	225	1272.687		
	Total	293652.961	231			

a. Dependent Variable: PE17

b. Predictors: (Constant), NEmp16, SCE16, CEE16, LEV16, HCE16, TA16

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	25.460	4.470		5.695	.000
	HCE16	1.325	.640	.143	2.071	.039
	SCE16	-2.656	4.055	-.045	-.655	.513
	CEE16	-.922	3.863	-.016	-.239	.812
	LEV16	.016	.021	.053	.790	.431
	TA16	4.854E-8	.000	.029	.424	.672
	NEmp16	-1.897E-5	.000	-.036	-.504	.615

a. Dependent Variable: PE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
```

Regression

Notes

Output Created		12-NOV-2018 17:44:57
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER HCE16 SCE16 CEE16 LEV16 TA16 NEmp16.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.03
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp16, SCE16, CEE16, LEV16, HCE16, TA16[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Notes

Output Created		12-NOV-2018 18:51:57
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB13 /METHOD=ENTER LEV13 TA13 NEmp13 VAIC13.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.04
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC13, LEV13, NEmp13, TA13[b]	.	Enter

a. Dependent Variable: TOB13

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change
1	.212[a]	.045	.028	2.62645	.045	2.669

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	4	228	.033

a. Predictors: (Constant), VAIC13, LEV13, NEmp13, TA13

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	73.650	4	18.412	2.669	.033[b]
	Residual	1572.804	228	6.898		
	Total	1646.454	232			

a. Dependent Variable: TOB13

b. Predictors: (Constant), VAIC13, LEV13, NEmp13, TA13

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.758	.300		5.852	.000
	LEV13	-.004	.001	-.163	-2.508	.013
	TA13	-1.097E-8	.000	-.090	-1.358	.176
	NEmp13	-1.993E-6	.000	-.066	-.988	.324
	VAIC13	.052	.059	.058	.889	.375

a. Dependent Variable: TOB13

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE13
  /METHOD=ENTER LEV13 TA13 NEmp13 VAIC13.
```

Regression

Notes

Output Created	12-NOV-2018 18:52:26

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE13 /METHOD=ENTER LEV13 TA13 NEmp13 VAIC13.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC13, LEV13, NEmp13, TA13[b]	.	Enter

a. Dependent Variable: ROE13

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.120[a]	.014	-.003	63.04850	.014	.838

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.502

a. Predictors: (Constant), VAIC13, LEV13, NEmp13, TA13

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13328.165	4	3332.041	.838	.502[b]
	Residual	906325.816	228	3975.113		
	Total	919653.981	232			

a. Dependent Variable: ROE13

b. Predictors: (Constant), VAIC13, LEV13, NEmp13, TA13

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.101	7.210		1.817	.071
	LEV13	.020	.034	.039	.596	.551
	TA13	-8.936E-8	.000	-.031	-.461	.645
	NEmp13	-3.114E-5	.000	-.043	-.643	.521
	VAIC13	2.108	1.416	.098	1.489	.138

a. Dependent Variable: ROE13

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE13
  /METHOD=ENTER LEV13 TA13 NEmp13 VAIC13.
```

Regression

Notes

Output Created		12-NOV-2018 18:52:51
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE13 /METHOD=ENTER LEV13 TA13 NEmp13 VAIC13.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC13, LEV13, NEmp13, TA13[b]	.	Enter

a. Dependent Variable: PE13

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.185[a]	.034	.017	22.91840	.034	2.028

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.091

a. Predictors: (Constant), VAIC13, LEV13, NEmp13, TA13

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4260.353	4	1065.088	2.028	.091[b]
	Residual	119757.703	228	525.253		
	Total	124018.056	232			

a. Dependent Variable: PE13

b. Predictors: (Constant), VAIC13, LEV13, NEmp13, TA13

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	24.265	2.621		9.259	.000
	LEV13	.001	.012	.006	.089	.929
	TA13	-7.845E-8	.000	-.074	-1.113	.267
	NEmp13	2.551E-5	.000	.097	1.449	.149
	VAIC13	-1.096	.515	-.139	-2.129	.034

a. Dependent Variable: PE13

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA14
  /METHOD=ENTER LEV14 NEmp14 TA14 VAIC14.
```

Regression

Notes

Output Created		12-NOV-2018 18:53:41
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA14 /METHOD=ENTER LEV14 NEmp14 TA14 VAIC14.

Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC14, TA14, LEV14, NEmp14[b]	.	Enter

a. Dependent Variable: ROA14

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.161[a]	.026	.009	15.77724	.026	1.509

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.201

a. Predictors: (Constant), VAIC14, TA14, LEV14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1502.080	4	375.520	1.509	.201[b]
	Residual	56754.041	228	248.921		
	Total	58256.120	232			

a. Dependent Variable: ROA14

b. Predictors: (Constant), VAIC14, TA14, LEV14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.654	1.633		5.298	.000
	LEV14	-.008	.009	-.062	-.944	.346
	NEmp14	-1.087E-5	.000	-.063	-.938	.349
	TA14	-4.663E-8	.000	-.064	-.958	.339
	VAIC14	.405	.256	.104	1.582	.115

a. Dependent Variable: ROA14

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB14
  /METHOD=ENTER LEV14 NEmp14 TA14 VAIC14.
```

Regression

Notes

Output Created		12-NOV-2018 18:53:58
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB14 /METHOD=ENTER LEV14 NEmp14 TA14 VAIC14.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.02
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC14, TA14, LEV14, NEmp14[b]	.	Enter

a. Dependent Variable: TOB14

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.148[a]	.022	.005	4.89932	.022	1.270

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.282

a. Predictors: (Constant), VAIC14, TA14, LEV14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	121.961	4	30.490	1.270	.282[b]
	Residual	5472.758	228	24.003		
	Total	5594.719	232			

a. Dependent Variable: TOB14

b. Predictors: (Constant), VAIC14, TA14, LEV14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.434	.507		4.800	.000
	LEV14	-.004	.003	-.105	-1.602	.111
	NEmp14	-2.895E-6	.000	-.054	-.805	.422
	TA14	-1.515E-8	.000	-.067	-1.003	.317
	VAIC14	.026	.079	.021	.322	.748

a. Dependent Variable: TOB14

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE14
  /METHOD=ENTER LEV14 NEmp14 TA14 VAIC14.
```

Regression

Notes

Output Created		12-NOV-2018 18:54:27
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE14 /METHOD=ENTER LEV14 NEmp14 TA14 VAIC14.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.05
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC14, TA14, LEV14, NEmp14[b]	.	Enter

a. Dependent Variable: ROE14

b. All requested variables entered.

Model Summary

					Change Statistics	
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change
1	.189[a]	.036	.019	68.74294	.036	2.121

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	4	228	.079

a. Predictors: (Constant), VAIC14, TA14, LEV14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	40088.048	4	10022.012	2.121	.079[b]
	Residual	1077434.901	228	4725.592		
	Total	1117522.949	232			

a. Dependent Variable: ROE14

b. Predictors: (Constant), VAIC14, TA14, LEV14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	21.268	7.116		2.989	.003
	LEV14	.103	.039	.172	2.638	.009
	NEmp14	-5.139E-5	.000	-.068	-1.018	.310
	TA14	-1.471E-7	.000	-.046	-.694	.489
	VAIC14	.357	1.115	.021	.320	.749

a. Dependent Variable: ROE14

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE14
  /METHOD=ENTER LEV14 NEmp14 TA14 VAIC14.
```

Regression

Notes

Output Created		12-NOV-2018 18:54:44
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE14 /METHOD=ENTER LEV14 NEmp14 TA14 VAIC14.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.05
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC14, TA14, LEV14, NEmp14[b]	.	Enter

a. Dependent Variable: PE14

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	Change Statistics: F Change
1	.222[a]	.049	.033	13.18418	.049	2.952

Model Summary

Model	Change Statistics: df1	Change Statistics: df2	Change Statistics: Sig. F Change
1	4	228	.021

a. Predictors: (Constant), VAIC14, TA14, LEV14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2052.593	4	513.148	2.952	.021[b]
	Residual	39631.576	228	173.823		
	Total	41684.169	232			

a. Dependent Variable: PE14

b. Predictors: (Constant), VAIC14, TA14, LEV14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients: B	Unstandardized Coefficients: Std. Error	Standardized Coefficients: Beta	t	Sig.
1	(Constant)	25.019	1.365		18.331	.000
	LEV14	-.017	.007	-.145	-2.233	.027
	NEmp14	7.453E-7	.000	.005	.077	.939
	TA14	-6.656E-8	.000	-.108	-1.636	.103
	VAIC14	-.420	.214	-.127	-1.964	.051

a. Dependent Variable: PE14

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
```

```
/DEPENDENT ROA15
/METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
```

Regression

Notes

Output Created		12-NOV-2018 18:56:24
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA15 /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: ROA15

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	Change Statistics: F Change
1	.245[a]	.060	.043	17.84370	.060	3.630

Model Summary

Model	Change Statistics: df1	Change Statistics: df2	Change Statistics: Sig. F Change
1	4	228	.007

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4623.576	4	1155.894	3.630	.007[b]
	Residual	72594.651	228	318.398		
	Total	77218.227	232			

a. Dependent Variable: ROA15

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients: B	Unstandardized Coefficients: Std. Error	Standardized Coefficients: Beta	t	Sig.
1	(Constant)	8.594	1.645		5.224	.000
	LEV15	-.019	.009	-.136	-2.108	.036
	TA15	-5.918E-8	.000	-.071	-1.091	.276

NEmp15	-1.066E-5	.000	-.056	-.852	.395
VAIC15	.652	.235	.179	2.777	.006

a. Dependent Variable: ROA15

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB15
  /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
```

Regression

Notes

Output Created		12-NOV-2018 18:57:00
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB15 /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: TOB15

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.189[a]	.036	.019	3.55962	.036	2.106

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.081

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	106.758	4	26.690	2.106	.081[b]
	Residual	2888.971	228	12.671		
	Total	2995.729	232			

a. Dependent Variable: TOB15

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.180	.328		6.642	.000
	LEV15	-.004	.002	-.144	-2.212	.028
	TA15	-1.349E-8	.000	-.082	-1.247	.214
	NEmp15	-2.130E-6	.000	-.057	-.853	.394
	VAIC15	.030	.047	.042	.642	.521

a. Dependent Variable: TOB15

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE15
  /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
```

Regression

Notes

Output Created		12-NOV-2018 18:57:33
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE15 /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: ROE15

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.095[a]	.009	-.008	62.06237	.009	.520

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	4	228	.721

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8005.931	4	2001.483	.520	.721[b]
	Residual	878196.169	228	3851.738		
	Total	886202.100	232			

a. Dependent Variable: ROE15

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	15.274	5.722		2.669	.008
	LEV15	.022	.031	.048	.720	.473
	TA15	-8.725E-8	.000	-.031	-.462	.644
	NEmp15	-3.063E-5	.000	-.047	-.704	.482
	VAIC15	.703	.816	.057	.862	.390

a. Dependent Variable: ROE15

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE15
  /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
```

Regression

Notes

Output Created		12-NOV-2018 18:58:00
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE15 /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.06
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: PE15

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.272[a]	.074	.058	33.48326	.074	4.558

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.001

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20438.774	4	5109.694	4.558	.001[b]
	Residual	255617.353	228	1121.129		
	Total	276056.128	232			

a. Dependent Variable: PE15

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	33.736	3.087		10.929	.000
	LEV15	-.064	.017	-.245	-3.824	.000
	TA15	-2.762E-8	.000	-.018	-.271	.786
	NEmp15	-1.049E-5	.000	-.029	-.447	.655
	VAIC15	-.687	.440	-.100	-1.560	.120

a. Dependent Variable: PE15

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
```

```
  /DEPENDENT PE17
  /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
```

Regression

Notes

Output Created		12-NOV-2018 18:58:23
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE17 /METHOD=ENTER LEV15 TA15 NEmp15 VAIC15.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: PE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.114[a]	.013	-.004	35.65457	.013	.750

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.559

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3815.804	4	953.951	.750	.559[b]
	Residual	289844.676	228	1271.249		
	Total	293660.480	232			

a. Dependent Variable: PE17

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26.280	3.287		7.995	.000
	LEV15	.006	.018	.024	.356	.722
	TA15	4.470E-8	.000	.028	.412	.680

NEmp15	-2.005E-5	.000	-.054	-.802	.423
VAIC15	.669	.469	.094	1.426	.155

a. Dependent Variable: PE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA16
  /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
```

Regression

Notes

Output Created		12-NOV-2018 18:59:34
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA16 /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: ROA16

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.235[a]	.055	.038	17.00872	.055	3.310

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	227	.012

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3829.934	4	957.483	3.310	.012[b]
	Residual	65670.353	227	289.297		
	Total	69500.287	231			

a. Dependent Variable: ROA16

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.385	1.832		4.577	.000
	LEV16	-.021	.010	-.143	-2.179	.030
	NEmp16	-9.297E-6	.000	-.036	-.527	.599
	TA16	-6.327E-8	.000	-.079	-1.175	.241
	VAIC16	.598	.283	.137	2.114	.036

a. Dependent Variable: ROA16

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB16
  /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
```

Regression

Notes

Output Created		12-NOV-2018 19:00:10
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB16 /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: TOB16

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change
1	.150[a]	.023	.005	5.26431	.023	1.315

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	4	227	.265

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	145.748	4	36.437	1.315	.265[b]
	Residual	6290.853	227	27.713		
	Total	6436.601	231			

a. Dependent Variable: TOB16

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.246	.567		3.961	.000
	LEV16	-.005	.003	-.114	-1.710	.089
	NEmp16	-1.836E-6	.000	-.023	-.336	.737
	TA16	-1.519E-8	.000	-.062	-.912	.363
	VAIC16	.058	.088	.044	.664	.508

a. Dependent Variable: TOB16

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE16
  /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
```

Regression

Notes

Output Created		12-NOV-2018 19:00:40
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE16 /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: ROE16

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.063[a]	.004	-.014	51.25187	.004	.229

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	227	.922

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2401.542	4	600.385	.229	.922[b]
	Residual	596273.181	227	2626.754		
	Total	598674.723	231			

a. Dependent Variable: ROE16

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.991	5.520		2.353	.019
	LEV16	-.027	.030	-.060	-.893	.373
	NEmp16	2.028E-5	.000	.027	.381	.703
	TA16	-3.197E-8	.000	-.014	-.197	.844
	VAIC16	.156	.853	.012	.183	.855

a. Dependent Variable: ROE16

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
```

```
/DEPENDENT PE16
/METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
```

Regression

Notes

Output Created		12-NOV-2018 19:00:59
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE16 /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.04
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: PE16

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.418[a]	.175	.160	40.67414	.175	12.038

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	227	.000

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79659.784	4	19914.946	12.038	.000[b]
	Residual	375545.633	227	1654.386		
	Total	455205.416	231			

a. Dependent Variable: PE16

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	28.490	4.381		6.503	.000
	LEV16	-.006	.024	-.017	-.273	.785
	NEmp16	.000	.000	.421	6.602	.000

TA16	-2.316E-7	.000	-.113	-1.799	.073
VAIC16	-.887	.677	-.079	-1.310	.192

a. Dependent Variable: PE16

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE17
  /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
```

Regression

Notes

Output Created		12-NOV-2018 19:01:19
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE17 /METHOD=ENTER LEV16 NEmp16 TA16 VAIC16.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: PE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.141[a]	.020	.003	35.60720	.020	1.153

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	227	.333

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5845.873	4	1461.468	1.153	.333[b]
	Residual	287807.088	227	1267.873		
	Total	293652.961	231			

a. Dependent Variable: PE17

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	23.259	3.835		6.064	.000
	LEV16	.019	.021	.062	.928	.355
	NEmp16	-2.165E-5	.000	-.041	-.586	.558
	TA16	5.213E-8	.000	.032	.463	.644
	VAIC16	1.102	.592	.123	1.861	.064

a. Dependent Variable: PE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA17
  /METHOD=ENTER LEV17 TA17 NEmp17 VAIC17.
```

Regression

Notes

Output Created		12-NOV-2018 19:02:07
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA17 /METHOD=ENTER LEV17 TA17 NEmp17 VAIC17.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.02
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC17, TA17, LEV17, NEmp17[b]	.	Enter

a. Dependent Variable: ROA17

b. All requested variables entered.

Model Summary

					Change Statistics	
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change
1	.189[a]	.036	.019	16.61605	.036	2.102

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	4	228	.081

a. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2321.854	4	580.463	2.102	.081[b]
	Residual	62949.193	228	276.093		
	Total	65271.047	232			

a. Dependent Variable: ROA17

b. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	7.236	1.697		4.264	.000
	LEV17	-.015	.009	-.108	-1.642	.102
	TA17	-4.401E-8	.000	-.075	-1.115	.266
	NEmp17	-4.647E-6	.000	-.018	-.267	.790
	VAIC17	.495	.265	.122	1.865	.064

a. Dependent Variable: ROA17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB17
  /METHOD=ENTER LEV17 TA17 NEmp17 VAIC17.
```

Regression

Notes

Output Created		12-NOV-2018 19:02:29
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB17 /METHOD=ENTER LEV17 TA17 NEmp17 VAIC17.
Resources	Processor Time	00:00:00.09
	Elapsed Time	00:00:00.05
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC17, TA17, LEV17, NEmp17[b]	.	Enter

a. Dependent Variable: TOB17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.133[a]	.018	.000	4.04788	.018	1.027

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.394

a. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.339	4	16.835	1.027	.394[b]
	Residual	3735.859	228	16.385		
	Total	3803.198	232			

a. Dependent Variable: TOB17

b. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.770	.413		4.281	.000
	LEV17	-.003	.002	-.091	-1.370	.172
	TA17	-8.049E-9	.000	-.057	-.837	.403
	NEmp17	-1.828E-6	.000	-.030	-.430	.667
	VAIC17	.051	.065	.052	.795	.428

a. Dependent Variable: TOB17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
```

```
/DEPENDENT ROE17
/METHOD=ENTER LEV17 TA17 NEmp17 VAIC17.
```

Regression

Notes

Output Created		12-NOV-2018 19:02:56
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE17 /METHOD=ENTER LEV17 TA17 NEmp17 VAIC17.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC17, TA17, LEV17, NEmp17[b]	.	Enter

a. Dependent Variable: ROE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.130[a]	.017	.000	39.63657	.017	.973

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.423

a. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6111.612	4	1527.903	.973	.423[b]
	Residual	358201.123	228	1571.058		
	Total	364312.735	232			

a. Dependent Variable: ROE17

b. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.325	4.049		2.056	.041
	LEV17	.038	.022	.117	1.763	.079
	TA17	-6.092E-8	.000	-.044	-.647	.518

NEmp17	1.864E-5	.000	.031	.448	.654
VAIC17	.117	.633	.012	.185	.853

a. Dependent Variable: ROE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE17
  /METHOD=ENTER LEV17 TA17 NEmp17 VAIC17.
```

Regression

Notes

Output Created		12-NOV-2018 19:03:19
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE17 /METHOD=ENTER LEV17 TA17 NEmp17 VAIC17.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC17, TA17, LEV17, NEmp17[b]	.	Enter

a. Dependent Variable: PE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change
1	.080[a]	.006	-.011	35.77429	.006	.365

Model Summary

Model	Change Statistics: df1	df2	Sig. F Change
1	4	228	.834

a. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1866.123	4	466.531	.365	.834[b]
	Residual	291794.357	228	1279.800		
	Total	293660.480	232			

a. Dependent Variable: PE17

b. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	28.676	3.654		7.848	.000
	LEV17	.018	.019	.063	.944	.346
	TA17	3.589E-8	.000	.029	.422	.673
	NEmp17	-2.632E-5	.000	-.048	-.701	.484
	VAIC17	-.245	.572	-.028	-.429	.668

a. Dependent Variable: PE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA18
  /METHOD=ENTER LEV18 NEmp18 TA18 VAIC18.
```

Regression

Notes

Output Created		12-NOV-2018 19:04:09
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA18 /METHOD=ENTER LEV18 NEmp18 TA18 VAIC18.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC18, LEV18, TA18, NEmp18[b]	.	Enter

a. Dependent Variable: ROA18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.147[a]	.021	.004	16.03752	.021	1.251

