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Faculty of Management and Economics

Doctoral Thesis

The European Foundation for Quality Management (EFQM) Excellence Model and the Czech Organizations

Evropská excelence modelu evropské nadace pro řízení kvality (EFQM) a české organizace

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ABSTRACT

Total Quality Management (TQM) is an approach that seeks to improve the performance and quality of organizations. It is a continuous process of increasing the quality of production by reducing waste. The EFQM (European Foundation for Quality Management) Excellence Model is an implementation to measure this approach, well known for European quality awards worldwide. There are many levels to obtain the Global Awards from the Foundation. These levels, points, and certificates are very important to be on the Finalist list and obtain the Global Award Winner and Prize Winner. Different publications showed that the award-winner organizations perform better and achieve significantly better results than their competitors. Up to now, research has not been conducted about these levels and quality certificates. Therefore, this study filled the gap and investigated the impacts of the quality certificates from the EFQM Model at Czech organizations.

The study's main goal is to examine the performance of certified firms from the EFQM Model and compare them with non-certified firms. Moreover, the research also explored why the Czech organizations are so little interested in this Model and did not receive the EFQM Excellence Award/Prize Winner. The data triangulation approach is employed to check the reliability and validity of the data. For the quantitative study, seven hypotheses were formulated to obtain the main goal of this study. The secondary data is obtained from the Albertina database of 307 Czech firms, including 20 certified firms that have obtained quality certificates from the EFQM Model. The gained data covered the time period from 2015 to 2019, and it was obtained from the three sectors: manufacturing, construction, and automobile. A dummy variable is employed to explore the effects of the quality certificates on organization performance. Two different regression techniques were employed to test the hypotheses: pooled ordinary least square (OLS) and maximum likelihood estimation (MLE). The findings of the dummy variable are significant and positive, which confirms that the organizations having quality certificates perform better than their competitors' organizations. Like the quality awards, the organizations also perform better if they have quality certificates. The outcomes of the qualitative method exposed that mostly Czech organizations are not aware of the benefits/importance of quality certificates and awards and don't implement the EFQM Excellence Model in their organizations. Overall, this research focused on the Czech organizations; however, the study's findings could be generalized to all organizations that are (or will try) trying to obtain the EFQM Excellence Award/Prize Winner. Hence, the current study results contribute theoretical and practical knowledge of the quality certificate for the organizations.

ABSTRAKT

Total Quality Management (TQM) je přístup, který se snaží zlepšit výkonnost a kvalitu organizací. Jde o kontinuální proces zvyšování kvality produkce snižováním plýtvání. EFQM (European Foundation for Quality Management) Excellence Model je implementován pro podporu tohoto přístupu, který je známý po celém světě v rámci posuzování národní/globální ceny za kvalitu. Ocenění za kvalitu dle EFQM modelu Evropské nadace lze získat v ČR v mnoha úrovních. Tyto úrovně, body a certifikáty jsou velmi důležité pro to, aby se organizace dostaly na seznam finalistů a získaly národní cenu nebo ocenění certifikátem. Různé studie ukázaly, že organizace, které získaly ocenění, dosahují lepších výkonů a mají výrazně lepší výsledky než jejich konkurenti. Doposud nebyl proveden výzkum o těchto úrovních ocenění kvality. Tato studie proto vyplnila mezeru a zkoumala dopady ocenění (cena, certifikát) kvality, vycházejících z modelu EFQM, na české organizace.

Hlavním cílem práce je prověřit výkonnost certifikovaných firem na základě požadavků modelu EFQM a porovnat je s necertifikovanými firmami. Výzkum se navíc zabýval otázkou, proč se české organizace o tento model tak málo zajímají a dosud neobdržely světovou cenu kvality EFQM Global Award. Ke kontrole spolehlivosti a platnosti dat byl použit přístup triangulace dat. Pro kvantitativní výzkum bylo formulováno sedm hypotéz, aby se naplnil hlavní cíl této práce. Sekundární data z 307 českých firem (včetně 20 certifikovaných firem, které získaly ocenění kvality na základě modelu EFQM) byla získávána z databáze Albertina. Získaná data se týkala období 2015 až 2019 a byla získána ze tří sektorů: výroba, stavebnictví a automobilový průmysl. K prozkoumání účinků ocenění kvality na výkon organizace byla použita fiktivní proměnná. K testování hypotéz byly použity dvě různé regresní techniky: obyčejná metoda nejmenších čtverců (OLS) a metoda maximální věrohodnosti (MLE). Zjištění fiktivní proměnné jsou významná a pozitivní, což potvrzuje, že organizace s certifikáty kvality fungují lépe než organizace jejich konkurentů. Výsledky kvalitativního výzkumu odhalily, že si většinou české organizace neuvědomují výhody/důležitost certifikátů kvality a národních cen za kvalitu a ve svých organizacích neimplementují model EFQM excelence. Celkově se tento výzkum zaměřil na české organizace, avšak dá se předpokládat, že výsledky výzkumu by bylo možné využít u všech organizací, které se pokoušejí (nebo se o to pokusí v budoucnu) získat ocenění za kvalitu dle modelu EFQM Excellence. Současné výsledky práce proto přispívají teoretickými a praktickými poznatky k získání ocenění kvality v organizacích.