Model Summary

Model	df1	df2	Sig. F Change
	Change Statistics		
1	4	228	.290

a. Predictors: (Constant), VAIC18, LEV18, TA18, NEmp18

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1286.919	4	321.730	1.251	.290[b]
	Residual	58642.100	228	257.202		
	Total	59929.019	232			

a. Dependent Variable: ROA18

b. Predictors: (Constant), VAIC18, LEV18, TA18, NEmp18

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.847	1.751		5.052	.000
	LEV18	-.020	.012	-.114	-1.707	.089
	NEmp18	-6.363E-6	.000	-.026	-.380	.704
	TA18	-7.316E-9	.000	-.013	-.189	.850
	VAIC18	.302	.272	.074	1.113	.267

a. Dependent Variable: ROA18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER LEV18 NEmp18 TA18 VAIC18.
```

Regression

Notes

Output Created		12-NOV-2018 19:04:31
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER LEV18 NEmp18 TA18 VAIC18.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC18, LEV18, TA18, NEmp18[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.150[a]	.022	.005	4.09236	.022	1.310

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.267

a. Predictors: (Constant), VAIC18, LEV18, TA18, NEmp18

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	87.768	4	21.942	1.310	.267[b]
	Residual	3818.408	228	16.747		
	Total	3906.176	232			

a. Dependent Variable: TOB18

b. Predictors: (Constant), VAIC18, LEV18, TA18, NEmp18

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.069	.447		4.630	.000
	LEV18	-.005	.003	-.111	-1.654	.099
	NEmp18	-1.707E-6	.000	-.028	-.399	.690
	TA18	-1.033E-8	.000	-.071	-1.048	.296
	VAIC18	.041	.069	.039	.588	.557

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
```

```
/DEPENDENT ROE18
/METHOD=ENTER LEV18 NEmp18 TA18 VAIC18.
```

Regression

Notes

Output Created		12-NOV-2018 19:05:02
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER LEV18 NEmp18 TA18 VAIC18.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC18, LEV18, TA18, NEmp18[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.205[a]	.042	.025	23.69331	.042	2.501

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	4	228	.043

a. Predictors: (Constant), VAIC18, LEV18, TA18, NEmp18

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5615.745	4	1403.936	2.501	.043[b]
	Residual	127993.040	228	561.373		
	Total	133608.785	232			

a. Dependent Variable: ROE18

b. Predictors: (Constant), VAIC18, LEV18, TA18, NEmp18

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	14.082	2.588		5.442	.000
	LEV18	.048	.018	.178	2.698	.008
	NEmp18	1.561E-5	.000	.043	.630	.529

TA18	3.632E-8	.000	.043	.636	.525
VAIC18	-.226	.401	-.037	-.564	.573

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER LEV18 NEmp18 TA18 VAIC18.
```

Regression Analysis, SPSS, Female Director and Intellectual Capital

```
GET
  FILE='C:\Users\elham\Desktop\DATA\Panel Data 3.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT HCE17
  /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
```

Regression

Notes

Output Created		16-AUG-2019 12:53:52
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav

	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT HCE17 /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.27
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

```
[DataSet1] C:\Users\elham\Desktop\DATA\Panel Data 3.sav
```

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17[b]	.	Enter

a. Dependent Variable: HCE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.199[a]	.040	.010	4.04011

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	152.023	7	21.718	1.331	.237[b]
	Residual	3672.554	225	16.322		
	Total	3824.577	232			

a. Dependent Variable: HCE17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-15.778	34.233		-.461	.645
	FNEx17	-.700	10.697	-.005	-.065	.948
	FEx17	57.250	72.179	.056	.793	.429
	FCeo17	165.562	107.916	.182	1.534	.126
	FCh17	-14.686	107.572	-.016	-.137	.892
	FDir17	7.951	136.357	.004	.058	.954
	TA17	3.314E-9	.000	.023	.344	.731
	NEmp17	-6.737E-6	.000	-.108	-1.593	.112

a. Dependent Variable: HCE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT SCE17
```

```
/METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
```

Regression

Notes

Output Created		17-AUG-2019 18:32:25
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT SCE17 /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.08
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17[b]	.	Enter

a. Dependent Variable: SCE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.306[a]	.094	.066	.26251

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.607	7	.230	3.330	.002[b]
	Residual	15.505	225	.069		
	Total	17.112	232			

a. Dependent Variable: SCE17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.372	2.224		.617	.538
	FNEx17	-.151	.695	-.015	-.217	.829
	FEx17	-7.823	4.690	-.114	-1.668	.097
	FCeo17	14.772	7.012	.243	2.107	.036

FCh17	-8.686	6.990	-.143	-1.243	.215
FDir17	-2.602	8.860	-.019	-.294	.769
TA17	1.363E-9	.000	.143	2.177	.031
NEmp17	-1.037E-6	.000	-.250	-3.775	.000

a. Dependent Variable: SCE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT CEE17
  /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
```

Regression

Notes

Output Created		17-AUG-2019 18:33:02
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT CEE17 /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.08
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17[b]	.	Enter

a. Dependent Variable: CEE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.295[a]	.087	.058	.56577

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.

1	Regression	6.841	7	.977	3.053	.004[b]
	Residual	72.022	225	.320		
	Total	78.862	232			

a. Dependent Variable: CEE17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-2.327	4.794		-.485	.628
	FNEx17	-2.869	1.498	-.132	-1.915	.057
	FEx17	10.809	10.108	.074	1.069	.286
	FCeo17	-4.162	15.112	-.032	-.275	.783
	FCh17	-14.246	15.064	-.109	-.946	.345
	FDir17	16.528	19.095	.056	.866	.388
	TA17	-3.017E-9	.000	-.147	-2.235	.026
	NEmp17	1.458E-6	.000	.163	2.463	.015

a. Dependent Variable: CEE17

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	143.713	7	20.530	1.215	.296[b]
	Residual	3802.920	225	16.902		
	Total	3946.633	232			

a. Dependent Variable: VAIC17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.191[a]	.036	.006	4.11119

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-16.734	34.835		-.480	.631
	FNEx17	-3.720	10.885	-.024	-.342	.733
	FEx17	60.236	73.448	.058	.820	.413
	FCeo17	176.173	109.815	.191	1.604	.110
	FCh17	-37.618	109.464	-.041	-.344	.731
	FDir17	21.877	138.756	.010	.158	.875
	TA17	1.660E-9	.000	.011	.169	.866
	NEmp17	-6.316E-6	.000	-.100	-1.468	.144

a. Dependent Variable: VAIC17

```
GET
  FILE='C:\Users\elham\Desktop\DATA\Panel Data 3.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT HCE17
  /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
```

Regression

Notes

Output Created		16-AUG-2019 12:53:52
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT HCE17 /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.

Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.27
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

```
[DataSet1] C:\Users\elham\Desktop\DATA\Panel Data 3.sav
```

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17[b]	.	Enter

a. Dependent Variable: HCE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.199[a]	.040	.010	4.04011

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	152.023	7	21.718	1.331	.237[b]
	Residual	3672.554	225	16.322		
	Total	3824.577	232			

a. Dependent Variable: HCE17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-15.778	34.233		-.461	.645
	FNEx17	-.700	10.697	-.005	-.065	.948
	FEx17	57.250	72.179	.056	.793	.429
	FCeo17	165.562	107.916	.182	1.534	.126
	FCh17	-14.686	107.572	-.016	-.137	.892
	FDir17	7.951	136.357	.004	.058	.954
	TA17	3.314E-9	.000	.023	.344	.731
	NEmp17	-6.737E-6	.000	-.108	-1.593	.112

a. Dependent Variable: HCE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT SCE17
  /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
```

Regression

Notes		
Output Created		17-AUG-2019 18:32:25
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT SCE17 /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.08
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17[b]	.	Enter

a. Dependent Variable: SCE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.306[a]	.094	.066	.26251

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.607	7	.230	3.330	.002[b]
	Residual	15.505	225	.069		
	Total	17.112	232			

a. Dependent Variable: SCE17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.372	2.224		.617	.538
	FNEx17	-.151	.695	-.015	-.217	.829
	FEx17	-7.823	4.690	-.114	-1.668	.097
	FCeo17	14.772	7.012	.243	2.107	.036
	FCh17	-8.686	6.990	-.143	-1.243	.215
	FDir17	-2.602	8.860	-.019	-.294	.769
	TA17	1.363E-9	.000	.143	2.177	.031
	NEmp17	-1.037E-6	.000	-.250	-3.775	.000

a. Dependent Variable: SCE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT CEE17
  /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
```

Regression

Notes

Output Created		17-AUG-2019 18:33:02
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT CEE17 /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.08
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method

1	NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17[b]	.	Enter

a. Dependent Variable: CEE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.295[a]	.087	.058	.56577

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.841	7	.977	3.053	.004[b]
	Residual	72.022	225	.320		
	Total	78.862	232			

a. Dependent Variable: CEE17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.327	4.794		-.485	.628
	FNEx17	-2.869	1.498	-.132	-1.915	.057
	FEx17	10.809	10.108	.074	1.069	.286
	FCeo17	-4.162	15.112	-.032	-.275	.783
	FCh17	-14.246	15.064	-.109	-.946	.345
	FDir17	16.528	19.095	.056	.866	.388
	TA17	-3.017E-9	.000	-.147	-2.235	.026
	NEmp17	1.458E-6	.000	.163	2.463	.015

a. Dependent Variable: CEE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT VAIC17
  /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
```

Regression

Notes

Output Created		17-AUG-2019 21:19:18
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT VAIC17 /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.

Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.14
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17[b]	.	Enter

a. Dependent Variable: VAIC17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.191[a]	.036	.006	4.11119

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	143.713	7	20.530	1.215	.296[b]
	Residual	3802.920	225	16.902		
	Total	3946.633	232			

a. Dependent Variable: VAIC17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-16.734	34.835		-.480	.631
	FNEx17	-3.720	10.885	-.024	-.342	.733
	FEx17	60.236	73.448	.058	.820	.413
	FCeo17	176.173	109.815	.191	1.604	.110
	FCh17	-37.618	109.464	-.041	-.344	.731
	FDir17	21.877	138.756	.010	.158	.875
	TA17	1.660E-9	.000	.011	.169	.866
	NEmp17	-6.316E-6	.000	-.100	-1.468	.144

a. Dependent Variable: VAIC17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT VAIC17
  /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
```

Regression

Notes

Output Created		19-AUG-2019 09:03:31
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.

	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT VAIC17 /METHOD=ENTER FNEx17 FEx17 FCeo17 FCh17 FDir17 TA17 NEmp17.
Resources	Processor Time	00:00:00.14
	Elapsed Time	00:00:01.69
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17[b]	.	Enter

a. Dependent Variable: VAIC17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.191[a]	.036	.006	4.11119

a. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	143.713	7	20.530	1.215	.296[b]
	Residual	3802.920	225	16.902		
	Total	3946.633	232			

a. Dependent Variable: VAIC17

b. Predictors: (Constant), NEmp17, FCeo17, FNEx17, FDir17, TA17, FEx17, FCh17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-16.734	34.835		-.480	.631
	FNEx17	-3.720	10.885	-.024	-.342	.733
	FEx17	60.236	73.448	.058	.820	.413
	FCeo17	176.173	109.815	.191	1.604	.110
	FCh17	-37.618	109.464	-.041	-.344	.731
	FDir17	21.877	138.756	.010	.158	.875
	TA17	1.660E-9	.000	.011	.169	.866
	NEmp17	-6.316E-6	.000	-.100	-1.468	.144

a. Dependent Variable: VAIC17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT HCE17
  /METHOD=ENTER FNEx16 NEmp16 TA16 FEx16 FCeo16 FCh16 FDir16.
```

Regression

Notes

Output Created	21-AUG-2019 19:26:47

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT HCE17 /METHOD=ENTER FNEx16 NEmp16 TA16 FEx16 FCeo16 FCh16 FDir16.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.42
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16[b]	.	Enter

a. Dependent Variable: HCE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.189[a]	.036	.006	4.04825

a. Predictors: (Constant), FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	137.206	7	19.601	1.196	.306[b]
	Residual	3687.370	225	16.388		
	Total	3824.577	232			

a. Dependent Variable: HCE17

b. Predictors: (Constant), FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.648	32.000		-.083	.934
	FNEx16	-5.130	10.580	-.035	-.485	.628
	NEmp16	-5.631E-6	.000	-.093	-1.365	.174
	TA16	4.796E-9	.000	.025	.373	.709
	FEx16	27.355	75.983	.026	.360	.719
	FCeo16	129.594	145.603	.136	.890	.374
	FCh16	19.697	140.774	.021	.140	.889
	FDir16	-30.629	129.077	-.016	-.237	.813

a. Dependent Variable: HCE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT SCE17
  /METHOD=ENTER FNEx16 NEmp16 TA16 FEx16 FCeo16 FCh16 FDir16.
```

Regression

Notes

Output Created		21-AUG-2019 19:27:46
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT SCE17 /METHOD=ENTER FNEx16 NEmp16 TA16 FEx16 FCeo16 FCh16 FDir16.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.17
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16[b]	.	Enter

a. Dependent Variable: SCE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.284[a]	.081	.052	.26439

a. Predictors: (Constant), FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.384	7	.198	2.829	.008[b]
	Residual	15.728	225	.070		
	Total	17.112	232			

a. Dependent Variable: SCE17

b. Predictors: (Constant), FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.498	2.090		1.195	.233
	FNEx16	.151	.691	.015	.218	.827
	NEmp16	-9.482E-7	.000	-.234	-3.520	.001
	TA16	1.889E-9	.000	.150	2.252	.025
	FEx16	-2.957	4.962	-.042	-.596	.552
	FCeo16	14.031	9.509	.220	1.476	.141

FCh16	-8.119	9.194	-.132	-.883	.378
FDir16	-9.354	8.430	-.072	-1.110	.268

a. Dependent Variable: SCE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT CEE17
  /METHOD=ENTER FNEx16 NEmp16 TA16 FEx16 FCeo16 FCh16 FDir16.
```

Regression

Notes

Output Created		21-AUG-2019 19:28:06
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT CEE17 /METHOD=ENTER FNEx16 NEmp16 TA16 FEx16 FCeo16 FCh16 FDir16.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.05
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16[b]	.	Enter

a. Dependent Variable: CEE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.294[a]	.086	.058	.56589

a. Predictors: (Constant), FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.809	7	.973	3.038	.005[b]

	Residual	72.053	225	.320		
	Total	78.862	232			

a. Dependent Variable: CEE17

b. Predictors: (Constant), FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.856	4.473		-.191	.848
	FNEx16	-2.695	1.479	-.128	-1.822	.070
	NEmp16	1.455E-6	.000	.167	2.523	.012
	TA16	-4.211E-9	.000	-.155	-2.346	.020
	FEx16	10.415	10.621	.068	.981	.328
	FCeo16	4.682	20.353	.034	.230	.818
	FCh16	-20.685	19.678	-.157	-1.051	.294
	FDir16	9.573	18.043	.034	.531	.596

a. Dependent Variable: CEE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT VAIC17
  /METHOD=ENTER FNEx16 NEmp16 TA16 FEx16 FCeo16 FCh16 FDir16.
```

Regression

Notes

Output Created		21-AUG-2019 19:28:24
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet1

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT VAIC17 /METHOD=ENTER FNEx16 NEmp16 TA16 FEx16 FCeo16 FCh16 FDir16.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.06
	Memory Required	14464 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16[b]	.	Enter

a. Dependent Variable: VAIC17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.181[a]	.033	.003	4.11863

a. Predictors: (Constant), FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	129.939	7	18.563	1.094	.368[b]
	Residual	3816.694	225	16.963		
	Total	3946.633	232			

a. Dependent Variable: VAIC17

b. Predictors: (Constant), FDir16, FEx16, FCeo16, TA16, NEmp16, FNEx16, FCh16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.005	32.557		-.031	.975
	FNEx16	-7.674	10.764	-.052	-.713	.477
	NEmp16	-5.124E-6	.000	-.083	-1.221	.223
	TA16	2.474E-9	.000	.013	.189	.850
	FEx16	34.812	77.304	.032	.450	.653
	FCeo16	148.307	148.134	.153	1.001	.318
	FCh16	-9.107	143.221	-.010	-.064	.949
	FDir16	-30.410	131.321	-.015	-.232	.817

a. Dependent Variable: VAIC17

Regression, SPSS, Time lag IC study

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER HCE16 SC16 CEE16 TA16 NEmp16 LEV16.
```

Regression

Notes

Output Created		04-DEC-2018 16:30:20
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER HCE16 SC16 CEE16 TA16 NEmp16 LEV16.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV16, CEE16, TA16, HCE16, NEmp16, SC16[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.189[a]	.036	.010	4.09011	.036	1.396

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	225	.217

a. Predictors: (Constant), LEV16, CEE16, TA16, HCE16, NEmp16, SC16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	140.098	6	23.350	1.396	.217[b]
	Residual	3764.024	225	16.729		
	Total	3904.122	231			

a. Dependent Variable: TOB18

b. Predictors: (Constant), LEV16, CEE16, TA16, HCE16, NEmp16, SC16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.947	.475		4.096	.000
	HCE16	.018	.071	.017	.257	.797
	SC16	5.326E-8	.000	.027	.214	.830

CEE16	.589	.443	.090	1.330	.185
TA16	-1.500E-8	.000	-.079	-.633	.528
NEmp16	-2.636E-6	.000	-.043	-.610	.542
LEV16	-.005	.002	-.137	-2.037	.043

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE18
  /METHOD=ENTER HCE16 SC16 CEE16 TA16 NEmp16 LEV16.
```

Regression

Notes

Output Created		04-DEC-2018 16:31:27
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER HCE16 SC16 CEE16 TA16 NEmp16 LEV16.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV16, CEE16, TA16, HCE16, NEmp16, SC16[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	Change Statistics: F Change
1	.234[a]	.055	.030	23.67479	.055	2.180

Model Summary

Model	Change Statistics: df1	Change Statistics: df2	Change Statistics: Sig. F Change
1	6	225	.046

a. Predictors: (Constant), LEV16, CEE16, TA16, HCE16, NEmp16, SC16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7330.663	6	1221.777	2.180	.046[b]
	Residual	126111.530	225	560.496		
	Total	133442.193	231			

a. Dependent Variable: ROE18

b. Predictors: (Constant), LEV16, CEE16, TA16, HCE16, NEmp16, SC16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.228	2.751		4.808	.000
	HCE16	-.302	.414	-.048	-.730	.466
	SC16	2.644E-6	.000	.225	1.839	.067
	CEE16	4.009	2.562	.105	1.565	.119
	TA16	-2.201E-7	.000	-.198	-1.604	.110
	NEmp16	1.321E-5	.000	.037	.528	.598
	LEV16	.026	.014	.127	1.909	.058

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER HCE16 SC16 CEE16 TA16 NEmp16 LEV16.
```

Regression

Notes

Output Created	04-DEC-2018 16:31:50
Comments	

Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER HCE16 SC16 CEE16 TA16 NEmp16 LEV16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV16, CEE16, TA16, HCE16, NEmp16, SC16[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change
1	.144[a]	.021	-.005	23.04929	.021	.790

Model Summary

Model	Change Statistics df1	df2	Sig. F Change
1	6	225	.579

a. Predictors: (Constant), LEV16, CEE16, TA16, HCE16, NEmp16, SC16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2517.922	6	419.654	.790	.579[b]
	Residual	119535.745	225	531.270		
	Total	122053.667	231			

a. Dependent Variable: PE18

b. Predictors: (Constant), LEV16, CEE16, TA16, HCE16, NEmp16, SC16

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	26.075	2.678		9.735	.000
	HCE16	-.733	.403	-.123	-1.820	.070
	SC16	-7.276E-7	.000	-.065	-.520	.604
	CEE16	-.320	2.494	-.009	-.128	.898
	TA16	5.377E-9	.000	.005	.040	.968
	NEmp16	-1.336E-5	.000	-.039	-.549	.583
	LEV16	.002	.013	.009	.131	.896

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
```

```
/NOORIGIN
/DEPENDENT TOB17
/METHOD=ENTER HCE15 SCE15 CEE15 TA15 NEmp15 LEV15.
```

Regression

Notes

Output Created		04-DEC-2018 16:34:53
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB17 /METHOD=ENTER HCE15 SCE15 CEE15 TA15 NEmp15 LEV15.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV15, CEE15, TA15, HCE15, SCE15, NEmp15[b]	.	Enter

a. Dependent Variable: TOB17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.174[a]	.030	.005	4.03930	.030	1.183

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	226	.316

a. Predictors: (Constant), LEV15, CEE15, TA15, HCE15, SCE15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	115.794	6	19.299	1.183	.316[b]
	Residual	3687.403	226	16.316		
	Total	3803.198	232			

a. Dependent Variable: TOB17

b. Predictors: (Constant), LEV15, CEE15, TA15, HCE15, SCE15, NEmp15

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	1.518	.483		3.142	.002
	HCE15	.031	.054	.037	.568	.571
	SCE15	.135	.421	.022	.321	.749
	CEE15	.670	.434	.104	1.542	.124
	TA15	-9.811E-9	.000	-.053	-.793	.428
	NEmp15	-2.390E-6	.000	-.056	-.832	.406
	LEV15	-.003	.002	-.106	-1.610	.109

a. Dependent Variable: TOB17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE17
  /METHOD=ENTER HCE15 SCE15 CEE15 TA15 NEmp15 LEV15.
```

Regression

Notes

Output Created		04-DEC-2018 16:35:39
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE17 /METHOD=ENTER HCE15 SCE15 CEE15 TA15 NEmp15 LEV15.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV15, CEE15, TA15, HCE15, SCE15, NEmp15[b]	.	Enter

a. Dependent Variable: ROE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	Change Statistics: F Change
1	.266[a]	.071	.046	38.70336	.071	2.868

Model Summary

Model	Change Statistics: df1	Change Statistics: df2	Change Statistics: Sig. F Change
1	6	226	.010

a. Predictors: (Constant), LEV15, CEE15, TA15, HCE15, SCE15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25776.063	6	4296.010	2.868	.010[b]
	Residual	338536.673	226	1497.950		
	Total	364312.735	232			

a. Dependent Variable: ROE17

b. Predictors: (Constant), LEV15, CEE15, TA15, HCE15, SCE15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.380	4.628		1.379	.169
	HCE15	-.228	.518	-.028	-.440	.661
	SCE15	-2.396	4.033	-.039	-.594	.553
	CEE15	6.076	4.161	.097	1.460	.146
	TA15	-6.022E-8	.000	-.033	-.508	.612
	NEmp15	-4.279E-6	.000	-.010	-.156	.877
	LEV15	.072	.020	.236	3.665	.000

a. Dependent Variable: ROE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE17
  /METHOD=ENTER HCE15 SCE15 CEE15 TA15 NEmp15 LEV15.
```

Regression

Notes

Output Created	04-DEC-2018 16:36:03

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE17 /METHOD=ENTER HCE15 SCE15 CEE15 TA15 NEmp15 LEV15.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV15, CEE15, TA15, HCE15, SCE15, NEmp15[b]	.	Enter

a. Dependent Variable: PE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.114[a]	.013	-.013	35.81145	.013	.497

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	226	.810

a. Predictors: (Constant), LEV15, CEE15, TA15, HCE15, SCE15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3824.558	6	637.426	.497	.810[b]
	Residual	289835.921	226	1282.460		
	Total	293660.480	232			

a. Dependent Variable: PE17

b. Predictors: (Constant), LEV15, CEE15, TA15, HCE15, SCE15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26.295	4.282		6.141	.000
	HCE15	.673	.480	.093	1.403	.162
	SCE15	.461	3.732	.008	.123	.902
	CEE15	.864	3.851	.015	.224	.823
	TA15	4.572E-8	.000	.028	.417	.677
	NEmp15	-2.038E-5	.000	-.055	-.801	.424
	LEV15	.006	.018	.023	.353	.725

a. Dependent Variable: PE17

```
REGRESSION
  /MISSING LISTWISE
```

```
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT TOB16
/METHOD=ENTER HCE14 SCE14 CEE14 TA14 NEmp14 LEV14.
```

Regression

Notes

Output Created		04-DEC-2018 23:20:21
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB16 /METHOD=ENTER HCE14 SCE14 CEE14 TA14 NEmp14 LEV14.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes

Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV14, HCE14, TA14, SCE14, CEE14, NEmp14[b]	.	Enter

a. Dependent Variable: TOB16

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	Change Statistics F Change
1	.126[a]	.016	-.010	5.29520	.016	.606

Model Summary

Model	Change Statistics df1	Change Statistics df2	Change Statistics Sig. F Change
1	6	226	.726

a. Predictors: (Constant), LEV14, HCE14, TA14, SCE14, CEE14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	101.906	6	16.984	.606	.726[b]
	Residual	6336.846	226	28.039		
	Total	6438.752	232			

a. Dependent Variable: TOB16

b. Predictors: (Constant), LEV14, HCE14, TA14, SCE14, CEE14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.863	.634		2.936	.004
	HCE14	.022	.090	.016	.240	.810
	SCE14	.148	.425	.023	.348	.728
	CEE14	.419	.458	.062	.913	.362
	TA14	-1.306E-8	.000	-.054	-.793	.428
	NEmp14	-3.077E-6	.000	-.054	-.784	.434
	LEV14	-.003	.003	-.061	-.923	.357

a. Dependent Variable: TOB16

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE16
  /METHOD=ENTER HCE14 SCE14 CEE14 TA14 NEmp14 LEV14.
```

Regression

Notes

Output Created		04-DEC-2018 23:20:57
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE16 /METHOD=ENTER HCE14 SCE14 CEE14 TA14 NEmp14 LEV14.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV14, HCE14, TA14, SCE14, CEE14, NEmp14[b]	.	Enter

a. Dependent Variable: ROE16

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.080[a]	.006	-.020	51.30477	.006	.241

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	226	.963

a. Predictors: (Constant), LEV14, HCE14, TA14, SCE14, CEE14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3803.131	6	633.855	.241	.963[b]
	Residual	594872.641	226	2632.180		
	Total	598675.772	232			

a. Dependent Variable: ROE16

b. Predictors: (Constant), LEV14, HCE14, TA14, SCE14, CEE14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.611	6.146		1.564	.119
	HCE14	-.096	.868	-.007	-.111	.912
	SCE14	-.201	4.117	-.003	-.049	.961
	CEE14	1.494	4.442	.023	.336	.737
	TA14	-4.430E-8	.000	-.019	-.278	.782
	NEmp14	8.531E-7	.000	.002	.022	.982
	LEV14	.032	.029	.073	1.100	.273

a. Dependent Variable: ROE16

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE16
  /METHOD=ENTER HCE14 SCE14 CEE14 TA14 NEmp14 LEV14.
```

Regression

Notes

Output Created	04-DEC-2018 23:21:37

Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA CHANGE /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE16 /METHOD=ENTER HCE14 SCE14 CEE14 TA14 NEmp14 LEV14.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.00
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV14, HCE14, TA14, SCE14, CEE14, NEmp14[b]	.	Enter

a. Dependent Variable: PE16

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.290[a]	.084	.060	42.97201	.084	3.463

Model Summary

Model	Change Statistics		
	df1	df2	Sig. F Change
1	6	226	.003

a. Predictors: (Constant), LEV14, HCE14, TA14, SCE14, CEE14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38364.959	6	6394.160	3.463	.003[b]
	Residual	417330.138	226	1846.594		
	Total	455695.097	232			

a. Dependent Variable: PE16

b. Predictors: (Constant), LEV14, HCE14, TA14, SCE14, CEE14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26.870	5.148		5.220	.000
	HCE14	-.764	.727	-.068	-1.051	.294
	SCE14	-1.729	3.448	-.032	-.501	.617
	CEE14	4.197	3.720	.074	1.128	.260
	TA14	-7.618E-8	.000	-.037	-.570	.569
	NEmp14	.000	.000	.253	3.836	.000
	LEV14	.006	.024	.016	.243	.808

a. Dependent Variable: PE16

```
REGRESSION
  /MISSING LISTWISE
```

```
DATASET NAME DataSet1 WINDOW=FRONT.
GET
  FILE='C:\Users\elham\Desktop\DATA\Panel Data.sav'.
DATASET NAME DataSet2 WINDOW=FRONT.
DATASET ACTIVATE DataSet1.
DATASET CLOSE DataSet2.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER HCE16 SCE16 CEE16 TA16 NEmp16 LEV16.
```

Regression

Notes

Output Created		04-JAN-2019 22:27:45
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER HCE16 SCE16 CEE16 TA16 NEmp16 LEV16.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.05
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV16, CEE16, TA16, SCE16, HCE16, NEmp16[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.191[a]	.037	.011	4.08872

a. Predictors: (Constant), LEV16, CEE16, TA16, SCE16, HCE16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142.656	6	23.776	1.422	.207[b]

	Residual	3761.466	225	16.718		
	Total	3904.122	231			

a. Dependent Variable: TOB18

b. Predictors: (Constant), LEV16, CEE16, TA16, SCE16, HCE16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.861	.512		3.632	.000
	HCE16	.012	.073	.011	.162	.872
	SCE16	.207	.465	.031	.446	.656
	CEE16	.599	.443	.092	1.352	.178
	TA16	-1.106E-8	.000	-.058	-.844	.400
	NEmp16	-2.536E-6	.000	-.041	-.587	.558
	LEV16	-.005	.002	-.131	-1.955	.052

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE18
  /METHOD=ENTER HCE16 SCE16 CEE16 TA16 NEmp16 LEV16.
```

Regression

Notes

Output Created		04-JAN-2019 22:30:43
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER HCE16 SCE16 CEE16 TA16 NEmp16 LEV16.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.06
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV16, CEE16, TA16, SCE16, HCE16, NEmp16[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.258[a]	.067	.042	23.52787

a. Predictors: (Constant), LEV16, CEE16, TA16, SCE16, HCE16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8891.081	6	1481.847	2.677	.016[b]
	Residual	124551.112	225	553.560		
	Total	133442.193	231			

a. Dependent Variable: ROE18

b. Predictors: (Constant), LEV16, CEE16, TA16, SCE16, HCE16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.973	2.948		5.418	.000
	HCE16	-.004	.422	-.001	-.009	.993
	SCE16	-6.681	2.674	-.168	-2.499	.013
	CEE16	3.854	2.548	.101	1.513	.132
	TA16	-9.908E-11	.000	.000	-.001	.999
	NEmp16	1.233E-5	.000	.034	.496	.620
	LEV16	.025	.014	.121	1.836	.068

a. Dependent Variable: ROE18

```
Your license will expire in 20 days.
GET
  FILE='C:\Users\elham\Desktop\DATA\Panel Data 2.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
CORRELATIONS
  /VARIABLES=HCE18 SCE18 CEE18
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		12-JUL-2019 15:40:50
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=HCE18 SCE18 CEE18 /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.05

```
[DataSet1] C:\Users\elham\Desktop\DATA\Panel Data 2.sav
```

Correlations

		HCE18	SCE18	CEE18
HCE18	Pearson Correlation	1	.117	-.239**
	Sig. (2-tailed)		.076	.000
	N	233	233	233
SCE18	Pearson Correlation	.117	1	-.206**

	Sig. (2-tailed)	.076		.002
	N	233	233	233
CEE18	Pearson Correlation	-.239**	-.206**	1
	Sig. (2-tailed)	.000	.002	
	N	233	233	233

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

```
CORRELATIONS
  /VARIABLES=HCE18 HCE17 SCE18 CEE18 HCE16 HCE15 HCE14 HCE13 HCE12 HCE11
HCE10 SCE17 SCE16 SCE15
    SCE14 SCE13 SCE12 SCE11 SCE10 CEE17 CEE16 CEE15 CEE14 CEE13 CEE12 CEE11
CEE10
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		12-JUL-2019 15:56:26
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.

Syntax		CORRELATIONS /VARIABLES=HCE18 HCE17 SCE18 CEE18 HCE16 HCE15 HCE14 HCE13 HCE12 HCE11 HCE10 SCE17 SCE16 SCE15 SCE14 SCE13 SCE12 SCE11 SCE10 CEE17 CEE16 CEE15 CEE14 CEE13 CEE12 CEE11 CEE10 /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.20
	Elapsed Time	00:00:00.18

Correlations

		HCE18	HCE17	SCE18	CEE18	HCE16	HCE15	HCE14	HCE13	HCE12	HCE11	HCE10	SCE17	SCE16	SCE15	SCE14	SCE13	SCE12	SCE11	SCE10
HCE18	Pearson Correlation	1	.878**	.117	-.239**	.805**	.684**	.884**	.739**	.798**	.581**	.495**	.472**	.171**	.232**	.096	.246**	-.311**	.387**	.267**
	Sig. (2-tailed)		.000	.076	.000	.000	.000	.000	.000	.000	.000	.000	.000	.009	.000	.144	.000	.000	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE17	Pearson Correlation	.878**	1	.127	-.187**	.649**	.578**	.796**	.565**	.816**	.512**	.416**	.401**	.178**	.122	.065	.142*	-.366**	.285**	.223**
	Sig. (2-tailed)	.000		.054	.004	.000	.000	.000	.000	.000	.000	.000	.000	.006	.062	.321	.030	.000	.000	.001
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE18	Pearson Correlation	.117	.127	1	-.206**	.135*	.126	.136*	.140*	.102	.095	.095	.322**	.120	.213**	.271**	.233**	-.019	.323**	.027
	Sig. (2-tailed)	.076	.054		.002	.040	.054	.037	.032	.120	.148	.148	.000	.068	.001	.000	.000	.771	.000	.677
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE18	Pearson Correlation	-.239**	-.187**	-.206**	1	-.238**	-.196**	-.231**	-.241**	-.146*	-.138*	-.147*	-.390**	-.180**	-.228**	-.190**	-.234**	.042	-.413**	-.243**

	Sig. (2-tailed)	.000	.004	.002		.000	.003	.000	.000	.026	.035	.025	.000	.006	.000	.004	.000	.528	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE16	Pearson Correlation	.805**	.649**	.135*	-.238**	1	.817**	.867**	.686**	.627**	.569**	.486**	.411**	.251**	.143*	.083	.222**	-.156*	.376**	.335**
	Sig. (2-tailed)	.000	.000	.040	.000		.000	.000	.000	.000	.000	.000	.000	.000	.030	.206	.001	.017	.000	.000
	N	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232
HCE15	Pearson Correlation	.684**	.578**	.126	-.196**	.817**	1	.735**	.553**	.514**	.429**	.396**	.347**	.191**	.080	.078	.173**	-.255**	.300**	.229**
	Sig. (2-tailed)	.000	.000	.054	.003	.000		.000	.000	.000	.000	.000	.000	.003	.223	.233	.008	.000	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE14	Pearson Correlation	.884**	.796**	.136*	-.231**	.867**	.735**	1	.752**	.770**	.511**	.502**	.406**	.205**	.186**	.107	.241**	-.334**	.407**	.289**
	Sig. (2-tailed)	.000	.000	.037	.000	.000	.000		.000	.000	.000	.000	.000	.002	.004	.102	.000	.000	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE13	Pearson Correlation	.739**	.565**	.140*	-.241**	.686**	.553**	.752**	1	.732**	.504**	.518**	.394**	.199**	.247**	.092	.396**	.045	.508**	.322**
	Sig. (2-tailed)	.000	.000	.032	.000	.000	.000	.000		.000	.000	.000	.000	.002	.000	.161	.000	.490	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE12	Pearson Correlation	.798**	.816**	.102	-.146*	.627**	.514**	.770**	.732**	1	.564**	.520**	.342**	.162*	.175**	.082	.262**	.053	.381**	.253**
	Sig. (2-tailed)	.000	.000	.120	.026	.000	.000	.000	.000		.000	.000	.000	.013	.007	.215	.000	.422	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE11	Pearson Correlation	.581**	.512**	.095	-.138*	.569**	.429**	.511**	.504**	.564**	1	.719**	.208**	.135*	.138*	.053	.194**	.030	.296**	.177**
	Sig. (2-tailed)	.000	.000	.148	.035	.000	.000	.000	.000	.000		.000	.001	.040	.036	.419	.003	.654	.000	.007
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE10	Pearson Correlation	.495**	.416**	.095	-.147*	.486**	.396**	.502**	.518**	.520**	.719**	1	.247**	.116	.159*	.060	.216**	.021	.349**	.232**

	Sig. (2-tailed)	.000	.000	.148	.025	.000	.000	.000	.000	.000	.000		.000	.076	.015	.364	.001	.749	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE17	Pearson Correlation	.472**	.401**	.322**	-.390**	.411**	.347**	.406**	.394**	.342**	.208**	.247**	1	.374**	.382**	.546**	.509**	-.080	.726**	.080
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000		.000	.000	.000	.000	.223	.000	.223
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE16	Pearson Correlation	.171**	.178**	.120	-.180**	.251**	.191**	.205**	.199**	.162*	.135*	.116	.374**	1	.160*	.290**	.296**	-.031	.349**	.027
	Sig. (2-tailed)	.009	.006	.068	.006	.000	.003	.002	.002	.013	.040	.076	.000		.015	.000	.000	.640	.000	.687
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE15	Pearson Correlation	.232**	.122	.213**	-.228**	.143*	.080	.186**	.247**	.175**	.138*	.159*	.382**	.160*	1	.530**	.416**	-.017	.541**	-.023
	Sig. (2-tailed)	.000	.062	.001	.000	.030	.223	.004	.000	.007	.036	.015	.000	.015		.000	.000	.792	.000	.724
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE14	Pearson Correlation	.096	.065	.271**	-.190**	.083	.078	.107	.092	.082	.053	.060	.546**	.290**	.530**	1	.579**	-.002	.718**	-.328**
	Sig. (2-tailed)	.144	.321	.000	.004	.206	.233	.102	.161	.215	.419	.364	.000	.000	.000		.000	.981	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE13	Pearson Correlation	.246**	.142*	.233**	-.234**	.222**	.173**	.241**	.396**	.262**	.194**	.216**	.509**	.296**	.416**	.579**	1	.025	.663**	.048
	Sig. (2-tailed)	.000	.030	.000	.000	.001	.008	.000	.000	.000	.003	.001	.000	.000	.000	.000		.707	.000	.466
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE12	Pearson Correlation	-.311**	-.366**	-.019	.042	-.156*	-.255**	-.334**	.045	.053	.030	.021	-.080	-.031	-.017	-.002	.025	1	.075	-.007
	Sig. (2-tailed)	.000	.000	.771	.528	.017	.000	.000	.490	.422	.654	.749	.223	.640	.792	.981	.707		.253	.921
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE11	Pearson Correlation	.387**	.285**	.323**	-.413**	.376**	.300**	.407**	.508**	.381**	.296**	.349**	.726**	.349**	.541**	.718**	.663**	.075	1	.076

	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.253		.245
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCE10	Pearson Correlation	.267**	.223**	.027	-.243**	.335**	.229**	.289**	.322**	.253**	.177**	.232**	.080	.027	-.023	-.328**	.048	-.007	.076	1
	Sig. (2-tailed)	.000	.001	.677	.000	.000	.000	.000	.000	.000	.007	.000	.223	.687	.724	.000	.466	.921	.245	
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE17	Pearson Correlation	-.187**	-.143*	-.111	.878**	-.181**	-.125	-.171**	-.174**	-.106	-.100	-.078	-.297**	-.115	-.185**	-.143*	-.172**	.027	-.297**	-.270**
	Sig. (2-tailed)	.004	.029	.091	.000	.006	.057	.009	.008	.107	.128	.235	.000	.079	.005	.030	.008	.680	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE16	Pearson Correlation	-.193**	-.151*	-.102	.730**	-.167*	-.104	-.178**	-.167*	-.124	-.113	-.102	-.252**	-.092	-.163*	-.153*	-.147*	.032	-.289**	-.172**
	Sig. (2-tailed)	.003	.021	.121	.000	.011	.112	.007	.011	.058	.084	.120	.000	.162	.013	.020	.025	.627	.000	.008
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE15	Pearson Correlation	-.188**	-.158*	-.103	.779**	-.165*	-.087	-.169**	-.163*	-.114	-.107	-.074	-.275**	-.110	-.190**	-.148*	-.184**	.029	-.291**	-.263**
	Sig. (2-tailed)	.004	.016	.116	.000	.012	.188	.010	.013	.083	.102	.260	.000	.094	.004	.024	.005	.660	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE14	Pearson Correlation	-.148*	-.114	-.069	.201**	-.148*	-.091	-.160*	-.152*	-.111	-.104	-.130*	-.170**	-.104	-.135*	-.146*	-.157*	.030	-.256**	.020
	Sig. (2-tailed)	.024	.082	.297	.002	.024	.165	.014	.021	.091	.112	.047	.009	.115	.039	.025	.017	.653	.000	.763
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE13	Pearson Correlation	-.214**	-.168*	-.115	.455**	-.207**	-.144*	-.209**	-.201**	-.137*	-.140*	-.173**	-.320**	-.140*	-.214**	-.188**	-.240**	.032	-.400**	-.082
	Sig. (2-tailed)	.001	.010	.079	.000	.002	.028	.001	.002	.037	.033	.008	.000	.032	.001	.004	.000	.629	.000	.213
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE12	Pearson Correlation	-.179**	-.145*	-.097	.372**	-.182**	-.124	-.172**	-.156*	-.096	-.086	-.105	-.254**	-.089	-.159*	-.136*	-.139*	.041	-.255**	-.039

	Sig. (2-tailed)	.006	.027	.139	.000	.005	.059	.009	.017	.145	.190	.111	.000	.176	.015	.038	.033	.535	.000	.557
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE11	Pearson Correlation	-.224**	-.229**	-.118	.510**	-.266**	-.220**	-.300**	-.329**	-.140*	-.059	-.155*	-.204**	-.077	-.190**	-.157*	-.095	.037	-.342**	-.156*
	Sig. (2-tailed)	.001	.000	.072	.000	.000	.001	.000	.000	.032	.370	.018	.002	.244	.004	.017	.149	.576	.000	.017
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE10	Pearson Correlation	-.260**	-.233**	-.138*	.730**	-.244**	-.186**	-.239**	-.250**	-.175**	-.131*	-.092	-.421**	-.175**	-.233**	-.182**	-.218**	.035	-.350**	-.280**
	Sig. (2-tailed)	.000	.000	.035	.000	.000	.004	.000	.000	.007	.046	.159	.000	.007	.000	.005	.001	.592	.000	.000
	N	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233