ACKNOWLEDGEMENTS

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS AND ABBREVATIONS

EFQM: European Foundation and Quality Management

ROA: Return on assets

ROE: Return on equity

LDR: Long-term debt ratio

FATA: Fixed assets to total assets

SG: Sales growth

CTOR: Capital turnover ratio

PCI: Physical capital intensity

DV: Dummy variable

TQM: Total quality management

RADAR: Results, approach, deployment, assessment, review

SDG: Sustainable development goal

OLS: Ordinary least square

MLE: Maximum likelihood estimation

ISO: International Organization for Standardization

ROCE: Return on capital employed

ROIC: Return on invested capital

ROS: Return on sales

TAT: total assets turnover

1. INTRODUCTION

1.1 Background

TQM is a continuous process of improving the quality of the output by reducing waste and the non-value-adding activities in the system (Yousefie et al., 2011; Zink, 2012). It is an approach that seeks to improve quality and performance, and it exceeds customer satisfaction and expectations. Continuous improvement must deal with improving results and, more crucially, with improving capabilities to produce better results in the future (Davies, 2004). Several TQM models have been established to be used as a framework to evaluate organizational performance and to achieve it, such as the European Foundation for Quality Management (EFQM) Excellence Model, the Deming Management Model, and the Malcolm Baldrige National Quality Award (MBNQA). The EFQM Excellence Model is one of the effective and implementations to measure the TQM approach.

Magd et al. (2021) argued that TQM is to assimilate all the efforts to improve overall quality. An empirical study is conducted by Bou-Llusar et al. (2009) to reveal whether quality award models represent TQM. After analyzing the data from 446 firms, the authors concluded that the EFQM Excellence Model replicates TQM, and a firm could attain TQM implementation by implementing the EFQM framework. In the European context, Boulter et al. (2013) argued the equivalent of MBNQA is the EFQM Excellence Model, as both models include TQM structures.

Periañez-Cristobal et al. (2020) argued that the most widespread Models of Excellence are MBNQA in the USA, EFQM in Europe and the Deming Price in Japan. These models are very similar in terms of the criteria they use for evaluation and in fundamental concepts. According to del Alonso-Almeida & Fuentes-Frías (2012), MBNQA and EFQM have been used as a guide to implementing the TQM in many organizations. Westlund (2001) claimed that the EFQM Excellence Model had become the most commonly applied Model for TQM in Europe.

The Awards process is an effective stimulator of business excellence for award-winner organizations. In EFQM Excellence Global Index, there are many levels and certificates such as Committed to Excellence, Recognised for Excellence, Committed to Sustainability, and Recognised by EFQM. (see Figure 12). Moreover, there are four categories of recognition: Platinum, Gold, Silver, and Bronze, and all these categories relate to different EFQM scoring levels between 300 and 700+ points. These levels and certificates are very important to be on the EFQM Award Finalist list and then obtain the EFQM Excellence Award Winner and EFQM Excellence Prize Winner. The overall level in the index of the

organizations is determined by Results, Approach, Deployment, Assessment, and Review (RADAR) scoring.

It is clear from the earlier research that organizations with quality awards perform better than their comparison organizations (see Section 2.2 for more details). Table 13 describes the detail of country-wise quality awards from the EFQM. Table 13 displays that there is only one Czech-based organization in the EFQM Finalist award list. The Czech-based organizations do not compete in the context of the quality awards with their neighbour countries' organizations. EFQM Excellence Model is very popular not only in Europe but also in the whole world. But the Czech organizations are very little interested in implementing the Model. What are the reasons behind this?

1.2 Research Purpose, Research Questions, and Objectives

1.2.1 Research Purpose

Before coming to the research methodology, it is important to address the research objectives first (Saunders et al., 2016). **The study's main goal is** to investigate the performance of the Czech organizations that have a quality certificate from the EFQM Model and compare them to non-certified organizations. However, the reasons why did the Czech organizations not receive the EFQM Excellence Award Winner and Prize Winner are also explored. Prior studies revealed that award-winning organizations perform better than their competitors. Thus, there are three possible scenarios are expected of the current research. **First**, the findings might be similar to the quality awards that the certified organizations from EFQM Model perform better than their competitors. Therefore, it will be suggested to Czech organizations to participate and implement the Model. In this way, they could gain more benefits. **Second**, the findings may be possible to expose that the quality certified organizations do not perform better than competitors. It means that Czech organizations should not waste their time, energy, and resources to implement the Model. **Third**, the outcomes show that there is no role of the certification from the Model at the organizations' performance at all. Then the second option will be suggested to the Czech organizations.

1.2.2 Research Questions

The main goal has been subdivided into the following research objectives and research questions in order to obtain a holistic view of the research. Each question and objective cover different aspects that need to be explored to reach the main goal.

1- What are the impacts of leverage (LDR) on the performance of the Czech organizations if they have a quality certificate from EFQM Model?
2- What are the effects of tangibility (FATA) on the performance of the certified organizations?
3- What are the impacts of the firm size (FS) on the performance of the certified organizations?
4- How sale growth (SG) affects the performance of the certified organizations from the EFQM Model?
5- What is the relationship between the capital turnover ratio (CTOR) and the performance of the certified organizations?
6- How does physical capital intensity (PCI) affect the performance of the organizations?
7- What is the impact of the quality certificate from the EFQM Excellence Model on the organization's performance?
8- What are the reasons that Czech organizations did not receive any EFQM Excellence Winner/Prize Award?

1.2.3 Research Objectives

1. To explore the role of leverage (LDR) on the organization's performance
2. To sort out the role of tangibility (FATA) in the performance of the certified organization
3. To examine the effects of the firm size (FS) on the performance of the Czech organization
4. To investigate the role of sales growth (SG) at the organization performance
5. To check the impacts of capital turnover ratio (CTOR) on the organization's performance
6. To examine the effects of Physical Capital Intensity (PCI) on the performance of the certified organization
7. To sort out the impact of the quality certificates on the organization's performance.
8. To study the factors why the Czech organizations did not receive the EFQM Excellence Winner/Prize Award.