Correlations

		CEE17	CEE16	CEE15	CEE14	CEE13	CEE12	CEE11	CEE10
HCE18	Pearson Correlation	-.187**	-.193**	-.188**	-.148*	-.214**	-.179**	-.224**	-.260**
	Sig. (2-tailed)	.004	.003	.004	.024	.001	.006	.001	.000
	N	233	233	233	233	233	233	233	233
HCE17	Pearson Correlation	-.143*	-.151*	-.158*	-.114	-.168*	-.145*	-.229**	-.233**
	Sig. (2-tailed)	.029	.021	.016	.082	.010	.027	.000	.000
	N	233	233	233	233	233	233	233	233
SCE18	Pearson Correlation	-.111	-.102	-.103	-.069	-.115	-.097	-.118	-.138*
	Sig. (2-tailed)	.091	.121	.116	.297	.079	.139	.072	.035
	N	233	233	233	233	233	233	233	233
CEE18	Pearson Correlation	.878**	.730**	.779**	.201**	.455**	.372**	.510**	.730**
	Sig. (2-tailed)	.000	.000	.000	.002	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233
HCE16	Pearson Correlation	-.181**	-.167*	-.165*	-.148*	-.207**	-.182**	-.266**	-.244**
	Sig. (2-tailed)	.006	.011	.012	.024	.002	.005	.000	.000
	N	232	232	232	232	232	232	232	232
HCE15	Pearson Correlation	-.125	-.104	-.087	-.091	-.144*	-.124	-.220**	-.186**
	Sig. (2-tailed)	.057	.112	.188	.165	.028	.059	.001	.004
	N	233	233	233	233	233	233	233	233

HCE14	Pearson Correlation	-.171**	-.178**	-.169**	-.160*	-.209**	-.172**	-.300**	-.239**
	Sig. (2-tailed)	.009	.007	.010	.014	.001	.009	.000	.000
	N	233	233	233	233	233	233	233	233
HCE13	Pearson Correlation	-.174**	-.167*	-.163*	-.152*	-.201**	-.156*	-.329**	-.250**
	Sig. (2-tailed)	.008	.011	.013	.021	.002	.017	.000	.000
	N	233	233	233	233	233	233	233	233
HCE12	Pearson Correlation	-.106	-.124	-.114	-.111	-.137*	-.096	-.140*	-.175**
	Sig. (2-tailed)	.107	.058	.083	.091	.037	.145	.032	.007
	N	233	233	233	233	233	233	233	233
HCE11	Pearson Correlation	-.100	-.113	-.107	-.104	-.140*	-.086	-.059	-.131*
	Sig. (2-tailed)	.128	.084	.102	.112	.033	.190	.370	.046
	N	233	233	233	233	233	233	233	233
HCE10	Pearson Correlation	-.078	-.102	-.074	-.130*	-.173**	-.105	-.155*	-.092
	Sig. (2-tailed)	.235	.120	.260	.047	.008	.111	.018	.159
	N	233	233	233	233	233	233	233	233
SCE17	Pearson Correlation	-.297**	-.252**	-.275**	-.170**	-.320**	-.254**	-.204**	-.421**
	Sig. (2-tailed)	.000	.000	.000	.009	.000	.000	.002	.000
	N	233	233	233	233	233	233	233	233
SCE16	Pearson Correlation	-.115	-.092	-.110	-.104	-.140*	-.089	-.077	-.175**
	Sig. (2-tailed)	.079	.162	.094	.115	.032	.176	.244	.007
	N	233	233	233	233	233	233	233	233
SCE15	Pearson Correlation	-.185**	-.163*	-.190**	-.135*	-.214**	-.159*	-.190**	-.233**
	Sig. (2-tailed)	.005	.013	.004	.039	.001	.015	.004	.000
	N	233	233	233	233	233	233	233	233
SCE14	Pearson Correlation	-.143*	-.153*	-.148*	-.146*	-.188**	-.136*	-.157*	-.182**
	Sig. (2-tailed)	.030	.020	.024	.025	.004	.038	.017	.005
	N	233	233	233	233	233	233	233	233
SCE13	Pearson Correlation	-.172**	-.147*	-.184**	-.157*	-.240**	-.139*	-.095	-.218**
	Sig. (2-tailed)	.008	.025	.005	.017	.000	.033	.149	.001
	N	233	233	233	233	233	233	233	233

SCE12	Pearson Correlation	.027	.032	.029	.030	.032	.041	.037	.035
	Sig. (2-tailed)	.680	.627	.660	.653	.629	.535	.576	.592
	N	233	233	233	233	233	233	233	233
SCE11	Pearson Correlation	-.297**	-.289**	-.291**	-.256**	-.400**	-.255**	-.342**	-.350**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233
SCE10	Pearson Correlation	-.270**	-.172**	-.263**	.020	-.082	-.039	-.156*	-.280**
	Sig. (2-tailed)	.000	.008	.000	.763	.213	.557	.017	.000
	N	233	233	233	233	233	233	233	233
CEE17	Pearson Correlation	1	.744**	.906**	-.014	.243**	.251**	.358**	.799**
	Sig. (2-tailed)		.000	.000	.832	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233
CEE16	Pearson Correlation	.744**	1	.680**	.474**	.325**	.276**	.317**	.539**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233
CEE15	Pearson Correlation	.906**	.680**	1	.103	.344**	.246**	.321**	.777**
	Sig. (2-tailed)	.000	.000		.116	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233
CEE14	Pearson Correlation	-.014	.474**	.103	1	.678**	.371**	.341**	.053
	Sig. (2-tailed)	.832	.000	.116		.000	.000	.000	.420
	N	233	233	233	233	233	233	233	233
CEE13	Pearson Correlation	.243**	.325**	.344**	.678**	1	.589**	.664**	.444**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
	N	233	233	233	233	233	233	233	233
CEE12	Pearson Correlation	.251**	.276**	.246**	.371**	.589**	1	.529**	.396**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
	N	233	233	233	233	233	233	233	233
CEE11	Pearson Correlation	.358**	.317**	.321**	.341**	.664**	.529**	1	.593**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
	N	233	233	233	233	233	233	233	233

CEE10	Pearson Correlation	.799**	.539**	.777**	.053	.444**	.396**	.593**	1
	Sig. (2-tailed)	.000	.000	.000	.420	.000	.000	.000	
	N	233	233	233	233	233	233	233	233

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

*. Correlation is significant at the 0.05 level (2-tailed).

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    SCE15 SCE14 SCE13 SCE12 SCE11 SCE10 CEE18 CEE17 CEE16 CEE15 CEE14 CEE13
CEE12 CEE11 CEE10 VAIC18
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Correlations

Notes

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	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.

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		TOB17 TOB16 TOB15
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		TOB10 HCE18 HCE17
		HCE16 HCE15 HCE14
		HCE13 HCE12 HCE11
		HCE10 SCE18 SCE17
		SCE16
		  SCE15 SCE14 SCE13
		SCE12 SCE11 SCE10
		CEE18 CEE17 CEE16
		CEE15 CEE14 CEE13
		CEE12 CEE11 CEE10
		VAIC18
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		VAIC14 VAIC13 VAIC12
		VAIC11 VAIC10
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		 /MISSING=PAIRWISE.

Resources	Processor Time	00:00:00.44
	Elapsed Time	00:00:00.41

Correlations

		ROA18	ROA17	ROA16	ROA15	ROA14	ROA13	ROA12	ROA11	ROA10	TOB18	TOB17	TOB16	TOB15	TOB14	TOB13	TOB12	TOB11	TOB10
ROA18	Pearson Correlation	1	.909**	.851**	.783**	.727**	.623**	.278**	.600**	.400**	.881**	.904**	.893**	.842**	.849**	.807**	.777**	.665**	.550**

		HCE18	HCE17	HCE16	HCE15	HCE14	HCE13	HCE12	HCE11	HCE10	SCE18	SCE17	SCE16	SCE15	SCE14	SCE13	SCE12	SCE11	SCE10	CEE18	CEE17	CEE16	CEE15
ROA18	Pearson Correlation	.081	.071	.048	.046	.030	.037	.007	.008	-.027	-.097	.143*	-.007	-.016	-.037	.041	.018	.034	.057	.166*	.116	.103	.076

	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.219	.283	.466	.488	.650	.572	.911	.909	.681	.142	.030	.917	.808	.578	.532	.784	.607	.387	.011	.077	.117	.246
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
ROA17	Pearson Correlation	.909**	1	.888**	.816**	.750**	.639**	.273**	.628**	.434**	.884**	.940**	.930**	.885**	.893**	.857**	.821**	.713**	.595**	.059	.098	.038	.041	.030	.030	.008	.013	-.026	.061	.165*	.053	-.013	-.018	.014	.003	.029	.041	.158*	.138*	.128	.106
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.373	.134	.568	.530	.648	.650	.904	.839	.694	.351	.011	.420	.840	.786	.827	.969	.663	.531	.016	.036	.051	.105
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
ROA16	Pearson Correlation	.851**	.888**	1	.883**	.819**	.703**	.322**	.599**	.411**	.861**	.902**	.908**	.873**	.870**	.832**	.801**	.664**	.555**	.042	.050	.113	.098	.067	.098	.001	-.006	.019	.059	.130*	.164*	.005	.021	.074	.026	.072	.059	.105	.095	.114	.090
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.523	.444	.086	.135	.310	.136	.984	.927	.777	.368	.047	.012	.935	.749	.264	.696	.275	.369	.109	.149	.083	.170
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
ROA15	Pearson Correlation	.783**	.816**	.883**	1	.867**	.780**	.442**	.633**	.470**	.830**	.850**	.858**	.859**	.847**	.819**	.789**	.777**	.590**	.083	.064	.138*	.158*	.101	.143*	.036	.073	.092	.057	.125	.096	-.005	-.011	.062	.020	.058	.089	.071	.076	.100	.149*

	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.204	.328	.035	.016	.123	.029	.582	.266	.160	.389	.056	.146	.935	.867	.346	.757	.381	.176	.283	.250	.129	.022
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
ROA14	Pearson Correlation	.727**	.750**	.819**	.867**	1	.863**	.576**	.649**	.545**	.761**	.788**	.790**	.803**	.801**	.798**	.767**	.679**	.621**	.051	.055	.075	.099	.086	.140*	.056	.040	.055	.045	.056	.059	.001	-.014	.068	.020	.036	.072	.144*	.113	.125	.170**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.443	.399	.253	.130	.189	.033	.398	.545	.401	.493	.393	.374	.992	.827	.298	.763	.580	.276	.028	.085	.057	.009
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
ROA13	Pearson Correlation	.623**	.639**	.703**	.780**	.863**	1	.691**	.588**	.527**	.650**	.775**	.775**	.680**	.668**	.695**	.692**	.636**	.591**	.035	.048	.042	.091	.087	.182**	.118	.016	.056	.046	.043	.052	-.012	-.042	.105	.033	.040	.091	.143*	.124	.160*	.199**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.598	.467	.523	.164	.185	.005	.072	.814	.397	.483	.517	.432	.856	.526	.110	.616	.546	.165	.030	.060	.014	.002
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
ROA12	Pearson Correlation	.278**	.273**	.322**	.442**	.576**	.691**	1	.362**	.401**	.302**	.309**	.303**	.329**	.321**	.358**	.372**	.402**	.342**	.019	-.003	-.009	.024	.029	.135*	.127	.057	.049	-.031	-.031	.033	-.081	-.185**	-.071	.077	-.010	.115	.110	.058	.158*	.200**

	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.771	.959	.887	.715	.657	.039	.053	.389	.455	.634	.640	.620	.219	.005	.279	.242	.874	.080	.095	.101	.016	.002
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
ROA11	Pearson Correlation	.600**	.628**	.599**	.633**	.649**	.588**	.362**	1	.675**	.626**	.646**	.645**	.699**	.686**	.726**	.778**	.759**	.659**	.029	.037	.026	.011	.000	.020	-.006	.234**	.096	.046	-.036	.013	-.059	-.085	-.017	.034	.028	.072	.155*	.123	.103	.148*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.664	.570	.696	.870	.994	.760	.923	.000	.145	.485	.588	.841	.367	.196	.798	.601	.668	.276	.018	.061	.118	.024
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
ROA10	Pearson Correlation	.400**	.434**	.411**	.470**	.545**	.527**	.401**	.675**	1	.446**	.468**	.463**	.520**	.513**	.605**	.601**	.633**	.637**	-.031	-.027	-.060	-.055	-.043	.000	-.015	.068	.141*	.022	-.057	-.022	-.097	-.140*	-.065	.057	.008	.050	.143*	.171**	.145*	.220**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.640	.684	.364	.406	.512	.996	.822	.302	.032	.735	.383	.736	.138	.032	.327	.386	.906	.443	.029	.009	.027	.001
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB18	Pearson Correlation	.881**	.884**	.861**	.830**	.761**	.650**	.302**	.626**	.446**	1	.958**	.947**	.917**	.932**	.898**	.866**	.743**	.634**	.022	.030	.015	.020	-.001	.014	-.009	-.004	-.010	.009	.060	.043	.008	.006	.038	.016	.028	.020	.130*	.103	.089	.092

	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.734	.644	.821	.762	.991	.835	.891	.952	.883	.890	.361	.514	.904	.931	.562	.810	.667	.764	.047	.118	.177	.162
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB17	Pearson Correlation	.904**	.940**	.902**	.850**	.788**	.675**	.309**	.646**	.468**	.958**	1	.989**	.950**	.965**	.927**	.893**	.770**	.653**	.027	.037	.024	.026	.007	.025	-.007	.002	.000	.055	.085	.042	.013	.009	.053	.017	.050	.031	.125	.111	.094	.095
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.680	.569	.716	.693	.921	.707	.911	.974	.995	.404	.195	.521	.847	.890	.423	.800	.446	.636	.058	.091	.151	.149
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB16	Pearson Correlation	.893**	.930**	.908**	.858**	.790**	.675**	.303**	.645**	.463**	.947**	.989**	1	.954**	.968**	.931**	.895**	.766**	.656**	.031	.032	.033	.031	.011	.026	-.013	.002	.002	.040	.091	.050	.020	.021	.058	.016	.054	.030	.124	.105	.097	.096
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.641	.631	.615	.633	.872	.688	.844	.978	.970	.543	.164	.448	.763	.755	.380	.805	.409	.649	.059	.110	.139	.146
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB15	Pearson Correlation	.842**	.885**	.873**	.859**	.803**	.680**	.329**	.699**	.520**	.917**	.950**	.954**	1	.985**	.963**	.943**	.841**	.746**	.008	.011	.018	.019	-.005	.005	-.028	-.007	-.004	.042	.067	.052	.006	.005	.030	.023	.025	.021	.122	.106	.102	.135*

	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.902	.871	.783	.777	.941	.940	.671	.910	.948	.525	.311	.425	.924	.934	.647	.729	.725	.709	.054	.163	.127	.039
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB14	Pearson Correlation	.849**	.893**	.870**	.847**	.801**	.668**	.321**	.686**	.513**	.932**	.965**	.968**	.985**	1	.974**	.934**	.815**	.716**	.014	.014	.020	.017	.002	.009	-.022	-.003	-.001	.038	.062	.047	.022	.025	.037	.020	.037	.012	.114	.096	.084	.107
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.827	.829	.758	.802	.971	.893	.737	.964	.986	.569	.349	.479	.736	.707	.574	.758	.578	.860	.082	.142	.201	.102
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB13	Pearson Correlation	.807**	.857**	.832**	.819**	.798**	.695**	.358**	.726**	.605**	.898**	.927**	.931**	.963**	.974**	1	.966**	.884**	.811**	.009	.009	.004	.005	-.006	.024	-.017	.007	.005	.065	.068	.052	.046	.039	.052	.028	.061	.009	.114	.102	.097	.122
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.892	.890	.948	.941	.923	.717	.796	.918	.939	.320	.304	.430	.486	.554	.431	.667	.353	.887	.082	.122	.132	.062
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB12	Pearson Correlation	.777**	.821**	.801**	.789**	.767**	.692**	.372**	.778**	.601**	.866**	.893**	.895**	.943**	.934**	.966**	1	.930**	.844**	.040	.033	.020	.015	.017	.054	.021	.030	.026	.078	.067	.058	.040	.009	.052	.034	.062	.033	.122	.114	.104	.140*

	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.546	.620	.765	.823	.798	.409	.744	.651	.690	.234	.312	.377	.548	.890	.430	.609	.347	.611	.062	.082	.112	.032
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB11	Pearson Correlation	.665**	.713**	.664**	.677**	.679**	.636**	.402**	.759**	.633**	.743**	.770**	.766**	.841**	.815**	.884**	.930**	1	.926**	.036	.030	-.011	-.011	-.005	.048	.032	.065	.032	.055	.060	.053	.034	-.027	.020	.043	.060	.033	.137*	.130*	.111	.167*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.582	.644	.864	.862	.939	.466	.627	.321	.627	.401	.362	.417	.609	.687	.764	.515	.363	.621	.037	.038	.091	.011
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
TOB10	Pearson Correlation	.550**	.595**	.555**	.590**	.621**	.591**	.342**	.659**	.637**	.634**	.653**	.656**	.746**	.716**	.811**	.844**	.926**	1	.037	.006	-.035	-.030	-.007	.048	.032	.056	.033	.108	.112	.078	.178**	.133*	.120	.047	.144*	-.032	.099	.101	.077	.156*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.576	.927	.592	.649	.801	.469	.627	.394	.618	.102	.087	.235	.006	.043	.066	.474	.028	.627	.133	.123	.244	.017
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE18	Pearson Correlation	.081	.059	.042	.083	.051	.035	.019	.029	-.031	.022	.027	.031	.008	.014	.009	.040	.036	.037	1	.878**	.805**	.684**	.884**	.739**	.798**	.581**	.495**	.117	.472**	.171**	.232**	.096	.246**	-.311**	.387**	.267**	-.239**	-.187**	-.193**	-.188**

	Sig. (2-tailed)	.219	.373	.523	.204	.443	.598	.771	.664	.640	.734	.680	.641	.902	.827	.892	.546	.582	.576		.000	.000	.000	.000	.000	.000	.000	.000	.076	.000	.009	.000	.144	.000	.000	.000	.000	.000	.004	.003	.004
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HCE17	Pearson Correlation	.071	.098	.050	.064	.055	.048	-.003	.037	-.027	.030	.037	.032	.011	.014	.009	.033	.030	.006	.878**	1	.649**	.578**	.796**	.565**	.816**	.512**	.416**	.127	.401**	.178**	.122	.065	.142*	-.366**	.285**	.223**	-.187**	-.143*	-.151*	-.158*
	Sig. (2-tailed)	.283	.134	.444	.328	.399	.467	.959	.570	.684	.644	.569	.631	.871	.829	.890	.620	.644	.927	.000		.000	.000	.000	.000	.000	.000	.000	.054	.000	.006	.062	.321	.030	.000	.000	.001	.004	.029	.021	.016
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCE16	Pearson Correlation	.048	.038	.113	.138*	.075	.042	-.009	.026	-.060	.015	.024	.033	.018	.020	.004	.020	-.011	-.035	.805**	.649**	1	.817**	.867**	.686**	.627**	.569**	.486**	.135*	.411**	.251**	.143*	.083	.222**	-.156*	.376**	.335**	-.238**	-.181**	-.167*	-.165*
	Sig. (2-tailed)	.466	.568	.086	.035	.253	.523	.887	.696	.364	.821	.716	.615	.783	.758	.948	.765	.864	.592	.000	.000		.000	.000	.000	.000	.000	.000	.040	.000	.000	.030	.206	.001	.017	.000	.000	.000	.006	.011	.012
	N	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232
HCE15	Pearson Correlation	.046	.041	.098	.158*	.099	.091	.024	.011	-.055	.020	.026	.031	.019	.017	.005	.015	-.011	-.030	.684**	.578**	.817**	1	.735**	.553**	.514**	.429**	.396**	.126	.347**	.191**	.080	.078	.173**	-.255**	.300**	.229**	-.196**	-.125	-.104	-.087