1.3 Summary of Chapters

This study involves seminal research into applying the quality certificate from the EFQM Excellence Model at the Czech organizations. The research is distinctive from other literature as it examines specifically using Mixed Methods

as a research technique. This study has seven chapters that are organized as follows:

Chapter 1 - Introduction provides the main goal and objectives of the study, a background to the investigation, and a summary of the study. It also discusses the rationale, uniqueness, significance, needs for the study, and methodology introduction.

Chapter 2 investigates the literature review regarding the current study about EFQM Excellence Model, award winner benefits, and the hypotheses development. After reviewing the literature, the following points are concluded:
1- It is observed from the literature review that there is an essential role of quality awards to achieve sustainability and excellence in the organization.
2- A number of studies focused on the EFQM Excellence Model, its components, and case studies.
3- It is noticed from the literature review that there is a shortage of the discussion of different quality certificates from the EFQM Model and their impacts on the organization's performance.

Chapter 3 is about the Research Methodology, which justifies why mixed methods were used to investigate the impacts of the quality certificates at the Czech organizations. There is also an explanation of which research philosophy, research approach, research strategy, and data collection have been used to complete the current study.

Chapter 4 – This chapter discusses the quantitative study and its results as well as focuses on the qualitative research and its results.

Chapter 5 is about results and discussion, and it includes outcomes of the hypotheses, explanation of the impacts of explanatory variables on the explained variable of the selected models. Therefore, the chapter describes the conclusion of quantitative and qualitative research.

Chapter 6 – The last chapter concludes the outcomes of the research with contributions from the author. This chapter discusses the limitation of the current study and provides a guideline to managers, academics, policymakers, and directors of the organizations.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

This chapter reviews literature related to the current study to provide a theoretical framework to develop the research model. This chapter is divided into three sections. (i) The first section highlights the background of the EFQM Excellence Model concerning its history, mechanisms, and consequences (ii) The second section states the benefits of quality awards (iii) The last section focuses on the development of hypotheses.

2.1 History and Background of the EFQM Excellence Model

MBNQA (Malcolm Baldrige National Quality Award) was established in 1987 in the United States, and the European Foundation for Quality Management (EFQM, Foundation) was founded in October 1989 in Belgium. The Foundation set up a team of experts from different sectors to develop the EFQM Excellence Model. According to Hides et al. (2004), the first European Quality Award was held in 1992. The EFQM Model was updated by the Foundation in 1999 and changed in 2003 (Blackmore et al., 2003). EFQM modified and improved the Model in 2010, 2013, and 2019.

Hoyle (2007) stsated that EFQM Excellence Model had been modified for the requirements of self-evaluation and improvement of organizations to obtain "Excellence". The Model is defined as "self-assessment", an all-encompassing regular and systematic process of reviewing organization activities and their outcomes. Excellence is understood as a comprehensive practice in quality management. Effective implementation of the Model needs special training and long-term experience of so-called internal evaluators. The RADAR logic is a powerful management tool and dynamic assessment framework that provides a structured approach to questioning the performance of an organization to achieve sustainable Excellence. According to Zhang et al. (2019), the EFQM Excellence Model is an advanced tool for quality self-assessment by organizations. The Model can be used to gain a holistic overview of any organization and supports stakeholders and managers to identify the main aspects to be improved for attaining Excellence (Espín et al., 2020).

The EFQM Excellence Model can be used as a business-wide framework in a holistic, focused, and practical way. So, the Model provides not only the basis for sustainable Excellence but also provides a complete framework that covers the whole organization. The Model is a useful framework for self-assessment and a good system for recognizing improvement initiatives (Rodríguez-González et al.,

2020). The Model has adapted and evolved with the passage of time to reflect changes in the global world. Hundreds of organizations, regardless of size, structure, sector, or maturity, have participated in the EFQM Excellence Awards and have contributed to the knowledge and experience of Excellence. **The Foundation's main goal is to raise the competitiveness of European organizations and support the sustainable development of European economies.** Even though EFQM focuses on Europe, it also supports all organizations from the rest of the world. The China Quality Association (CQA) and EFQM Association signed a cooperation agreement in May 2016. The CQA proposed to push to implement the EFQM Excellence Model all over the country. Presently, the EFQM Excellence Model is broadly applied in China (Zhang et al. 2020; Zhang et al. 2019). EFQM Excellence Model also supports the United Nations 17 Sustainable Development Goals (SDG). The United Nation's 17 SDG calls for action by all countries to promote social equity, sound governance, and prosperity while protecting the planet. The Foundation announced on the official website for recognizing the role that organizations can perform in supporting the goals of the United Nations (see Figure 13).

The EFQM Excellence Model (2013) was replaced by EFQM Excellence Model (2020) in 2019 (Nenadál, 2020). In the EFQM 2020 Model, there are three complete logics: "Direction", "Execution", and "Results". To elaborate on each logic, the EFQM Model states:

The EFQM Model structure is based on the simple but powerful logic of asking three questions:
*"**Why**" does this organization exist? What Purpose does it fulfil? Why this particular Strategy? (Direction)*
*"**How**" does it intend to deliver on its Purpose and its Strategy? (Execution)*
*"**What**" has it actually achieved to date? "What" does it intend to achieve tomorrow? (Results).*

All the above structure of the EFQM Excellence Model (2020) has been explained in the following Figure 1, Figure 2, and Figure 3.

Figure 1: EFQM Excellence Model (Source: efqm.org)

According to Nenadál (2020), the EFQM Excellence Model (2020) illustrates a connection between an organization's purpose and strategy and how it supports sustainable value creation for their key stakeholders and generates excellent results. The Foundation is an independent and not-for-profit, committed to helping its members in their journey towards Excellence (Turisová et al., 2021).

Figure 2 and Figure 3 show the framework of EFQM 2020 based on seven criteria, which are divided into three parts. The first five criteria are found in the first two parts: direction and execution. They evaluate and define what the organization is doing and how it is doing. The last two criteria belong to the third part: result, they evaluate the obtained results.
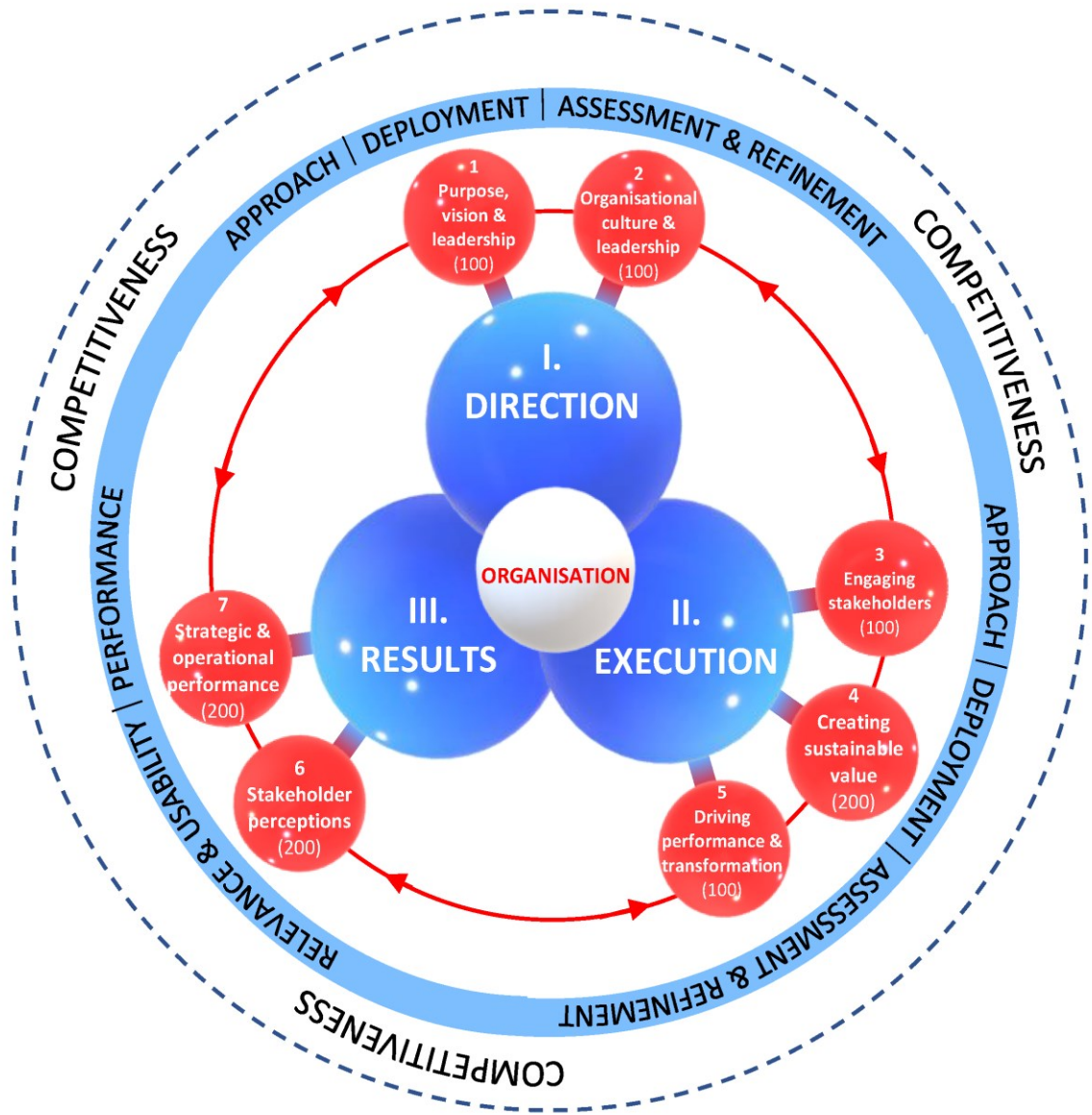
Figure 2: Innovative EFQM Excellence Model (2020), (Source: efqm.org)
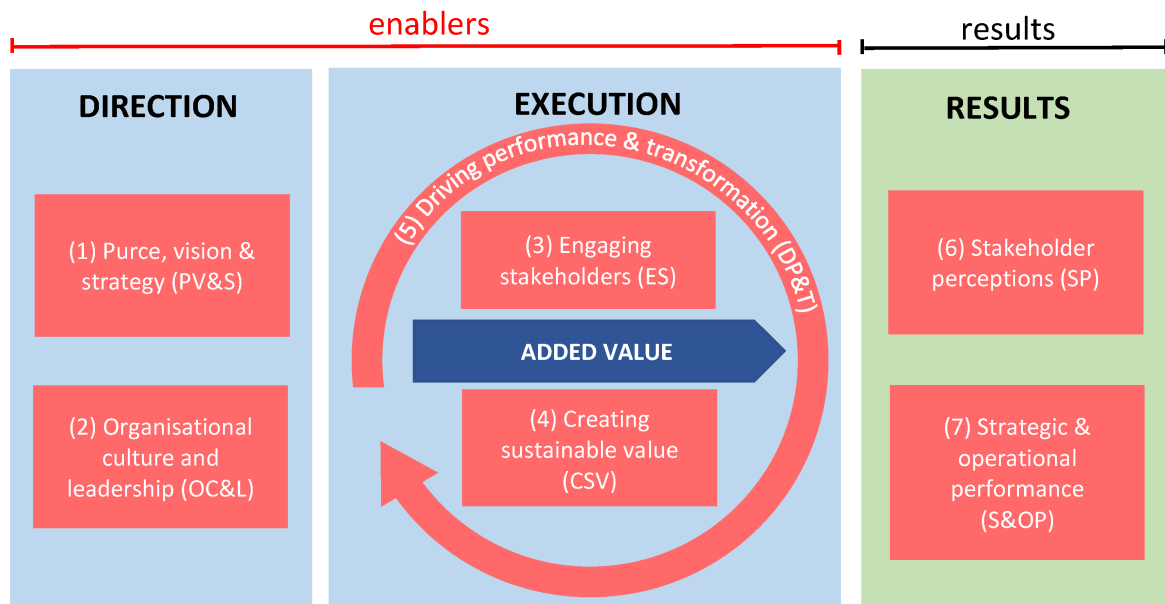
Figure 3: Division of the EFQM 2020 Model, enablers and results (Source: efqm.org)