	Sig. (2-tailed)	.488	.530	.135	.016	.130	.164	.715	.870	.406	.762	.693	.633	.777	.802	.941	.823	.862	.649	.000	.000	.000		.000	.000	.000	.000	.000	.054	.000	.003	.223	.233	.008	.000	.000	.000	.003	.057	.112	.188
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCEN14	Pearson Correlation	.030	.030	.067	.101	.086	.087	.029	.000	-.043	-.001	.007	.011	-.005	.002	-.006	.017	-.005	-.017	.884**	.796**	.867**	.735**	1	.752**	.770**	.511**	.502**	.136*	.406**	.205**	.186**	.107	.241**	-.334**	.407**	.289**	-.231**	-.171**	-.178**	-.169**
	Sig. (2-tailed)	.650	.648	.310	.123	.189	.185	.657	.994	.512	.991	.921	.872	.941	.971	.923	.798	.939	.801	.000	.000	.000	.000		.000	.000	.000	.000	.037	.000	.002	.004	.102	.000	.000	.000	.000	.000	.009	.007	.010
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCEN13	Pearson Correlation	.037	.030	.098	.143*	.140*	.182**	.135*	.020	.000	.014	.025	.026	.005	.009	.024	.054	.048	.048	.739**	.565**	.686**	.553**	.752**	1	.732**	.504**	.518**	.140*	.394**	.199**	.247**	.092	.396**	.045	.508**	.322**	-.241**	-.174**	-.117*	-.163*
	Sig. (2-tailed)	.572	.650	.136	.029	.033	.005	.039	.760	.996	.835	.707	.688	.940	.893	.717	.409	.466	.469	.000	.000	.000	.000	.000		.000	.000	.000	.032	.000	.002	.000	.161	.000	.490	.000	.000	.000	.008	.011	.013
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
HCEN12	Pearson Correlation	.007	.008	.001	.036	.056	.118	.127	-.006	-.015	-.009	-.007	-.013	-.028	-.022	-.017	.021	.032	.032	.798**	.816**	.627**	.514**	.770**	.732**	1	.564**	.520**	.102	.342**	.162*	.175**	.082	.262**	.053	.381**	.253**	-.146*	-.106	-.124	-.114

Sig.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
(2-	9	9	9	5	3	0	0	9	8	8	9	8	6	7	7	7	6	6	0	0	0	0	0	0		0	0	1	0	0	0	2	0	4	0	0	0	1	0	0
taile	1	0	8	8	9	7	5	2	2	9	1	4	7	3	9	4	2	2	0	0	0	0	0	0		0	0	2	0	1	0	1	0	2	0	0	2	0	5	8
d)	1	4	4	2	8	2	3	3	2	1	1	4	1	7	6	4	7	7	0	0	0	0	0	0		0	0	0	0	3	7	5	0	2	0	0	6	7	8	3
N	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
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E n	0	1	0	7	4	1	5	3	6	0	0	0	0	0	0	3	6	5	8	1	6	2	1	0	6		1	9	0	3	3	5	9	3	9	7	1	1	1	1
1 Cor	8	3	0	3	0	6	7	4	8	0	2	2	0	0	7	0	5	6	1	2	9	9	1	4	4		9	5	8	5	8	3	4	0	6	7	3	0	1	0
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(2-	9	8	9	2	5	8	3	0	3	9	9	9	9	9	9	6	3	3	0	0	0	0	0	0	0		0	1	0	0	0	4	0	6	0	0	0	1	0	1
taile	0	3	2	6	4	1	8	0	0	5	7	7	1	6	1	5	2	9	0	0	0	0	0	0	0		0	4	0	4	3	1	0	5	0	0	3	2	8	0
d)	9	9	7	6	5	4	9	0	2	2	4	8	0	4	8	1	1	4	0	0	0	0	0	0	0		0	8	1	0	6	9	3	4	0	7	5	8	4	2
N	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
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E n	0	0	1	9	5	5	4	9	4	0	0	0	0	0	0	2	3	3	9	1	8	9	0	1	2	1		9	4	1	5	6	1	2	4	3	1	0	1	0
1 Cor	2	2	9	2	5	6	9	6	1	1	0	2	0	0	5	6	2	3	5	6	6	6	2	8	0	9		5	7	6	9	0	6	1	9	2	4	7	0	7
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taile	8	9	7	6	0	9	5	4	3	8	9	7	4	8	3	9	2	1	0	0	0	0	0	0	0	0		4	0	7	1	6	0	4	0	0	2	3	2	6
d)	1	4	7	0	1	7	5	5	2	3	5	0	8	6	9	0	7	8	0	0	0	0	0	0	0	0		8	0	6	5	4	1	9	0	0	5	5	0	0
N	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
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C rso	.	0	0	0	0	0	.	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0		3	1	2	2	2	.	3	0	.	.	.	.
E n	0	6	5	5	4	4	0	4	2	0	5	4	4	3	6	7	5	0	1	2	3	2	3	4	0	9	9		2	2	1	7	3	0	2	2	2	1	1	1
1 Cor	9	1	9	7	5	6	3	6	2	9	5	0	2	8	5	8	5	8	7	7	5	6	6	0	2	5	5		2	0	3	1	3	1	3	7	0	1	0	0
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	Sig. (2-tailed)	.142	.351	.368	.389	.493	.483	.634	.485	.735	.890	.404	.543	.525	.569	.320	.234	.401	.102	.076	.054	.040	.054	.037	.032	.120	.148	.148		.000	.068	.001	.000	.000	.771	.000	.677	.002	.091	.121	.116
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCEN17	Pearson Correlation	.143*	.165*	.130*	.125	.056	.043	-.031	-.036	-.057	.060	.085	.091	.067	.062	.068	.067	.060	.112	.472**	.401**	.411**	.347**	.406**	.394**	.342**	.208**	.247**	.322**	1	.374**	.382**	.546**	.509**	-.080	.726**	.080	-.390**	-.297**	-.252**	-.275**
	Sig. (2-tailed)	.030	.011	.047	.056	.393	.517	.640	.588	.383	.361	.195	.164	.311	.349	.304	.312	.362	.087	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000		.000	.000	.000	.000	.223	.000	.223	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCEN16	Pearson Correlation	-.007	.053	.164*	.096	.059	.052	.033	.013	-.022	.043	.042	.050	.052	.047	.052	.058	.053	.078	.171**	.178**	.251**	.191**	.205**	.199**	.162*	.135*	.116	.120	.374**	1	.160*	.290**	.296**	-.031	.349**	.027	-.180**	-.115	-.102	-.110
	Sig. (2-tailed)	.917	.420	.012	.146	.374	.432	.620	.841	.736	.514	.521	.448	.425	.479	.430	.377	.417	.235	.009	.006	.000	.003	.002	.002	.013	.040	.076	.068	.000		.015	.000	.000	.640	.000	.687	.006	.079	.162	.094
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCEN15	Pearson Correlation	-.016	-.013	.005	-.005	.001	-.012	-.081	-.059	-.097	.008	.013	.020	.006	.022	.046	.040	.034	.178**	.232**	.122	.143*	.080	.186**	.287**	.175**	.138*	.159*	.213**	.382**	.160*	1	.530**	.416**	-.017	.541**	-.023	-.228**	-.185**	-.163*	-.190**

	Sig. (2-tailed)	.808	.840	.935	.935	.992	.856	.219	.367	.138	.904	.847	.763	.924	.736	.486	.548	.609	.006	.000	.062	.030	.223	.004	.000	.007	.036	.015	.001	.000	.015		.000	.000	.792	.000	.724	.000	.005	.013	.004
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCEN14	Pearson Correlation	-.037	-.018	.021	-.011	-.014	-.042	-.185**	-.085	-.140*	.006	.009	.021	.005	.025	.039	.009	-.027	.133*	.096	.065	.083	.078	.107	.092	.082	.053	.060	.271**	.546**	.290**	.530**	1	.579**	-.002	.718**	-.328**	-.190**	-.143*	-.153*	-.148*
	Sig. (2-tailed)	.578	.786	.749	.867	.827	.526	.005	.196	.032	.931	.890	.755	.937	.707	.554	.890	.687	.043	.144	.321	.206	.233	.102	.161	.215	.419	.364	.000	.000	.000	.000		.000	.981	.000	.000	.004	.030	.020	.024
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCEN13	Pearson Correlation	.041	.014	.074	.062	.068	.105	-.071	-.017	-.065	.038	.053	.058	.030	.037	.052	.052	.020	.120	.246**	.142*	.222**	.173**	.241**	.396**	.262**	.194**	.216**	.233**	.509**	.296**	.416**	.579**	1	.025	.663**	.048	-.234**	-.112**	-.147*	-.184**
	Sig. (2-tailed)	.532	.827	.264	.346	.298	.110	.279	.798	.327	.562	.423	.380	.649	.574	.431	.430	.764	.066	.000	.030	.001	.008	.000	.000	.000	.003	.001	.000	.000	.000	.000	.000		.707	.000	.466	.000	.008	.025	.005
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCEN12	Pearson Correlation	.018	.003	.026	.020	.020	.033	.077	.034	.057	.016	.017	.016	.023	.020	.028	.034	.043	.047	-.311**	-.366**	-.156*	-.255**	-.334**	.045	.053	.030	.021	-.019	-.080	-.031	-.017	-.002	.025	1	.075	-.007	.042	.027	.032	.029

	Sig. (2-tailed)	.784	.969	.696	.757	.763	.616	.242	.601	.386	.810	.800	.805	.725	.758	.667	.609	.515	.474	.000	.000	.017	.000	.000	.490	.422	.654	.749	.771	.223	.640	.792	.981	.707		.253	.921	.528	.680	.627	.660
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCEN11	Pearson Correlation	.034	.029	.072	.058	.036	.040	-.010	.028	.008	.028	.050	.054	.025	.037	.061	.062	.060	.144*	.387**	.285**	.376**	.300**	.407**	.508**	.381**	.296**	.349**	.323**	.726**	.349**	.541**	.718**	.663**	.075	1	.076	-.413**	-.217**	-.289**	-.291**
	Sig. (2-tailed)	.607	.663	.275	.381	.580	.546	.874	.668	.906	.667	.446	.409	.709	.578	.353	.347	.363	.028	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.253		.245	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
SCEN10	Pearson Correlation	.057	.041	.059	.089	.072	.091	.115	.072	.050	.020	.031	.030	.021	.012	.009	.033	.033	-.032	.267**	.223**	.335**	.229**	.289**	.322**	.253**	.177**	.232**	.027	.080	.027	-.023	-.328**	.048	-.007	.076	1	-.243**	-.270**	-.172**	-.263**
	Sig. (2-tailed)	.387	.531	.369	.176	.276	.165	.080	.276	.443	.764	.636	.649	.754	.860	.887	.611	.621	.627	.000	.001	.000	.000	.000	.000	.000	.007	.000	.677	.223	.687	.724	.000	.466	.921	.245		.000	.000	.008	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEN18	Pearson Correlation	.166*	.158*	.105	.071	.144*	.143*	.110	.155*	.143*	.130*	.125	.124	.122	.114	.114	.122	.137*	.099	-.239**	-.187**	-.238**	-.196**	-.231**	-.241**	-.146*	-.138*	-.147*	-.206**	-.390**	-.180**	-.228**	-.190**	-.234**	.042	-.413**	-.243**	1	.878**	.730**	.779**

	Sig. (2-tailed)	.011	.016	.109	.283	.028	.030	.095	.018	.029	.047	.058	.059	.063	.082	.082	.062	.037	.133	.000	.004	.000	.003	.000	.000	.026	.035	.025	.002	.000	.006	.000	.004	.000	.528	.000	.000		.000	.000	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEEN17	Pearson Correlation	.116	.138*	.095	.076	.113	.124	.108	.123	.171**	.103	.111	.105	.106	.096	.102	.114	.130*	.101	-.187**	-.143*	-.181**	-.125	-.171**	-.174**	-.106	-.100	-.078	-.111	-.297**	-.115	-.185**	-.143*	-.172**	.027	-.297**	-.270**	.878**	1	.744**	.906**
	Sig. (2-tailed)	.077	.036	.149	.250	.085	.060	.101	.061	.009	.118	.091	.110	.107	.142	.122	.082	.048	.123	.004	.029	.006	.057	.009	.008	.107	.128	.235	.091	.000	.079	.005	.030	.008	.680	.000	.000	.000		.000	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEEN16	Pearson Correlation	.103	.128	.114	.100	.125	.160*	.158*	.103	.145*	.089	.094	.097	.102	.084	.097	.104	.111	.077	-.193**	-.151*	-.167*	-.104	-.178**	-.167*	-.124	-.113	-.102	-.102	-.252**	-.092	-.163*	-.153*	-.147*	.032	-.289**	-.172**	.730**	.744**	1	.680**
	Sig. (2-tailed)	.117	.051	.083	.129	.057	.014	.016	.118	.027	.177	.151	.139	.121	.201	.138	.112	.091	.244	.003	.021	.011	.112	.007	.011	.058	.084	.120	.121	.000	.162	.013	.020	.025	.627	.000	.008	.000	.000		.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEEN15	Pearson Correlation	.076	.106	.090	.149*	.170**	.199**	.200**	.148*	.220**	.092	.095	.096	.135*	.107	.122	.140*	.167*	.156*	-.188**	-.158*	-.165*	-.087	-.169**	-.163*	-.114	-.107	-.074	-.103	-.275**	-.110	-.190**	-.148*	-.184**	.029	-.291**	-.263**	.779**	.906**	.680**	1

	Sig. (2-tailed)	.246	.105	.170	.022	.009	.002	.002	.024	.001	.162	.149	.146	.039	.102	.062	.032	.011	.017	.004	.016	.012	.188	.010	.013	.083	.102	.260	.116	.000	.094	.004	.024	.005	.660	.000	.000	.000	.000	.000	
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEEN14	Pearson Correlation	.026	.074	.043	.122	.135*	.148*	.152*	.132*	.131*	.078	.058	.058	.095	.089	.114	.101	.099	.083	-.148*	-.114	-.148*	-.091	-.160*	-.152*	-.111	-.104	-.130*	-.069	-.170**	-.104	-.135*	-.146*	-.157*	.030	-.256**	.020	.201**	-.014	.474**	.103
	Sig. (2-tailed)	.688	.260	.515	.063	.039	.024	.020	.045	.045	.238	.378	.380	.147	.178	.082	.123	.133	.210	.024	.082	.024	.165	.014	.021	.011	.112	.047	.297	.009	.115	.039	.025	.017	.653	.000	.763	.002	.832	.000	.116
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEEN13	Pearson Correlation	.028	.079	.041	.103	.189**	.257**	.236**	.190**	.208**	.070	.056	.056	.084	.084	.129*	.111	.128	.118	-.214**	-.168*	-.207**	-.114*	-.209**	-.201**	-.137*	-.140*	-.173**	-.115	-.320**	-.140*	-.214**	-.188**	-.240**	.032	-.400**	-.082	.455**	.243**	.325**	.344**
	Sig. (2-tailed)	.674	.230	.536	.119	.004	.000	.000	.004	.001	.290	.393	.399	.199	.199	.049	.090	.051	.073	.001	.010	.002	.028	.001	.002	.037	.033	.008	.079	.000	.032	.001	.004	.000	.629	.000	.213	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEEN12	Pearson Correlation	.024	.048	.029	.070	.136*	.205**	.278**	.160*	.219**	.052	.035	.028	.046	.048	.079	.089	.115	.118	-.179**	-.145*	-.182**	-.124	-.172**	-.156*	-.096	-.086	-.105	-.097	-.254**	-.089	-.159*	-.136*	-.139*	.041	-.255**	-.039	.372**	.251**	.276**	.246**

	Sig. (2-tailed)	.714	.462	.663	.285	.038	.002	.000	.015	.001	.430	.592	.675	.487	.465	.228	.177	.079	.072	.006	.027	.005	.059	.009	.017	.145	.190	.111	.139	.000	.176	.015	.038	.033	.535	.000	.557	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE11	Pearson Correlation	.034	.033	-.004	-.001	.026	.026	.226**	.165*	.205**	.031	.030	.026	.053	.056	.103	.094	.174**	.176**	-.224**	-.229**	-.266**	-.220**	-.330**	-.329**	-.140*	-.059	-.155*	-.118	-.204**	-.077	-.190**	-.157*	-.095	.037	-.342**	-.156*	.510**	.358**	.317**	.321**
	Sig. (2-tailed)	.601	.617	.501	.870	.693	.054	.000	.012	.002	.638	.652	.692	.421	.399	.118	.152	.008	.007	.001	.000	.000	.001	.000	.000	.032	.370	.018	.072	.002	.244	.004	.017	.149	.576	.000	.017	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
CEE10	Pearson Correlation	.006	.020	-.010	.015	.104	.127	.173**	.199**	.353**	.031	.032	.023	.060	.059	.105	.105	.177**	.182**	-.260**	-.233**	-.244**	-.186**	-.239**	-.250**	-.175**	-.131*	-.092	-.138*	-.421**	-.175**	-.233**	-.182**	-.218**	.035	-.350**	-.280**	.730**	.799**	.539**	.777**
	Sig. (2-tailed)	.931	.765	.879	.820	.114	.053	.008	.002	.000	.635	.632	.725	.358	.367	.111	.109	.007	.005	.000	.000	.000	.004	.000	.000	.007	.046	.159	.035	.000	.007	.000	.005	.001	.592	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
VAIC18	Pearson Correlation	.078	.088	.065	.101	.075	.059	.025	.055	-.010	.038	.052	.052	.030	.035	.035	.069	.062	.069	.977**	.865**	.790**	.674**	.869**	.726**	.787**	.574**	.488**	.295**	.484**	.172**	.245**	.128	.263**	-.304**	.399**	.240**	-.164*	-.107	-.128	-.118

	Sig. (2-tailed)	.235	.182	.323	.123	.256	.367	.708	.406	.883	.560	.432	.429	.647	.600	.596	.297	.345	.294	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.009	.000	.051	.000	.000	.000	.000	.012	.102	.051	.072
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
VAIC17	Pearson Correlation	.095	.127	.072	.082	.074	.067	.010	.052	-.006	.048	.058	.052	.030	.032	.028	.053	.052	.028	.869**	.991**	.640**	.574**	.787**	.557**	.811**	.503**	.414**	.130*	.419**	.184**	.120	.080	.149*	-.362**	.286**	.187**	-.086	-.019	-.060	-.046
	Sig. (2-tailed)	.147	.052	.276	.211	.259	.306	.880	.431	.928	.461	.377	.429	.650	.630	.673	.424	.427	.674	.000	.000	.000	.000	.000	.000	.000	.000	.000	.047	.000	.005	.069	.223	.023	.000	.000	.004	.193	.771	.362	.489
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
VAIC16	Pearson Correlation	.062	.065	.152*	.164*	.102	.074	.021	.043	-.038	.035	.045	.055	.042	.040	.028	.045	.015	-.010	.773**	.630**	.978**	.802**	.841**	.666**	.610**	.552**	.471**	.133*	.415**	.381**	.136*	.101	.236**	-.151*	.371**	.300**	-.141*	-.074	-.017	-.068
	Sig. (2-tailed)	.349	.325	.021	.012	.123	.262	.749	.513	.564	.595	.499	.404	.527	.543	.676	.500	.821	.879	.000	.000	.000	.000	.000	.000	.000	.000	.000	.044	.000	.000	.038	.127	.000	.022	.000	.000	.031	.259	.795	.302
	N	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232	232
VAIC15	Pearson Correlation	.053	.053	.109	.174**	.120	.114	.038	.022	-.039	.032	.039	.046	.036	.033	.026	.037	.014	.013	.681**	.566**	.804**	.987**	.728**	.558**	.515**	.428**	.402**	.139*	.357**	.195**	.184**	.127	.201**	-.251**	.330**	.190**	-.125	-.033	-.039	.016

	Sig. (2-tailed)	.424	.425	.097	.008	.068	.083	.559	.744	.555	.624	.551	.488	.582	.619	.691	.571	.831	.842	.000	.000	.000	.000	.000	.000	.000	.000	.000	.034	.000	.003	.005	.052	.002	.000	.000	.004	.057	.616	.559	.809
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
VAIC14	Pearson Correlation	.027	.040	.078	.120	.107	.105	.020	.008	-.045	.015	.019	.026	.015	.025	.024	.038	.009	.027	.853**	.767**	.833**	.715**	.966**	.723**	.746**	.489**	.476**	.175**	.475**	.239**	.264**	.282**	.323**	-.320**	.494**	.219**	-.125**	-.119**	-.113	-.175**
	Sig. (2-tailed)	.685	.544	.237	.067	.103	.110	.762	.909	.490	.815	.768	.696	.823	.710	.717	.565	.895	.681	.000	.000	.000	.000	.000	.000	.000	.000	.000	.007	.000	.000	.000	.000	.000	.000	.000	.001	.001	.002	.086	.007
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
VAIC13	Pearson Correlation	.046	.044	.111	.163*	.175**	.231**	.160*	.048	.026	.029	.040	.042	.022	.027	.051	.077	.070	.081	.710**	.536**	.655**	.533**	.723**	.984**	.718**	.489**	.499**	.146*	.393**	.207**	.256**	.132*	.470**	.052	.509**	.303**	-.188**	-.151*	-.127	-.125
	Sig. (2-tailed)	.487	.507	.092	.013	.008	.000	.014	.462	.692	.654	.545	.523	.733	.681	.441	.240	.289	.220	.000	.000	.000	.000	.000	.000	.000	.000	.000	.025	.000	.001	.000	.044	.000	.427	.000	.000	.004	.021	.053	.057
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
VAIC12	Pearson Correlation	.019	.011	.020	.045	.063	.122	.162*	.029	.042	.008	.008	.003	-.002	.001	.012	.044	.059	.062	.360**	.339**	.337**	.195**	.326**	.547**	.750**	.421**	.382**	.054	.177**	.090	.104	.048	.196**	.696**	.306**	.175**	-.051	-.041	-.049	-.046

	Sig. (2-tailed)	.774	.868	.762	.498	.338	.064	.013	.655	.520	.908	.902	.961	.979	.990	.856	.504	.366	.342	.000	.000	.000	.003	.000	.000	.000	.000	.000	.410	.007	.169	.114	.465	.003	.000	.000	.007	.437	.537	.456	.488
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
VAIC11	Pearson Correlation	.012	.018	-.006	.074	.044	.029	.076	.247**	.086	.001	.008	.007	-.001	.004	.020	.041	.084	.079	.573**	.499**	.556**	.419**	.498**	.495**	.564**	.996**	.713**	.101	.226**	.145*	.148*	.078	.220**	.037	.316**	.164*	-.112	-.082	-.099	-.093
	Sig. (2-tailed)	.850	.786	.927	.259	.507	.658	.248	.000	.190	.993	.907	.913	.987	.949	.766	.529	.203	.227	.000	.000	.000	.000	.000	.000	.000	.000	.000	.125	.000	.027	.024	.235	.001	.577	.000	.012	.088	.211	.133	.159
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
VAIC10	Pearson Correlation	-.018	-.017	.024	.103	.078	.085	.088	.131*	.195**	-.002	.009	.010	.007	.009	.021	.045	.061	.054	.477**	.398**	.479**	.386**	.489**	.507**	.511**	.701**	.986**	.075	.188**	.091	.117	-.012	.183**	.025	.297**	.315**	-.067	.006	-.042	.008
	Sig. (2-tailed)	.786	.799	.711	.115	.234	.198	.179	.045	.003	.973	.889	.882	.910	.890	.744	.491	.352	.410	.000	.000	.000	.000	.000	.000	.000	.000	.000	.252	.004	.169	.075	.855	.005	.707	.000	.000	.307	.925	.520	.905
	N	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233

Correlations

		CEE 14	CEE 13	CEE 12	CEE 11	CEE 10	VAIC 18	VAIC 17	VAIC 16	VAIC 15	VAIC 14	VAIC 13	VAIC 12	VAIC 11	VAIC 10
ROA 18	Pearson Correlation	.026	.028	.024	.034	.006	.078	.095	.062	.053	.027	.046	.019	.012	-.018
	Sig. (2-tailed)	.688	.674	.714	.601	.931	.235	.147	.349	.424	.685	.487	.774	.850	.786
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233

ROA 17	Pearson Correlation	.074	.079	.048	.033	.020	.088	.127	.065	.053	.040	.044	.011	.018	-.017
	Sig. (2-tailed)	.260	.230	.462	.617	.765	.182	.052	.325	.425	.544	.507	.868	.786	.799
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
ROA 16	Pearson Correlation	.043	.041	.029	-.044	-.010	.065	.072	.152*	.109	.078	.111	.020	-.006	.024
	Sig. (2-tailed)	.515	.536	.663	.501	.879	.323	.276	.021	.097	.237	.092	.762	.927	.711
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
ROA 15	Pearson Correlation	.122	.103	.070	-.011	.015	.101	.082	.164*	.174**	.120	.163*	.045	.074	.103
	Sig. (2-tailed)	.063	.119	.285	.870	.820	.123	.211	.012	.008	.067	.013	.498	.259	.115
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
ROA 14	Pearson Correlation	.135*	.189**	.136*	.026	.104	.075	.074	.102	.120	.107	.175**	.063	.044	.078
	Sig. (2-tailed)	.039	.004	.038	.693	.114	.256	.259	.123	.068	.103	.008	.338	.507	.234
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
ROA 13	Pearson Correlation	.148*	.257**	.205**	.126	.127	.059	.067	.074	.114	.105	.231**	.122	.029	.085
	Sig. (2-tailed)	.024	.000	.002	.054	.053	.367	.306	.262	.083	.110	.000	.064	.658	.198
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
ROA 12	Pearson Correlation	.152*	.236**	.278**	.226**	.173**	.025	.010	.021	.038	.020	.160*	.162*	.076	.088
	Sig. (2-tailed)	.020	.000	.000	.000	.008	.708	.880	.749	.559	.762	.014	.013	.248	.179
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
ROA 11	Pearson Correlation	.132*	.190**	.160*	.165*	.199**	.055	.052	.043	.022	.008	.048	.029	.247**	.131*
	Sig. (2-tailed)	.045	.004	.015	.012	.002	.406	.431	.513	.744	.909	.462	.655	.000	.045
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
ROA 10	Pearson Correlation	.131*	.208**	.219**	.205**	.353**	-.010	-.006	-.038	-.039	-.045	.026	.042	.086	.195**
	Sig. (2-tailed)	.045	.001	.001	.002	.000	.883	.928	.564	.555	.490	.692	.520	.190	.003
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233

TOB 18	Pearson Correlation	.078	.070	.052	.031	.031	.038	.048	.035	.032	.015	.029	.008	.001	-.002
	Sig. (2-tailed)	.238	.290	.430	.638	.635	.560	.461	.595	.624	.815	.654	.908	.993	.973
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
TOB 17	Pearson Correlation	.058	.056	.035	.030	.032	.052	.058	.045	.039	.019	.040	.008	.008	.009
	Sig. (2-tailed)	.378	.393	.592	.652	.632	.432	.377	.499	.551	.768	.545	.902	.907	.889
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
TOB 16	Pearson Correlation	.058	.056	.028	.026	.023	.052	.052	.055	.046	.026	.042	.003	.007	.010
	Sig. (2-tailed)	.380	.399	.675	.692	.725	.429	.429	.404	.488	.696	.523	.961	.913	.882
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
TOB 15	Pearson Correlation	.095	.084	.046	.053	.060	.030	.030	.042	.036	.015	.022	-.002	-.001	.007
	Sig. (2-tailed)	.147	.199	.487	.421	.358	.647	.650	.527	.582	.823	.733	.979	.987	.910
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
TOB 14	Pearson Correlation	.089	.084	.048	.056	.059	.035	.032	.040	.033	.025	.027	.001	.004	.009
	Sig. (2-tailed)	.178	.199	.465	.399	.367	.600	.630	.543	.619	.710	.681	.990	.949	.890
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
TOB 13	Pearson Correlation	.114	.129*	.079	.103	.105	.035	.028	.028	.026	.024	.051	.012	.020	.021
	Sig. (2-tailed)	.082	.049	.228	.118	.111	.596	.673	.676	.691	.717	.441	.856	.766	.744
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
TOB 12	Pearson Correlation	.101	.111	.089	.094	.105	.069	.053	.045	.037	.038	.077	.044	.041	.045
	Sig. (2-tailed)	.123	.090	.177	.152	.109	.297	.424	.500	.571	.565	.240	.504	.529	.491
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
TOB 11	Pearson Correlation	.099	.128	.115	.174**	.177**	.062	.052	.015	.014	.009	.070	.059	.084	.061
	Sig. (2-tailed)	.133	.051	.079	.008	.007	.345	.427	.821	.831	.895	.289	.366	.203	.352
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233

TOB 10	Pearson Correlation	.083	.118	.118	.176**	.182**	.069	.028	-.010	.013	.027	.081	.062	.079	.054
	Sig. (2-tailed)	.210	.073	.072	.007	.005	.294	.674	.879	.842	.681	.220	.342	.227	.410
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
HCE 18	Pearson Correlation	-.148*	-.214**	-.179**	-.224**	-.260**	.977**	.869**	.773**	.681**	.853**	.710**	.360**	.573**	.477**
	Sig. (2-tailed)	.024	.001	.006	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
HCE 17	Pearson Correlation	-.114	-.168*	-.145*	-.229**	-.233**	.865**	.991**	.630**	.566**	.767**	.536**	.339**	.499**	.398**
	Sig. (2-tailed)	.082	.010	.027	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
HCE 16	Pearson Correlation	-.148*	-.207**	-.182**	-.266**	-.244**	.790**	.640**	.978**	.804**	.833**	.655**	.337**	.556**	.479**
	Sig. (2-tailed)	.024	.002	.005	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	232	232	232	232	232	232	232	232	232	232	232	232	232	232
HCE 15	Pearson Correlation	-.091	-.144*	-.124	-.220**	-.186**	.674**	.574**	.802**	.987**	.715**	.533**	.195**	.419**	.386**
	Sig. (2-tailed)	.165	.028	.059	.001	.004	.000	.000	.000	.000	.000	.000	.003	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
HCE 14	Pearson Correlation	-.160*	-.209**	-.172**	-.300**	-.239**	.869**	.787**	.841**	.728**	.966**	.723**	.326**	.498**	.489**
	Sig. (2-tailed)	.014	.001	.009	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
HCE 13	Pearson Correlation	-.152*	-.201**	-.156*	-.329**	-.250**	.726**	.557**	.666**	.558**	.723**	.984**	.547**	.495**	.507**
	Sig. (2-tailed)	.021	.002	.017	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
HCE 12	Pearson Correlation	-.111	-.137*	-.096	-.140*	-.175**	.787**	.811**	.610**	.515**	.746**	.718**	.750**	.564**	.511**
	Sig. (2-tailed)	.091	.037	.145	.032	.007	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233

HCE 11	Pearson Correlation	-.104	-.140*	-.086	-.059	-.131*	.574**	.503**	.552**	.428**	.489**	.489**	.421**	.996**	.701**
	Sig. (2-tailed)	.112	.033	.190	.370	.046	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
HCE 10	Pearson Correlation	-.130*	-.173**	-.105	-.155*	-.092	.488**	.414**	.471**	.402**	.476**	.499**	.382**	.713**	.986**
	Sig. (2-tailed)	.047	.008	.111	.018	.159	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
SCE 18	Pearson Correlation	-.069	-.115	-.097	-.118	-.138*	.295**	.130*	.133*	.139*	.175**	.146*	.054	.101	.075
	Sig. (2-tailed)	.297	.079	.139	.072	.035	.000	.047	.044	.034	.007	.025	.410	.125	.252
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
SCE 17	Pearson Correlation	-.170**	-.320**	-.254**	-.204**	-.421**	.484**	.419**	.415**	.357**	.475**	.393**	.177**	.226**	.188**
	Sig. (2-tailed)	.009	.000	.000	.002	.000	.000	.000	.000	.000	.000	.000	.007	.000	.004
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
SCE 16	Pearson Correlation	-.104	-.140*	-.089	-.077	-.175**	.172**	.184**	.381**	.195**	.239**	.207**	.090	.145*	.091
	Sig. (2-tailed)	.115	.032	.176	.244	.007	.009	.005	.000	.003	.000	.001	.169	.027	.169
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
SCE 15	Pearson Correlation	-.135*	-.214**	-.159*	-.190**	-.233**	.245**	.120	.136*	.184**	.264**	.256**	.104	.148*	.117
	Sig. (2-tailed)	.039	.001	.015	.004	.000	.000	.069	.038	.005	.000	.000	.114	.024	.075
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
SCE 14	Pearson Correlation	-.146*	-.188**	-.136*	-.157*	-.182**	.128	.080	.101	.127	.282**	.132*	.048	.078	-.012
	Sig. (2-tailed)	.025	.004	.038	.017	.005	.051	.223	.127	.052	.000	.044	.465	.235	.855
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
SCE 13	Pearson Correlation	-.157*	-.240**	-.139*	-.095	-.218**	.263**	.149*	.236**	.201**	.323**	.470**	.196**	.220**	.183**
	Sig. (2-tailed)	.017	.000	.033	.149	.001	.000	.023	.000	.002	.000	.000	.003	.001	.005
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233

SCE 12	Pearson Correlation	.030	.032	.041	.037	.035	-.304**	-.362**	-.151*	-.251**	-.320**	.052	.696**	.037	.025
	Sig. (2-tailed)	.653	.629	.535	.576	.592	.000	.000	.022	.000	.000	.427	.000	.577	.707
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
SCE 11	Pearson Correlation	-.256**	-.400**	-.255**	-.342**	-.350**	.399**	.286**	.371**	.330**	.494**	.509**	.306**	.316**	.297**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
SCE 10	Pearson Correlation	.020	-.082	-.039	-.156*	-.280**	.240**	.187**	.300**	.190**	.219**	.303**	.175**	.164*	.315**
	Sig. (2-tailed)	.763	.213	.557	.017	.000	.000	.004	.000	.004	.001	.000	.007	.012	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
CEE 18	Pearson Correlation	.201**	.455**	.372**	.510**	.730**	-.164*	-.086	-.141*	-.125	-.225**	-.188**	-.051	-.112	-.067
	Sig. (2-tailed)	.002	.000	.000	.000	.000	.012	.193	.031	.057	.001	.004	.437	.088	.307
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
CEE 17	Pearson Correlation	-.014	.243**	.251**	.358**	.799**	-.107	-.019	-.074	-.033	-.199**	-.151*	-.041	-.082	.006
	Sig. (2-tailed)	.832	.000	.000	.000	.000	.102	.771	.259	.616	.002	.021	.537	.211	.925
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
CEE 16	Pearson Correlation	.474**	.325**	.276**	.317**	.539**	-.128	-.060	-.017	-.039	-.113	-.127	-.049	-.099	-.042
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.051	.362	.795	.559	.086	.053	.456	.133	.520
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
CEE 15	Pearson Correlation	.103	.344**	.246**	.321**	.777**	-.118	-.046	-.068	.016	-.175**	-.125	-.046	-.093	.008
	Sig. (2-tailed)	.116	.000	.000	.000	.000	.072	.489	.302	.809	.007	.057	.488	.159	.905
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
CEE 14	Pearson Correlation	1	.678**	.371**	.341**	.053	-.136*	-.125	-.084	-.095	.007	-.055	-.034	-.086	-.116
	Sig. (2-tailed)		.000	.000	.000	.420	.038	.056	.205	.150	.916	.400	.606	.192	.078
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233

CEE 13	Pearson Correlation	.678**	1	.589**	.664**	.444**	-.183**	-.152*	-.170**	-.126	-.111	-.061	-.036	-.099	-.113
	Sig. (2-tailed)	.000		.000	.000	.000	.005	.021	.010	.054	.090	.350	.588	.132	.084
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
CEE 12	Pearson Correlation	.371**	.589**	1	.529**	.396**	-.154*	-.124	-.146*	-.112	-.124	-.072	.029	-.050	-.048
	Sig. (2-tailed)	.000	.000		.000	.000	.019	.059	.026	.088	.060	.273	.655	.444	.462
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
CEE 11	Pearson Correlation	.341**	.664**	.529**	1	.593**	-.187**	-.188**	-.219**	-.202**	-.259**	-.222**	-.039	.015	-.083
	Sig. (2-tailed)	.000	.000	.000		.000	.004	.004	.001	.002	.000	.001	.551	.823	.204
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
CEE 10	Pearson Correlation	.053	.444**	.396**	.593**	1	-.201**	-.145*	-.177**	-.116	-.260**	-.197**	-.075	-.094	.021
	Sig. (2-tailed)	.420	.000	.000	.000		.002	.027	.007	.078	.000	.003	.253	.152	.754
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
VAI C18	Pearson Correlation	-.136*	-.183**	-.154*	-.187**	-.201**	1	.868**	.769**	.682**	.846**	.705**	.358**	.570**	.475**
	Sig. (2-tailed)	.038	.005	.019	.004	.002		.000	.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
VAI C17	Pearson Correlation	-.125	-.152*	-.124	-.188**	-.145*	.868**	1	.637**	.576**	.759**	.533**	.340**	.494**	.405**
	Sig. (2-tailed)	.056	.021	.059	.004	.027	.000		.000	.000	.000	.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
VAI C16	Pearson Correlation	-.084	-.170**	-.146*	-.219**	-.177**	.769**	.637**	1	.801**	.824**	.644**	.332**	.544**	.470**
	Sig. (2-tailed)	.205	.010	.026	.001	.007	.000	.000		.000	.000	.000	.000	.000	.000
	N	232	232	232	232	232	232	232	232	232	232	232	232	232	232
VAI C15	Pearson Correlation	-.095	-.126	-.112	-.202**	-.116	.682**	.576**	.801**	1	.718**	.544**	.200**	.422**	.397**
	Sig. (2-tailed)	.150	.054	.088	.002	.078	.000	.000	.000		.000	.000	.002	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233

VAIC14	Pearson Correlation	.007	-.111	-.124	-.259**	-.260**	.846**	.759**	.824**	.718**	1	.721**	.321**	.485**	.452**
	Sig. (2-tailed)	.916	.090	.060	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
VAIC13	Pearson Correlation	-.055	-.061	-.072	-.222**	-.197**	.705**	.533**	.644**	.544**	.721**	1	.548**	.490**	.495**
	Sig. (2-tailed)	.400	.350	.273	.001	.003	.000	.000	.000	.000	.000		.000	.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
VAIC12	Pearson Correlation	-.034	-.036	.029	-.039	-.075	.358**	.340**	.332**	.200**	.321**	.548**	1	.428**	.382**
	Sig. (2-tailed)	.606	.588	.655	.551	.253	.000	.000	.000	.002	.000	.000		.000	.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
VAIC11	Pearson Correlation	-.086	-.099	-.050	.015	-.094	.570**	.494**	.544**	.422**	.485**	.490**	.428**	1	.699**
	Sig. (2-tailed)	.192	.132	.444	.823	.152	.000	.000	.000	.000	.000	.000	.000		.000
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233
VAIC10	Pearson Correlation	-.116	-.113	-.048	-.083	.021	.475**	.405**	.470**	.397**	.452**	.495**	.382**	.699**	1
	Sig. (2-tailed)	.078	.084	.462	.204	.754	.000	.000	.000	.000	.000	.000	.000	.000	
	N	233	233	233	233	233	233	233	232	233	233	233	233	233	233

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

*. Correlation is significant at the 0.05 level (2-tailed).

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA18
  /METHOD=ENTER NEmp17 TA17 LEV17 VAIC17.
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Regression

Notes

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA18 /METHOD=ENTER NEmp17 TA17 LEV17 VAIC17.
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	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC17, TA17, LEV17, NEmp17[b]	.	Enter

a. Dependent Variable: ROA18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.124[a]	.015	-.002	16.08805

a. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	916.847	4	229.212	.886	.473[b]
	Residual	59012.172	228	258.825		
	Total	59929.019	232			

a. Dependent Variable: ROA18

b. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.006	1.643		4.872	.000
	NEmp17	-8.909E-6	.000	-.036	-.528	.598
	TA17	-2.351E-8	.000	-.042	-.615	.539
	LEV17	-.006	.009	-.043	-.649	.517
	VAIC17	.353	.257	.091	1.373	.171

a. Dependent Variable: ROA18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER NEmp17 TA17 LEV17 VAIC17.
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Regression

Notes

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER NEmp17 TA17 LEV17 VAIC17.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.05
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC17, TA17, LEV17, NEmp17[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.145[a]	.021	.004	4.09555

a. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.817	4	20.454	1.219	.303[b]
	Residual	3824.359	228	16.774		
	Total	3906.176	232			

a. Dependent Variable: TOB18

b. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.001	.418		4.783	.000
	NEmp17	-2.305E-6	.000	-.037	-.536	.592
	TA17	-9.057E-9	.000	-.063	-.931	.353
	LEV17	-.003	.002	-.103	-1.553	.122
	VAIC17	.041	.065	.042	.633	.528

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE18
  /METHOD=ENTER NEmp17 TA17 LEV17 VAIC17.
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Regression

Notes

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER NEmp17 TA17 LEV17 VAIC17.
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	Elapsed Time	00:00:00.05
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Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC17, TA17, LEV17, NEmp17[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.291[a]	.085	.069	23.15738

a. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11340.490	4	2835.122	5.287	.000[b]
	Residual	122268.295	228	536.264		
	Total	133608.785	232			

a. Dependent Variable: ROE18

b. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	12.293	2.365		5.197	.000
	NEmp17	1.963E-5	.000	.053	.808	.420
	TA17	-2.304E-8	.000	-.027	-.419	.676
	LEV17	.055	.013	.279	4.350	.000
	VAIC17	.088	.370	.015	.238	.812

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
```

```
/NOORIGIN
/DEPENDENT PE18
/METHOD=ENTER NEmp17 TA17 LEV17 VAIC17.
```

Regression

Notes

Output Created		16-JUL-2019 17:26:59
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER NEmp17 TA17 LEV17 VAIC17.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.04
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC17, TA17, LEV17, NEmp17[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.125[a]	.016	-.002	22.96185

a. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1894.081	4	473.520	.898	.466[b]
	Residual	120212.221	228	527.247		
	Total	122106.302	232			

a. Dependent Variable: PE18

b. Predictors: (Constant), VAIC17, TA17, LEV17, NEmp17

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	25.948	2.345		11.063	.000
	NEmp17	-1.233E-5	.000	-.035	-.512	.609
	TA17	-4.040E-8	.000	-.050	-.741	.460
	LEV17	.000	.012	.001	.011	.991
	VAIC17	-.601	.367	-.108	-1.638	.103

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA18
  /METHOD=ENTER NEmp16 TA16 LEV16 VAIC16.
```

Regression

Notes

Output Created		16-JUL-2019 17:35:02
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA18 /METHOD=ENTER NEmp16 TA16 LEV16 VAIC16.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.10

	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: ROA18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.135[a]	.018	.001	16.09403

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1090.946	4	272.736	1.053	.381[b]
	Residual	58797.066	227	259.018		
	Total	59888.011	231			

a. Dependent Variable: ROA18

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.194	1.733		5.303	.000
	NEmp16	-5.966E-6	.000	-.025	-.357	.721
	TA16	-3.462E-8	.000	-.046	-.680	.497
	LEV16	-.014	.009	-.099	-1.483	.139

VAIC16	.209	.268	.052	.780	.436

a. Dependent Variable: ROA18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER NEmp16 TA16 LEV16 VAIC16.
```

Regression

Notes

Output Created		16-JUL-2019 17:35:36
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER NEmp16 TA16 LEV16 VAIC16.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.06
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.169[a]	.029	.011	4.08761

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	111.286	4	27.822	1.665	.159[b]
	Residual	3792.836	227	16.709		
	Total	3904.122	231			

a. Dependent Variable: TOB18

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.201	.440		4.999	.000
	NEmp16	-1.535E-6	.000	-.025	-.362	.718
	TA16	-1.338E-8	.000	-.070	-1.034	.302
	LEV16	-.005	.002	-.138	-2.067	.040
	VAIC16	.023	.068	.022	.332	.740

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE18
  /METHOD=ENTER NEmp16 TA16 LEV16 VAIC16.
```

Regression

Notes

Output Created		16-JUL-2019 17:37:41
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.