2.2 Benefits of the Quality Awards

Different publications explained that different quality awards help to improve the organization's performance. According to Stiglitz (1987), quality depends on price, so the higher quality products will sell at higher prices. If chances are higher for winning the award, then improvement in the quality and prices of products will be higher in the future. Santos et al. (2012) exposed that the industrial enterprises with having International Organization for Standardization (ISO) 9001 are investing more fast than other enterprises. The scholars examined that 66.39% of industrial organizations had returned to ISO 9001 in less than three years. Additionally, at the same time, organizations (both production and non-productive) that have implemented ISO 9001 invest faster than others organizations (Santos et al., 2012). Leonard (2006) exposed that when an organization effectively uses the MBNQA, it improves the organization's financial and non-financial performance. According to Asadi (2020), there are numerous achievements and advantages to implementing the EFQM Excellence Model in organizations, including the creation of competitive advantage, attention to customer demands, and needs in all dimensions.

Prior studies showed that award-winning organizations perform better than their competitors' organizations, even though the sample sizes were small in these studies. For example, Subedi and Maheshwari (2007) took 15 firms, Przasnyski and Tai (2002) took 17 firms, and Jacob et al. (2004) took 18 firms as a sample size in their studies. For instance, Jacob et al. (2004) took a sample of 18 Baldrige Award winners' firms from 1988 to 2002 and exposed that award winners' firms

significantly performed better in terms of asset utilization and profitability. Subedi and Maheshwari (2007) investigated a sample of 15 Baldrige Award winners' firms and 30 control firms from 1989 to 2003. The authors explored that the award-winning firms had better sales growth and earnings than the control firms. According to Zhang and Xia (2013), the award-winning organizations have better results after receiving awards and have superior performance records before the award. In the current research, the sample size is small to assess the organization's performance (20 certified organizations out of 307; see chapter 4 for more details).

Corbett et al. (2005) took a sample of those 554 publicly traded manufacturing firms in the United States that has an ISO 9000 certificate. The scholars found an extremely significant improvement in financial performance after the implementation of ISO 9001. Within three years of receiving certification, the firms showed significant abnormal improvements in financial performance such as return on sales, sales growth, return on assets, and profits. According to Zhang and Xia (2013), the awards simply recognize a firm's efforts to achieve developed quality and customer satisfaction. The awards are the firm's own long-term quality improvement efforts that lead to higher performance results. Zhang and Xia (2013) claimed that their study showed award-winning firms' sales consistently and significantly expanded compared to the control firms over 10-year. And it was because the consumers try to found better quality and are loyal to organizations that constantly provide high-quality products and services. Additionally, Marimon et al. (2019) argued that quality standard has become more popular among customers. After reviewing 103 articles published during 1993-2016, in the systematic literature review on TQM, Aquilani et al. (2017) concluded that customer focus had gained importance in recent times.

The study by Boulter et al. (2013) was based on 120 companies where 85 companies were European and 35 were non-European. The researchers compared award-winner companies to without awards companies and exposed that the companies with an award achieved significantly better results than other companies in terms of shareholder value, assets, growth, and profit (see Figure 10 and Figure 11). Figure 10 and Figure 11 revealed that the organizations with quality awards perform better than their comparison organizations. The same findings were reported by Augustyn et al. (2019) in the context of 4-Star and 5-Star hotels in Egypt.

A systematic literature review (SLR) about the EFQM Excellence Model was carried out from 1991 to 2019 by Yousaf and Bris (2019). The study showed that practical applications of the EFQM Excellence Model are the relationships between the criteria, case studies, the importance of the leadership criterion, etc. The researchers analyzed that the mostly authors discussed only two sectors: health and education, and the most empirical studies used analysis of variance,

partial least square, T-test, and factorial analysis techniques. Moreover, most of these studies were conducted in Spain, UK, and Germany, and the organizations from these countries won the maximum EFQM Excellence Global Awards.

As discussed above, several researchers claimed that quality-award winning organizations perform better than competitors. But the Czech organizations don't participate in the quality awards like EFQM (Nenadál et al., 2018). Table 11 and Table 12 describe the sector-wise and category-wise Czech organizations that have the quality certificates from the EFQM Model. The certified organizations from the Foundation are only 112 (actual 95 organizations, as many organizations received certificates several times). EFQM Excellence Model has become the most commonly applied Model in Europe for TQM (Murthy et al., 2021; Kim et al., 2010; Westlund, 2001). Then why do the Czech organizations not participate and obtain the quality awards from the EFQM Model, which is very popular in Europe and worldwide? Therefore, the current study is going to fulfill this gap and find out the reasons.

It is clear from the above discussion that award-winning organizations perform better than their competitors, but a few studies discussed conflicting opinions about it. For example, Doeleman et al. (2014) argued that improvements in performance are not only implementing the EFQM Excellence Model in an organization, but also depends on various individual factors in an organization. Dahlgaard et al. (2013) pointed some gaps in the culture and values of an organization. A study by Yousaf et al. (2021) revealed that the quality certificates from the EFQM Excellence Model have a negative impact on the firm's profitability. According to Doeleman et al. (2014), there are many sub-criteria in EFQM Excellence Model, which gives an excellent opportunity for an organization to manage these sub-criteria to improve its performance.

2.3 Hypotheses Development

The current research selected several variables based on the previous studies that impact the organization's performance. In the following subsections, the variables are discussed, and the hypotheses are developed in order to explore the research objectives and questions.

2.3.1 Leverage (LDR)

Organizations use a high debt ratio to get benefits from the tax shields; in this way, organizations improve their performance. It means that organizations choose to operate with high leverage. Organizations use debt until the optimum level of the debt is gotten (Titman & Wessels, 1988). Conversely, the excess debts can raise the financial distress costs and diminution the firm value. Hillier et al. (2010) mentioned that conflicts of interest increased between bondholders and

shareholders when an organization has more debts. Many empirical studies that have been conducted earlier have reported the impact of leverage on the organizations' performance. Several authors have reported the negative relationship between LDR and organization performance (Fama and French, 1999; Myers, 1984; Tang and Chang, 2015; Nguyen and Nguyen, 2015; Khan et al., 2018; Al-Gamrh et al., 2020; Fernández-López et al., 2020; Mishra et al., 2020). The study by Appiadjei (2014); Zeitun and Tian (2007); Carvalho and Lara (2003) also explored the negative impact of LDR on organization performance. On the other hand, a few scholars explored the positive impact of LDR on firm performance (Gulzar et al., 2020; Berger and Patti, 2006; Hadlock and James, 2002; Ghosh et al., 2000). Due to the mixed relationship between LDR and organization performance, the proposed hypotheses are:

H_1: LDR is associated with the organization's performance of non-certified firms.
H_{1A}: LDR has an impact on organization performance of the certified organizations from the EFQM Model.

2.3.2 Tangibility (FATA)

Tangibility (FATA) is measured by the ratio of net fixed assets to the total assets in the current study. Firms choose to invest in those areas where high returns are expected. Therefore, firms prefer making long-term investments which causes a decrease in fixed assets. Fixed assets alone are not appropriate to generate profits. If a firm does not produce enough funds to pay back short-term liabilities, it has to be paid out from the fixed assets. A higher value of FATA offers the stakeholders a high level of security that helps to liquidate additional assets in case of bankruptcy of the organization (Baker & Martin, 2011). Ahmed and Bhuyan (2020) found a negative relationship between FATA and organization performance. Many researchers such as Maçãs et al. (2009); Getahun (2016); Nguyen and Nguyen (2015); and Gharaibeh and Khaled (2020) also exposed the negative impact of FATA on organization performance. On the contrary, a few studies have reported a positive relationship between FATA and organization performance (Iltaş and Demirgüneş, 2020; Birhan, 2017). Hence, the following hypotheses are proposed about the relationship between FATA and organization performance.

H_2: FATA has a significant impact on the organizational performance of non-certified organizations.
H_{2A}: FATA has an impact on the organizational performance of certified organizations.

2.3.3 Firm Size (FS)

Firm size (FS) is also an important variable that affects the organization's performance due to economies of scale. Chandrapala and Knápková (2013) claimed that large firms enjoy economies of scale as their operational activities are more efficient. The previous literature asserted that large firms have relatively fewer adjustment costs. It is easy for them to access the credit market to obtain more debt and benefit from tax shields. Al-Gamrh, Ku Ismail, et al. (2020) investigated the positive impact of FS on firm profitability. The same results have been explored by Farhan et al. (2021); Li et al. (2021); Al-Gamrh et al. (2020); Khan et al. (2018); Molodchik et al. (2016); Chandrapala and Knápková (2013); and Kuntluru et al. (2008). However, some researchers investigated the opposite relationship between both variables, such as Ullah et al. (2020); Gulzar et al. (2020); AttaUllah and SaifUllah (2017); Masnoon and Saeed (2014). Thus, based on the above studies about FS, the following hypotheses are proposed.

H₃: There is a significant relationship between FS and organization performance for non-certified organizations.

H₃ₐ: There is an impact of FS on organization performance for certified organizations.

2.3.4 Sales Growth (SG)

The sale growth (SG) is measured by using the change in net sales. Increasing SG means that there is an increasing demand for a firm's products. A firm with a high sales growth rate is expected to have high performance on its investments. Chandrapala and Knápková (2013) found a positive relationship between SG and ROA. The authors mentioned the fact that Czech firms may keep good relations with external environmental factors. Kiprotich et al. (2014); Kuntluru et al. (2008); Barbosa and Louri (2005); Deloof (2003) also investigated the same relationship. Subedi and Maheshwari (2007) reported that SG of the Baldridge Award winners' organizations is more than the non-award winners. The hypotheses about the relationship between SG and organization performance is:

H₄: SG is significantly associated with organization performance for non-certified organizations.

H₄ₐ: SG is significantly associated with organization performance of the certified organizations.

2.3.5 Capital Turnover Ratio (CTOR)

Kuntluru et al. (2008) introduced the capital turnover ratio (CTOR) to measure the firm's capital intensity. The higher value of CTOR may imply lower efficiency in capital utilization, and it will result in low profitability. Kuntluru et al. (2008) find that CTOR has negatively related to the organization's performance. Chandrapala and Knápková (2013) also explored the negative impact of CTOR on organization performance. The following hypotheses are proposed for certified and non-certified organizations separately to examine the impact of CTOR on organization performance.