	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER NEmp16 TA16 LEV16 VAIC16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.07
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.175[a]	.031	.014	23.87019

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4100.738	4	1025.185	1.799	.130[b]

Residual	129341.455	227	569.786		
Total	133442.193	231			

a. Dependent Variable: ROE18

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	15.991	2.571		6.220	.000
	NEmp16	2.177E-5	.000	.061	.879	.380
	TA16	-2.846E-8	.000	-.026	-.377	.707
	LEV16	.028	.014	.136	2.040	.043
	VAIC16	-.380	.397	-.063	-.956	.340

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER NEmp16 TA16 LEV16 VAIC16.
```

Regression

Notes

Output Created		16-JUL-2019 17:38:06
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER NEmp16 TA16 LEV16 VAIC16.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.20
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC16, TA16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.137[a]	.019	.001	22.96931

a. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2290.873	4	572.718	1.086	.364[b]
	Residual	119762.794	227	527.589		
	Total	122053.667	231			

a. Dependent Variable: PE18

b. Predictors: (Constant), VAIC16, TA16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	26.454	2.474		10.693	.000
	NEmp16	-1.326E-5	.000	-.039	-.556	.578
	TA16	-5.311E-8	.000	-.050	-.730	.466
	LEV16	.000	.013	.002	.030	.976
	VAIC16	-.700	.382	-.121	-1.831	.068

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA18
  /METHOD=ENTER NEmp15 LEV15 TA15 VAIC15.
```

Regression

Notes

Output Created		16-JUL-2019 18:03:05
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA18 /METHOD=ENTER NEmp15 LEV15 TA15 VAIC15.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.11
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: ROA18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.128[a]	.016	-.001	16.07866

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	985.707	4	246.427	.953	.434[b]
	Residual	58943.312	228	258.523		
	Total	59929.019	232			

a. Dependent Variable: ROA18

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.018	1.482		6.084	.000
	NEmp15	-6.334E-6	.000	-.038	-.562	.575
	LEV15	-.011	.008	-.091	-1.383	.168
	TA15	-3.681E-8	.000	-.050	-.753	.452
	VAIC15	.180	.211	.056	.851	.396

a. Dependent Variable: ROA18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER NEmp15 LEV15 TA15 VAIC15.
```

Regression

Notes

Output Created	16-JUL-2019 18:03:33
Comments	

Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER NEmp15 LEV15 TA15 VAIC15.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.07
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.154[a]	.024	.007	4.08960

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	92.922	4	23.230	1.389	.239[b]
	Residual	3813.254	228	16.725		
	Total	3906.176	232			

a. Dependent Variable: TOB18

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.048	.377		5.432	.000
	NEmp15	-2.094E-6	.000	-.049	-.730	.466
	LEV15	-.004	.002	-.114	-1.735	.084
	TA15	-1.314E-8	.000	-.070	-1.057	.292
	VAIC15	.030	.054	.037	.561	.576

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE18
  /METHOD=ENTER NEmp15 LEV15 TA15 VAIC15.
```

Regression

Notes

Output Created		16-JUL-2019 18:05:54
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER NEmp15 LEV15 TA15 VAIC15.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.05
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.211[a]	.044	.028	23.66440

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5927.949	4	1481.987	2.646	.034[b]
	Residual	127680.836	228	560.004		
	Total	133608.785	232			

a. Dependent Variable: ROE18

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.593	2.182		7.147	.000
	NEmp15	8.189E-6	.000	.033	.494	.622
	LEV15	.036	.012	.198	3.044	.003
	TA15	-2.031E-8	.000	-.019	-.282	.778
	VAIC15	-.290	.311	-.060	-.932	.352

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER NEmp15 LEV15 TA15 VAIC15.
```

Regression

Notes

Output Created		16-JUL-2019 18:06:15
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER NEmp15 LEV15 TA15 VAIC15.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.08
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method

1	VAIC15, LEV15, TA15, NEmp15[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.169[a]	.028	.011	22.81098

a. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3468.553	4	867.138	1.666	.159[b]
	Residual	118637.749	228	520.341		
	Total	122106.302	232			

a. Dependent Variable: PE18

b. Predictors: (Constant), VAIC15, LEV15, TA15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26.677	2.103		12.685	.000
	NEmp15	-1.224E-5	.000	-.051	-.765	.445
	LEV15	-.021	.011	-.118	-1.799	.073
	TA15	-4.806E-8	.000	-.046	-.693	.489
	VAIC15	-.387	.300	-.084	-1.289	.199

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA18
  /METHOD=ENTER TA15 NEmp15 LEV15 HCE15 SCE15 CEE15.
```

Regression

Notes

Output Created		16-JUL-2019 18:15:47
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA18 /METHOD=ENTER TA15 NEmp15 LEV15 HCE15 SCE15 CEE15.
Resources	Processor Time	00:00:00.08
	Elapsed Time	00:00:00.09
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CEE15, LEV15, TA15, HCE15, SCE15, NEmp15[b]	.	Enter

a. Dependent Variable: ROA18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.151[a]	.023	-.003	16.09851

a. Predictors: (Constant), CEE15, LEV15, TA15, HCE15, SCE15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1358.373	6	226.396	.874	.515[b]
	Residual	58570.646	226	259.162		
	Total	59929.019	232			

a. Dependent Variable: ROA18

b. Predictors: (Constant), CEE15, LEV15, TA15, HCE15, SCE15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.400	1.925		4.364	.000
	TA15	-2.983E-8	.000	-.041	-.605	.546
	NEmp15	-8.505E-6	.000	-.051	-.743	.458
	LEV15	-.011	.008	-.091	-1.377	.170
	HCE15	.186	.216	.057	.860	.390

SCE15	-.309	1.677	-.012	-.184	.854
CEE15	2.074	1.731	.081	1.198	.232

a. Dependent Variable: ROA18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER TA15 NEmp15 LEV15 HCE15 SCE15 CEE15.
```

Regression

Notes

Output Created		16-JUL-2019 18:16:39
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER TA15 NEmp15 LEV15 HCE15 SCE15 CEE15.
Resources	Processor Time	00:00:00.08
	Elapsed Time	00:00:00.07
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CEE15, LEV15, TA15, HCE15, SCE15, NEmp15[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.180[a]	.032	.007	4.08943

a. Predictors: (Constant), CEE15, LEV15, TA15, HCE15, SCE15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	126.680	6	21.113	1.263	.276[b]

Residual	3779.496	226	16.723		
Total	3906.176	232			

a. Dependent Variable: TOB18

b. Predictors: (Constant), CEE15, LEV15, TA15, HCE15, SCE15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.731	.489		3.539	.000
	TA15	-1.129E-8	.000	-.060	-.902	.368
	NEmp15	-2.636E-6	.000	-.061	-.907	.365
	LEV15	-.004	.002	-.112	-1.705	.090
	HCE15	.026	.055	.032	.483	.630
	SCE15	.101	.426	.016	.238	.812
	CEE15	.650	.440	.100	1.478	.141

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE18
  /METHOD=ENTER TA15 NEmp15 LEV15 HCE15 SCE15 CEE15.
```

Regression

Notes

Output Created		16-JUL-2019 18:20:03
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER TA15 NEmp15 LEV15 HCE15 SCE15 CEE15.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.07
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CEE15, LEV15, TA15, HCE15, SCE15, NEmp15[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.253[a]	.064	.039	23.52367

a. Predictors: (Constant), CEE15, LEV15, TA15, HCE15, SCE15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8548.724	6	1424.787	2.575	.020[b]
	Residual	125060.060	226	553.363		
	Total	133608.785	232			

a. Dependent Variable: ROE18

b. Predictors: (Constant), CEE15, LEV15, TA15, HCE15, SCE15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	14.647	2.813		5.208	.000
	TA15	-1.622E-9	.000	-.001	-.023	.982
	NEmp15	2.220E-6	.000	.009	.133	.894
	LEV15	.036	.012	.197	3.044	.003
	HCE15	-.251	.315	-.052	-.797	.426
	SCE15	-2.525	2.451	-.068	-1.030	.304
	CEE15	4.243	2.529	.111	1.677	.095

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER TA15 NEmp15 LEV15 HCE15 SCE15 CEE15.
```

Regression

Notes

Output Created		16-JUL-2019 18:21:17
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER TA15 NEmp15 LEV15 HCE15 SCE15 CEE15.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.09
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method

1	CEE15, LEV15, TA15, HCE15, SCE15, NEmp15[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.190[a]	.036	.010	22.82152

a. Predictors: (Constant), CEE15, LEV15, TA15, HCE15, SCE15, NEmp15

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4400.539	6	733.423	1.408	.212[b]
	Residual	117705.763	226	520.822		
	Total	122106.302	232			

a. Dependent Variable: PE18

b. Predictors: (Constant), CEE15, LEV15, TA15, HCE15, SCE15, NEmp15

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	27.400	2.729		10.042	.000
	TA15	-3.888E-8	.000	-.037	-.556	.579
	NEmp15	-1.543E-5	.000	-.064	-.951	.343
	LEV15	-.021	.012	-.121	-1.837	.067
	HCE15	-.328	.306	-.071	-1.071	.285
	SCE15	-3.038	2.378	-.086	-1.278	.203
	CEE15	.932	2.454	.026	.380	.704

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER CEE14 SCE14 HCE14 LEV14 NEmp14 TA14.
```

Regression

Notes

Output Created		16-JUL-2019 18:24:37
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER CEE14 SCE14 HCE14 LEV14 NEmp14 TA14.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.06

	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	TA14, HCE14, LEV14, SCE14, CEE14, NEmp14[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.141[a]	.020	-.006	23.01323

a. Predictors: (Constant), TA14, HCE14, LEV14, SCE14, CEE14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2414.674	6	402.446	.760	.602[b]
	Residual	119691.628	226	529.609		
	Total	122106.302	232			

a. Dependent Variable: PE18

b. Predictors: (Constant), TA14, HCE14, LEV14, SCE14, CEE14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26.011	2.757		9.435	.000

CEE14	.356	1.992	.012	.179	.858
SCE14	-1.533	1.847	-.056	-.830	.407
HCE14	-.543	.389	-.094	-1.395	.164
LEV14	.002	.013	.012	.189	.850
NEmp14	-1.762E-5	.000	-.070	-1.033	.303
TA14	-3.924E-8	.000	-.037	-.548	.584

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE18
  /METHOD=ENTER CEE14 SCE14 HCE14 LEV14 NEmp14 TA14.
```

Regression

Notes

Output Created		16-JUL-2019 18:25:02
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE18 /METHOD=ENTER CEE14 SCE14 HCE14 LEV14 NEmp14 TA14.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.07
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	TA14, HCE14, LEV14, SCE14, CEE14, NEmp14[b]	.	Enter

a. Dependent Variable: ROE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.137[a]	.019	-.007	24.08593

a. Predictors: (Constant), TA14, HCE14, LEV14, SCE14, CEE14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2498.953	6	416.492	.718	.636[b]

Residual	131109.831	226	580.132		
Total	133608.785	232			

a. Dependent Variable: ROE18

b. Predictors: (Constant), TA14, HCE14, LEV14, SCE14, CEE14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	18.417	2.885		6.383	.000
	CEE14	.597	2.085	.020	.287	.775
	SCE14	-2.450	1.933	-.085	-1.268	.206
	HCE14	-.391	.407	-.064	-.960	.338
	LEV14	.009	.014	.044	.664	.507
	NEmp14	1.026E-5	.000	.039	.575	.566
	TA14	-1.108E-8	.000	-.010	-.148	.883

a. Dependent Variable: ROE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA18
  /METHOD=ENTER CEE14 SCE14 HCE14 LEV14 NEmp14 TA14.
```

Regression

Notes

Output Created		16-JUL-2019 18:25:41
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA18 /METHOD=ENTER CEE14 SCE14 HCE14 LEV14 NEmp14 TA14.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.05
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	TA14, HCE14, LEV14, SCE14, CEE14, NEmp14[b]	.	Enter

a. Dependent Variable: ROA18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.132[a]	.017	-.009	16.14139

a. Predictors: (Constant), TA14, HCE14, LEV14, SCE14, CEE14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1045.936	6	174.323	.669	.675[b]
	Residual	58883.083	226	260.545		
	Total	59929.019	232			

a. Dependent Variable: ROA18

b. Predictors: (Constant), TA14, HCE14, LEV14, SCE14, CEE14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.434	1.934		4.879	.000
	CEE14	.490	1.397	.024	.350	.726
	SCE14	-.814	1.295	-.042	-.628	.530
	HCE14	.150	.273	.037	.549	.584
	LEV14	-.013	.009	-.095	-1.433	.153
	NEmp14	-7.679E-6	.000	-.044	-.642	.522
	TA14	-3.113E-8	.000	-.042	-.620	.536

a. Dependent Variable: ROA18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER CEE14 SCE14 HCE14 LEV14 NEmp14 TA14.
```

Regression

Notes

Output Created		16-JUL-2019 18:26:05
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER CEE14 SCE14 HCE14 LEV14 NEmp14 TA14.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.07
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method

1	TA14, HCE14, LEV14, SCE14, CEE14, NEmp14[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.151[a]	.023	-.003	4.10991

a. Predictors: (Constant), TA14, HCE14, LEV14, SCE14, CEE14, NEmp14

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.738	6	14.790	.876	.514[b]
	Residual	3817.438	226	16.891		
	Total	3906.176	232			

a. Dependent Variable: TOB18

b. Predictors: (Constant), TA14, HCE14, LEV14, SCE14, CEE14, NEmp14

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.803	.492		3.661	.000
	CEE14	.413	.356	.079	1.160	.247
	SCE14	.053	.330	.011	.159	.874
	HCE14	.009	.070	.009	.127	.899
	LEV14	-.003	.002	-.083	-1.255	.211
	NEmp14	-2.719E-6	.000	-.061	-.892	.373
	TA14	-1.090E-8	.000	-.058	-.853	.395

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB18
  /METHOD=ENTER CEE13 TA13 NEmp13 SCE13 HCE13 LEV13.
```

Regression

Notes

Output Created		16-JUL-2019 18:28:02
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB18 /METHOD=ENTER CEE13 TA13 NEmp13 SCE13 HCE13 LEV13.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.12

	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV13, TA13, HCE13, NEmp13, CEE13, SCE13[b]	.	Enter

a. Dependent Variable: TOB18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.174[a]	.030	.004	4.09413

a. Predictors: (Constant), LEV13, TA13, HCE13, NEmp13, CEE13, SCE13

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	117.983	6	19.664	1.173	.322[b]
	Residual	3788.193	226	16.762		
	Total	3906.176	232			

a. Dependent Variable: TOB18

b. Predictors: (Constant), LEV13, TA13, HCE13, NEmp13, CEE13, SCE13

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.416	.630		2.246	.026

CEE13	.702	.588	.082	1.194	.234
TA13	-1.271E-8	.000	-.068	-.995	.321
NEmp13	-2.654E-6	.000	-.057	-.829	.408
SCE13	.742	.807	.067	.919	.359
HCE13	.011	.104	.008	.108	.914
LEV13	-.004	.002	-.111	-1.682	.094

a. Dependent Variable: TOB18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB17
  /METHOD=ENTER CEE13 TA13 NEmp13 SCE13 HCE13 LEV13.
```

Regression

Notes

Output Created		16-JUL-2019 18:59:12
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB17 /METHOD=ENTER CEE13 TA13 NEmp13 SCE13 HCE13 LEV13.
Resources	Processor Time	00:00:00.11
	Elapsed Time	00:00:00.07
	Memory Required	6356 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV13, TA13, HCE13, NEmp13, CEE13, SCE13[b]	.	Enter

a. Dependent Variable: TOB17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.159[a]	.025	-.001	4.05034

a. Predictors: (Constant), LEV13, TA13, HCE13, NEmp13, CEE13, SCE13

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	95.610	6	15.935	.971	.445[b]

	Residual	3707.588	226	16.405		
	Total	3803.198	232			

a. Dependent Variable: TOB17

b. Predictors: (Constant), LEV13, TA13, HCE13, NEmp13, CEE13, SCE13

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.208	.624		1.938	.054
	CEE13	.607	.581	.072	1.043	.298
	TA13	-1.178E-8	.000	-.064	-.932	.353
	NEmp13	-2.219E-6	.000	-.048	-.701	.484
	SCE13	.830	.799	.076	1.039	.300
	HCE13	.019	.103	.013	.182	.856
	LEV13	-.003	.002	-.096	-1.456	.147

a. Dependent Variable: TOB17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROA17
  /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
```

Regression

Notes

Output Created		16-JUL-2019 19:38:57
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROA17 /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
Resources	Processor Time	00:00:00.09
	Elapsed Time	00:00:00.06
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	TA16, VAIC16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: ROA17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.185[a]	.034	.017	16.66003

a. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2226.458	4	556.614	2.005	.095[b]
	Residual	63005.358	227	277.557		
	Total	65231.816	231			

a. Dependent Variable: ROA17

b. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.851	1.794		4.933	.000
	LEV16	-.021	.010	-.145	-2.179	.030
	VAIC16	.221	.277	.052	.796	.427
	NEmp16	-2.811E-6	.000	-.011	-.163	.871
	TA16	-6.521E-8	.000	-.084	-1.237	.218

a. Dependent Variable: ROA17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT TOB17
  /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
```

Regression

Notes

Output Created	16-JUL-2019 19:39:57
Comments	

Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT TOB17 /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.16
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	TA16, VAIC16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: TOB17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.167[a]	.028	.011	4.03478

a. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	106.220	4	26.555	1.631	.167[b]
	Residual	3695.430	227	16.279		
	Total	3801.650	231			

a. Dependent Variable: TOB17

b. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.001	.435		4.603	.000
	LEV16	-.005	.002	-.141	-2.112	.036
	VAIC16	.033	.067	.032	.487	.627
	NEmp16	-9.569E-7	.000	-.016	-.229	.819
	TA16	-1.194E-8	.000	-.063	-.935	.351

a. Dependent Variable: TOB17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ROE17
  /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
```

Regression

Notes

Output Created		16-JUL-2019 19:41:01
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ROE17 /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.05
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	TA16, VAIC16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: ROE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.342[a]	.117	.101	37.64243

a. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42578.576	4	10644.644	7.512	.000[b]
	Residual	321648.240	227	1416.953		
	Total	364226.816	231			

a. Dependent Variable: ROE17

b. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.267	4.054		1.052	.294
	LEV16	.117	.022	.340	5.350	.000
	VAIC16	-.274	.626	-.027	-.438	.662
	NEmp16	-1.289E-5	.000	-.022	-.330	.742
	TA16	-8.078E-8	.000	-.044	-.678	.498

a. Dependent Variable: ROE17

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE18
  /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
```

Regression

Notes

Output Created		16-JUL-2019 19:41:54
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE18 /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.09
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method

1	TA16, VAIC16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: PE18

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.137[a]	.019	.001	22.96931

a. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2290.873	4	572.718	1.086	.364[b]
	Residual	119762.794	227	527.589		
	Total	122053.667	231			

a. Dependent Variable: PE18

b. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26.454	2.474		10.693	.000
	LEV16	.000	.013	.002	.030	.976
	VAIC16	-.700	.382	-.121	-1.831	.068
	NEmp16	-1.326E-5	.000	-.039	-.556	.578
	TA16	-5.311E-8	.000	-.050	-.730	.466

a. Dependent Variable: PE18

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PE17
  /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
```