H_5: CTOR is associated with organization performance for non-certified organizations.
H_{5A}: The is a significant relationship between CTOR and organization performance of the certified organizations.

2.3.6 Physical Capital Intensity (PCI)

Barbosa and Louri (2005) used the physical capital intensity (PCI) variable to measure the impact of labor intensity on the variability of profits of the organizations. The study focused on Greece and Portugal-based firms. The authors reported mixed results and suggested that Greece-based firms may improve performance to pick a labor-intensive technology. Portugal-based firms may improve their performance if they choose a capital-intensive technology. Chandrapala and Knápková (2013) also included PCI to investigated the variable's impacts on the performance of Czech organizations. But, the scholars did not find a significant relationship between the two variables. Hence, the following hypotheses are proposed based on the previous studies.

H_6: PCI has an impact on organization performance for non-certified organizations.
H_{6A}: PCI is associated with organization performance for certified organizations.

2.3.7 Dummy Variable (DV)

A dummy variable (DV) is used to investigate the impacts of the quality certificates from the EFQM Model on the organization's performance. The benefits of the quality awards are discussed in section 2.2. Based on the literature review, it is assumed that the DV has a significant impact on organizational performance. The proposed hypothesis about the DV is:

H7: There is a significant impact of quality certificates from the EFQM Model on the organization's performance.

2.4 The Conceptual Research Model

Based on the literature reviewed, it is possible to introduce a conceptual research model. The model has been developed by taking into consideration the organization's performance. Thus, organization performance is the dependent variable which is measured by ROA (return on assets) and ROE (return on equity).
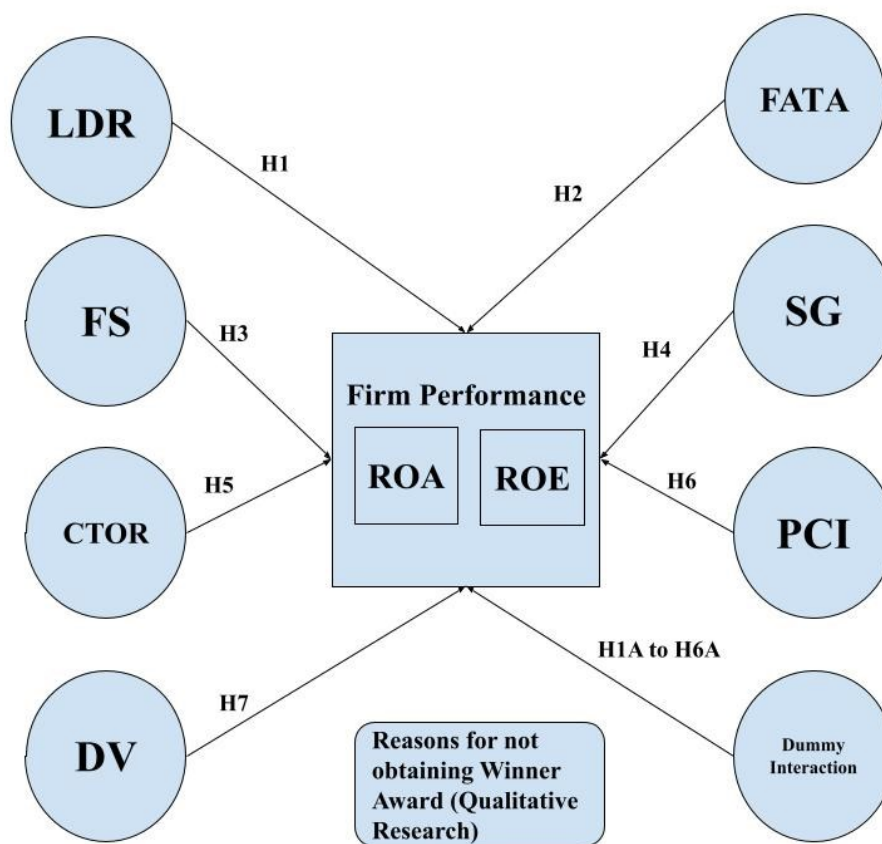
Figure 4: The Conceptual Research Model (Source: Author)

The conceptual model illustrated above in Figure 4 is referred to as a theoretical model of the current research. The complete discussion about the variables can be seen in the following.

2.5 Variables

There are numerous measures of an organization's performance that are useful to capture the Excellence of an organization. However, Return on Assets (ROA) and Return on Equity (ROE) are the common indicators to measure the organization's performance.

2.5.1 Dependent Variables

Several researchers prefer to employ financial measures to summarize the outcomes of the firms' social, economic, and other impacts (Boulter et al., 2013). Therefore, the study under consideration is composed of financial measures of dependent and independent variables. It is essential to give more information about the explanatory and explained variables. ROA and ROE are the dependent variables, which are proxies to measure the organization's performance in the current study. Several scholars have used only ROA as a proxy to measure the organization's performance, such as Pais and Gama (2015); Singh and Kumar (2017); Nyeadi et al. (2018); Simionescu et al. (2021); Jencova et al. (2021); Li et al. (2021); Yanadori et al. (2021). However, numerous authors have used both variables; ROA and ROE, as proxies to measure organization performance like Samo and Murad (2019); Akgün and Karataş (2020); Ahmed and Bhuyan (2020); Kayani et al. (2020); Jyoti and Khanna (2021); Bawazir et al. (2021); Yousaf (2021); Yousaf and Bris (2021a). Therefore, the current study employed both ROA and ROE as dependent variables.