Regression

Notes

Output Created		16-JUL-2019 19:42:23
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PE17 /METHOD=ENTER LEV16 VAIC16 NEmp16 TA16.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.06
	Memory Required	5612 bytes
	Additional Memory Required for Residual Plots	0 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	TA16, VAIC16, LEV16, NEmp16[b]	.	Enter

a. Dependent Variable: PE17

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.141[a]	.020	.003	35.60720

a. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5845.873	4	1461.468	1.153	.333[b]
	Residual	287807.088	227	1267.873		
	Total	293652.961	231			

a. Dependent Variable: PE17

b. Predictors: (Constant), TA16, VAIC16, LEV16, NEmp16

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	23.259	3.835		6.064	.000
	LEV16	.019	.021	.062	.928	.355
	VAIC16	1.102	.592	.123	1.861	.064
	NEmp16	-2.165E-5	.000	-.041	-.586	.558
	TA16	5.213E-8	.000	.032	.463	.644

a. Dependent Variable: PE17

Descriptive Analysis

```
DESCRIPTIVES VARIABLES=ROA18 ROA17 ROA16 ROA15 ROA14 ROA13 ROA12 ROA11
ROA10 TOB18 TOB17 TOB16
    TOB15 TOB14 TOB13 TOB12 TOB11 TOB10 NEmp18 NEmp17 NEmp16 NEmp15 NEmp14
NEmp13 NEmp12 NEmp11 NEmp10
    TA18 TA17 TA16 TA15 TA14 TA13 TA12 TA11 TA10 LEV18 LEV17 LEV16 LEV15
LEV14 LEV13 LEV12 LEV11 LEV10
    HCE18 HCE17 HCE16 HCE15 HCE14 HCE13 HCE12 HCE11 HCE10 SCE18 SCE17 SCE16
SCE15 SCE14 SCE13 SCE12
    SCE11 SCE10 CEE18 CEE17 CEE16 CEE15 CEE14 CEE13 CEE12 CEE11 CEE10
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Notes

Output Created		05-DEC-2019 14:01:21
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.

Syntax		DESCRIPTIVES VARIABLES=ROA18 ROA17 ROA16 ROA15 ROA14 ROA13 ROA12 ROA11 ROA10 TOB18 TOB17 TOB16 TOB15 TOB14 TOB13 TOB12 TOB11 TOB10 NEmp18 NEmp17 NEmp16 NEmp15 NEmp14 NEmp13 NEmp12 NEmp11 NEmp10 TA18 TA17 TA16 TA15 TA14 TA13 TA12 TA11 TA10 LEV18 LEV17 LEV16 LEV15 LEV14 LEV13 LEV12 LEV11 LEV10 HCE18 HCE17 HCE16 HCE15 HCE14 HCE13 HCE12 HCE11 HCE10 SCE18 SCE17 SCE16 SCE15 SCE14 SCE13 SCE12 SCE11 SCE10 CEE18 CEE17 CEE16 CEE15 CEE14 CEE13 CEE12 CEE11 CEE10 /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.08

```
[DataSet1] C:\Users\elham\Desktop\DATA\Panel Data 2.sav
```

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROA18	233	-27.12	217.89	8.4400	16.07217
ROA17	233	-26.02	233.81	7.4299	16.77321
ROA16	233	-19.38	234.14	8.2165	17.30919
ROA15	233	-53.54	235.46	8.9295	18.24383
ROA14	233	-14.01	188.63	9.0765	15.84626

ROA13	233	-23.66	136.25	8.3776	13.29239
ROA12	233	-55.47	219.68	10.7894	18.98106
ROA11	233	-34.67	111.02	8.5232	11.30142
ROA10	233	-33.98	58.53	6.1622	8.94116
TOB18	233	.09	57.26	1.7500	4.10329
TOB17	233	.08	60.18	1.6113	4.04884
TOB16	233	.04	78.21	1.8835	5.26813
TOB15	233	.05	50.79	1.8510	3.59341
TOB14	233	.09	71.52	2.0615	4.91072
TOB13	233	.01	36.87	1.5818	2.66398
TOB12	233	.05	26.04	1.3951	1.97054
TOB11	233	.13	17.23	1.4173	1.53942
TOB10	233	.10	10.93	1.2316	1.13354
NEmp18	233	19.00	588112.00	26816.6707	66141.65894
NEmp17	233	20.00	592897.00	26314.8565	65370.23591
NEmp16	233	19.00	611366.00	26687.3157	66997.16442
NEmp15	233	60.00	1061700.00	35796.5693	95539.66724
NEmp14	233	61.00	953500.00	35305.4884	91631.72334
NEmp13	233	.00	858100.00	33905.7897	87547.37958
NEmp12	233	7.00	699300.00	33194.3920	77847.18735
NEmp11	233	18.00	639904.00	31968.4914	76114.15458
NEmp10	233	67.00	56381000.00	802062.3993	5815055.28300
TA18	233	-2301616.00	301296559.00	9341853.8280	28163613.31000
TA17	233	-2191494.00	334315577.00	8627879.1860	28441932.74000
TA16	233	-2014225.00	229541133.00	7187926.3760	21523753.97000
TA15	233	-1758531.00	226240361.00	6964818.3980	21955552.80000
TA14	233	-1735488.00	217094982.00	6914358.6200	21720400.01000
TA13	233	-518610.00	221986065.00	7039479.2340	21887236.53000
TA12	233	-493100.00	223308321.00	6895748.5640	21545700.07000
TA11	233	16.39	206115841.00	6293293.4320	19928949.70000
TA10	233	-3749357.00	180414467.00	5008019.0470	16918816.22000
LEV18	233	-237.45	516.79	67.0430	89.73500
LEV17	233	-569.14	870.61	76.7326	122.32837
LEV16	233	-768.16	564.83	80.4983	115.49760
LEV15	233	-635.79	932.39	68.1339	130.91628
LEV14	233	-632.20	898.87	60.5778	116.04620
LEV13	233	-778.05	876.61	63.0853	121.06701
LEV12	233	-919.69	883.67	56.1699	114.17744
LEV11	233	-771.26	876.61	69.9580	115.06624
LEV10	233	-758.97	880.18	73.2034	138.46745

HCE18	233	-.47	38.51	2.9767	3.83816
HCE17	233	-2.68	47.91	2.7981	4.06020
HCE16	232	-1.41	33.04	2.8674	3.84538
HCE15	233	-35.38	35.60	2.7070	4.93911
HCE14	233	-4.20	30.80	2.9291	3.95102
HCE13	233	-3.78	22.86	2.7078	2.84017
HCE12	233	-1.48	75.91	3.1698	5.85466
HCE11	233	-27.39	27.34	2.6262	4.51708
HCE10	233	-11.40	29.22	2.2486	2.98508
SCE18	233	-.27	11.89	.5446	.79767
SCE17	233	-.52	1.98	.4853	.27158
SCE16	233	-7.80	2.29	.4507	.60489
SCE15	233	-.58	8.47	.5364	.64672
SCE14	233	.02	12.70	.5384	.83239
SCE13	233	-2.71	3.11	.4811	.37319
SCE12	233	-80.40	2.47	.1696	5.30907
SCE11	233	.11	2.68	.4906	.25661
SCE10	233	-2.28	3.41	.4309	.40553
CEE18	233	-2.03	2.47	.4547	.43757
CEE17	233	-5.70	2.86	.4208	.58303
CEE16	233	-2.86	6.08	.4836	.62892
CEE15	233	-6.23	2.49	.4710	.63000
CEE14	233	-.13	7.37	.5861	.78332
CEE13	233	-.02	2.66	.5186	.48083
CEE12	233	-.04	7.06	.5264	.58232
CEE11	233	-.64	3.54	.4821	.42176
CEE10	233	-3.44	2.17	.4418	.45312
Valid N (listwise)	232				

```
DESCRIPTIVES VARIABLES=NEmp18 TA18 LEV18 HCE18 SCE18 CEE18 VAIC18 ROE18
PE18 TOB18 ROA18
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Notes

Output Created		05-DEC-2019 16:08:22
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 2.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=NEmp18 TA18 LEV18 HCE18 SCE18 CEE18 VAIC18 ROE18 PE18 TOB18 ROA18 /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.04

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NEmp18	233	19.00	588112.00	26816.6707	66141.65894
TA18	233	-2301616.00	301296559.00	9341853.8280	28163613.31000
LEV18	233	-237.45	516.79	67.0430	89.73500
HCE18	233	-.47	38.51	2.9767	3.83816
SCE18	233	-.27	11.89	.5446	.79767
CEE18	233	-2.03	2.47	.4547	.43757
VAIC18	233	.62	39.79	3.9760	3.91509
ROE18	233	-101.13	119.18	17.1393	23.99792
PE18	233	3.07	174.18	23.0594	22.94167
TOB18	233	.09	57.26	1.7500	4.10329
ROA18	233	-27.12	217.89	8.4400	16.07217
Valid N (listwise)	233				

```
GET
  FILE='C:\Users\elham\Desktop\DATA\Panel Data 3.sav'.
DATASET NAME DataSet2 WINDOW=FRONT.
```

```
DESCRIPTIVES VARIABLES=ROA18 TOB18 NEmp18 TA18 LEV18 HCE18 SCE18 CEE18
VAIC18 ROE18 PE18 FCh17
    FDir17 FCeo17 FEx17 FNEx17
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Notes

Output Created		05-DEC-2019 16:25:25
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=ROA18 TOB18 NEmp18 TA18 LEV18 HCE18 SCE18 CEE18 VAIC18 ROE18 PE18 FCh17 FDir17 FCeo17 FEx17 FNEx17 /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.02

```
[DataSet2] C:\Users\elham\Desktop\DATA\Panel Data 3.sav
```

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROA18	233	-27.12	217.89	8.4400	16.07217
TOB18	233	.09	57.26	1.7500	4.10329
NEmp18	233	19.00	588112.00	26816.6707	66141.65894
TA18	233	-2301616.00	301296559.00	9341853.8280	28163613.31000
LEV18	233	-237.45	516.79	67.0430	89.73500
HCE18	233	-.47	38.51	2.9767	3.83816
SCE18	233	-.27	11.89	.5446	.79767
CEE18	233	-2.03	2.47	.4547	.43757
VAIC18	233	.62	39.79	3.9760	3.91509
ROE18	233	-101.13	119.18	17.1393	23.99792
PE18	233	3.07	174.18	23.0594	22.94167
FCh17	233	.07	.09	.0791	.00447
FDir17	233	.23	.25	.2397	.00197
FCeo17	233	.07	.09	.0791	.00446
FEx17	233	.08	.09	.0883	.00397
FNEx17	233	.23	.33	.2525	.02677
Valid N (listwise)	233				

```
DATASET ACTIVATE DataSet2.
DATASET CLOSE DataSet1.
DESCRIPTIVES VARIABLES=TA18 FCh17 FDir17 FCeo17 FEx17 FNEx17 ROA17 PE17
ROE17 CEE17 SCE17 HCE17
    LEV17 NEmp17 TOB17
  /STATISTICS=MEAN STDDEV VARIANCE MIN MAX.
```

Descriptives

Notes

Output Created		05-DEC-2019 16:50:23
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=TA18 FCh17 FDir17 FCeo17 FEx17 FNEx17 ROA17 PE17 ROE17 CEE17 SCE17 HCE17 LEV17 NEmp17 TOB17 /STATISTICS=MEAN STDDEV VARIANCE MIN MAX.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
TA18	233	-2301616.00	301296559.00	9341853.8280	28163613.31000
FCh17	233	.07	.09	.0791	.00447
FDir17	233	.23	.25	.2397	.00197
FCeo17	233	.07	.09	.0791	.00446
FEx17	233	.08	.09	.0883	.00397
FNEx17	233	.23	.33	.2525	.02677
ROA17	233	-26.02	233.81	7.4299	16.77321
PE17	233	3.79	285.85	28.7938	35.57777
ROE17	233	-424.42	154.52	11.6394	39.62718
CEE17	233	-5.70	2.86	.4208	.58303
SCE17	233	-.52	1.98	.4853	.27158
HCE17	233	-2.68	47.91	2.7981	4.06020
LEV17	233	-569.14	870.61	76.7326	122.32837
NEmp17	233	20.00	592897.00	26314.8565	65370.23591
TOB17	233	.08	60.18	1.6113	4.04884
Valid N (listwise)	233				

Descriptive Statistics

	Variance
TA18	793189114400000.000
FCh17	.000

FDir17	.000
FCeo17	.000
FEx17	.000
FNEx17	.001
ROA17	281.341
PE17	1265.778
ROE17	1570.314
CEE17	.340
SCE17	.074
HCE17	16.485
LEV17	14964.231
NEmp17	4273267743.000
TOB17	16.393
Valid N (listwise)	

```
DESCRIPTIVES VARIABLES=ROA17 ROA16 ROA15 ROA14 ROA13 ROA12 ROA11 ROA10
TOB17 TOB16 TOB15 TOB14
    TOB13 TOB12 TOB11 TOB10 NEmp17 NEmp16 NEmp15 NEmp14 NEmp13 NEmp12
NEmp11 NEmp10 TA17 TA16 TA15 TA14
    TA13 TA12 TA11 TA10 HCE17 HCE16 HCE15 HCE14 HCE13 HCE12 HCE11 HCE10
SCE17 SCE16 SCE15 SCE14 SCE13
    SCE12 SCE11 SCE10 CEE17 CEE16 CEE15 CEE14 CEE13 CEE12 CEE11 CEE10 FCh17
FCh16 FCh15 FCh14 FCh13
    FCh12 FCh11 FCh10 FCeo17 FCeo16 FCeo15 FCeo14 FCeo13 FCeo12 FCe011
FCeo10 FEx17 FEx16 FEx15 FEx14
    FEx13 FEx12 FEx11 FEx10 FNEx17 FNEx16 FNEx15 FNEx14 FNEx13 FNEx12
FNEx11 FNEx10
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Notes

Output Created		05-DEC-2019 18:31:23
Comments		
Input	Data	C:\Users\elham\Desktop\DATA\Panel Data 3.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	245
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=ROA17 ROA16 ROA15 ROA14 ROA13 ROA12 ROA11 ROA10 TOB17 TOB16 TOB15 TOB14 TOB13 TOB12 TOB11 TOB10 NEmp17 NEmp16 NEmp15 NEmp14 NEmp13 NEmp12 NEmp11 NEmp10 TA17 TA16 TA15 TA14 TA13 TA12 TA11 TA10 HCE17 HCE16 HCE15 HCE14 HCE13 HCE12 HCE11 HCE10 SCE17 SCE16 SCE15 SCE14 SCE13 SCE12 SCE11 SCE10 CEE17 CEE16 CEE15 CEE14 CEE13 CEE12 CEE11 CEE10 FCh17 FCh16 FCh15 FCh14 FCh13 FCh12 FCh11 FCh10 FCeo17 FCeo16 FCeo15 FCeo14 FCeo13 FCeo12 FCe011 FCeo10 FEx17 FEx16 FEx15 FEx14 FEx13 FEx12 FEx11 FEx10 FNEx17 FNEx16 FNEx15 FNEx14 FNEx13 FNEx12 FNEx11 FNEx10 /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.04

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROA17	233	-26.02	233.81	7.4299	16.77321
ROA16	233	-19.38	234.14	8.2165	17.30919
ROA15	233	-53.54	235.46	8.9295	18.24383
ROA14	233	-14.01	188.63	9.0765	15.84626
ROA13	233	-23.66	136.25	8.3776	13.29239
ROA12	233	-55.47	219.68	10.7894	18.98106
ROA11	233	-34.67	111.02	8.5232	11.30142
ROA10	233	-33.98	58.53	6.1622	8.94116
TOB17	233	.08	60.18	1.6113	4.04884
TOB16	233	.04	78.21	1.8835	5.26813
TOB15	233	.05	50.79	1.8510	3.59341
TOB14	233	.09	71.52	2.0615	4.91072
TOB13	233	.01	36.87	1.5818	2.66398
TOB12	233	.05	26.04	1.3951	1.97054
TOB11	233	.13	17.23	1.4173	1.53942
TOB10	233	.10	10.93	1.2316	1.13354
NEmp17	233	20.00	592897.00	26314.8565	65370.23591
NEmp16	233	19.00	611366.00	26687.3157	66997.16442
NEmp15	233	60.00	1061700.00	35796.5693	95539.66724
NEmp14	233	61.00	953500.00	35305.4884	91631.72334
NEmp13	233	.00	858100.00	33905.7897	87547.37958
NEmp12	233	7.00	699300.00	33194.3920	77847.18735
NEmp11	233	18.00	639904.00	31968.4914	76114.15458
NEmp10	233	67.00	56381000.00	802062.3993	5815055.28300
TA17	233	-2191494.00	334315577.00	8627879.1860	28441932.74000
TA16	233	-2014225.00	229541133.00	7187926.3760	21523753.97000
TA15	233	-1758531.00	226240361.00	6964818.3980	21955552.80000
TA14	233	-1735488.00	217094982.00	6914358.6200	21720400.01000
TA13	233	-518610.00	221986065.00	7039479.2340	21887236.53000
TA12	233	-493100.00	223308321.00	6895748.5640	21545700.07000
TA11	233	16.39	206115841.00	6293293.4320	19928949.70000
TA10	233	-3749357.00	180414467.00	5008019.0470	16918816.22000
HCE17	233	-2.68	47.91	2.7981	4.06020
HCE16	232	-1.41	33.04	2.8674	3.84538
HCE15	233	-35.38	35.60	2.7070	4.93911
HCE14	233	-4.20	30.80	2.9291	3.95102
HCE13	233	-3.78	22.86	2.7078	2.84017
HCE12	233	-1.48	75.91	3.1698	5.85466
HCE11	233	-27.39	27.34	2.6262	4.51708

HCE10	233	-11.40	29.22	2.2486	2.98508
SCE17	233	-.52	1.98	.4853	.27158
SCE16	233	-7.80	2.29	.4507	.60489
SCE15	233	-.58	8.47	.5364	.64672
SCE14	233	.02	12.70	.5384	.83239
SCE13	233	-2.71	3.11	.4811	.37319
SCE12	233	-80.40	2.47	.1696	5.30907
SCE11	233	.11	2.68	.4906	.25661
SCE10	233	-2.28	3.41	.4309	.40553
CEE17	233	-5.70	2.86	.4208	.58303
CEE16	233	-2.86	6.08	.4836	.62892
CEE15	233	-6.23	2.49	.4710	.63000
CEE14	233	-.13	7.37	.5861	.78332
CEE13	233	-.02	2.66	.5186	.48083
CEE12	233	-.04	7.06	.5264	.58232
CEE11	233	-.64	3.54	.4821	.42176
CEE10	233	-3.44	2.17	.4418	.45312
FCh17	233	.07	.09	.0791	.00447
FCh16	233	.07	.09	.0791	.00442
FCh15	233	.07	.09	.0791	.00442
FCh14	233	.07	.09	.0791	.00442
FCh13	233	.07	.09	.0790	.00430
FCh12	233	.07	.09	.0788	.00419
FCh11	233	.07	.09	.0789	.00423
FCh10	233	.07	.09	.0788	.00411
FCeo17	233	.07	.09	.0791	.00446
FCeo16	233	.07	.09	.0789	.00426
FCeo15	233	.07	.09	.0791	.00442
FCeo14	233	.07	.09	.0791	.00447
FCeo13	233	.07	.09	.0790	.00421
FCeo12	233	.07	.09	.0788	.00411
FCe011	233	.07	.09	.0788	.00411
FCeo10	233	.07	.09	.0791	.00440
FEx17	233	.08	.09	.0883	.00397
FEx16	233	.08	.09	.0884	.00383
FEx15	233	.08	.09	.0884	.00393
FEx14	233	.08	.09	.0884	.00384
FEx13	233	.08	.09	.0883	.00394
FEx12	233	.08	.09	.0884	.00384
FEx11	233	.08	.09	.0883	.00394

FEx10	233	.08	.09	.0883	.00394
FNEx17	233	.23	.33	.2525	.02677
FNEx16	233	.23	.33	.2531	.02772
FNEx15	233	.23	.33	.2535	.02817
FNEx14	233	.23	.33	.2540	.02850
FNEx13	233	.23	.33	.2531	.02773
FNEx12	233	.23	.33	.2524	.02679
FNEx11	233	.23	.33	.2524	.02680
FNEx10	233	.23	.33	.2524	.02680
Valid N (listwise)	232				