2.5.2 Independent Variables

The independent variables are leverage (LDR), tangibility (FATA), size of the firm (FS), sales growth (SG), capital turnover ratio (CTOR), and labor capital intensity (PCI). DV is a dummy variable, and DV*LDR, DV*FATA, DV*FS, DV*SG, DV*CTOR, and DV*PCI are interaction terms representing the variables of the certified organizations from the EFQM Model. The complete list of explained and explanatory variables is given in Table 1.

Table 1: Summary presentation of selected variables (Source: Author)

Variables	Abbreviations	Measurements	Citation
Dependent Variables			
Return on assets	ROA	(Earnings before interest and tax) / (total assets)	Tahir et al. (2016); Singh and Kumar (2017); Pham et al. (2020);

			Kayani et al. (2020); Farhan et al. (2021)
Return on equity	ROE	(Earnings before interest and tax) / (total equity)	Arshad (2021); Medcalfe and Miro (2021); Anton (2021); Kayani et al. (2020); Ahmed and Bhuyan (2020); Wamugo et al. (2014)
Independent Variables			
Leverage (Long-term debt ratio)	LDR	(Long-term debt) / (total assets)	Yousaf (2021); Al-Gamrh et al. (2020); Fernández-López et al. 2020; Saini and Singhania (2018); Akgün and Karataş (2020); Anarfi and Boateng (2016)
Tangibility (Fixed assets to total assets)	FATA	(Fixed assets) / (total assets)	Yousaf and Bris (2021b); Sharma et al. (2020); Altaf (2020)
Firm Size	FS	Log (Total assets)	Wang et al. (2021); Shamsuzzoha and Tanaka (2021); Tran and Vo (2020); Nguyen (2020)
Sales Growth	SG	(Current year sales - previous year sales) / (previous year sales)	Kayani et al. (2020); Sharma et al. (2020); Nyeadi et al. (2018); Singh and Kumar (2017); Onaolapo and Kajola (2015)
Capital Turnover Ratio	CTOR	(Net fixed assets) / (total sales)	Chandrapala and Knápková (2013); Kuntluru et al. (2008)
Physical capital intensity	PCI	Log of tangible assets per employee	Barbosa and Louri (2005); Chandrapala and Knápková (2013)
Dummy variable	DV	DV = 1 if it is EFQM certified firm, 0 otherwise	Yousaf (2021); Yousaf and Bris (2021b); Yousaf et al. (2021)

Leverage of certified firms	DV*LDR	(Long-term debt) / (total assets)	
Tangibility of certified firms	DV*FATA	(Fixed assets) / (total assets)	
Firm size of certified firms	DV*FS	Log (Total assets)	
Sales growth of certified firms	DV*SG	(Current year sales - previous year sales) / (previous year sales)	
Capital turnover ratio of certified firms	DV*CTOR	(Net fixed assets) / (total sales)	
Physical capital intensity of certified firms	DV*PCI	Log of tangible assets per employee	

2.6 Regression Equations

The regression equations for Models 1 and Models 2 are given below. In Model 1 and Model 2, dummy interaction terms represent the variables of the certified organizations, and without dummy interaction terms are the variables of non-certified organizations.

$\textbf{ROA}_{it} = \alpha + \beta_1(LDR_{it}) + \beta_2(FATA_{it}) + \beta_3(FS_{it}) + \beta_4(SG_{it}) + \beta_5(CTOR_{it}) + \beta_6(PCI_{it}) + \beta_7(DV_{it}) + \beta_8(DV*LDR_{it}) + \beta_9(DV*FATA_{it}) + \beta_{10}(DV*FS_{it}) + \beta_{11}(DV*SG_{it}) + \beta_{12}(DV*CTOR_{it}) + \beta_{13}(DV*PCI_{it}) + \eta_i + \varepsilon_{it}$ 　　　　　　Model 1

$\textbf{ROE}_{it} = \alpha + \beta_1(LDR_{it}) + \beta_2(FATA_{it}) + \beta_3(FS_{it}) + \beta_4(SG_{it}) + \beta_5(CTOR_{it}) + \beta_6(PCI_{it}) + \beta_7(DV_{it}) + \beta_8(DV*LDR_{it}) + \beta_9(DV*FATA_{it}) + \beta_{10}(DV*FS_{it}) + \beta_{11}(DV*SG_{it}) + \beta_{12}(DV*CTOR_{it}) + \beta_{13}(DV*PCI_{it}) + \eta_i + \varepsilon_{it}$ 　　　　　　Model 2

Where, i=1, 2, 3,…., n (number of firms) and t= 2015, 2016, 2017, 2018, and 2019. β values represent the regression coefficients of the independent variables, and DV is a dummy variable that takes the value of 1 for EFQM certified organizations and zeroes for other organizations. DV*LDR, DV*FATA, DV*FS, DV*SG, DV*CTOR, and DV*PCI are dummy interaction terms. η_i and ε_{it} are unobserved firm-specific effects and error terms for firm i at time t, respectively.

3. RESEARCH METHODOLOGY

The methodology is a research strategy that describes the methods of how research should be undertaken. This study chapter presents an overview of the research philosophy, methodology, and design used to undertake the study. Hence, this chapter explains the research methods and scientific approaches that are considered suitable for this research.

3.1 Research Design

According to Saunders et al. (2016), a research design is a universal plan; in what way will the researchers respond to the research questions. The current research discusses the overall research design process: research approach, research strategy, research philosophy, data collection methods, and data analysis. Saunders et al. (2016) proposed a research methodology structure that is based on the theoretical concept of "**research onion**". The research onion model was primarily designed for business studies. The research onion consists of six main layers, and the layers give a more detailed description of the stages of a research process. To achieve the goal, the right steps must be taken consequently, and it applies in research cover one step first before proceeding to another. So, the research process is the same as the unwrapping of an onion layer by layer. However, some main layers of the "research onion" are described in the following used in the current study.
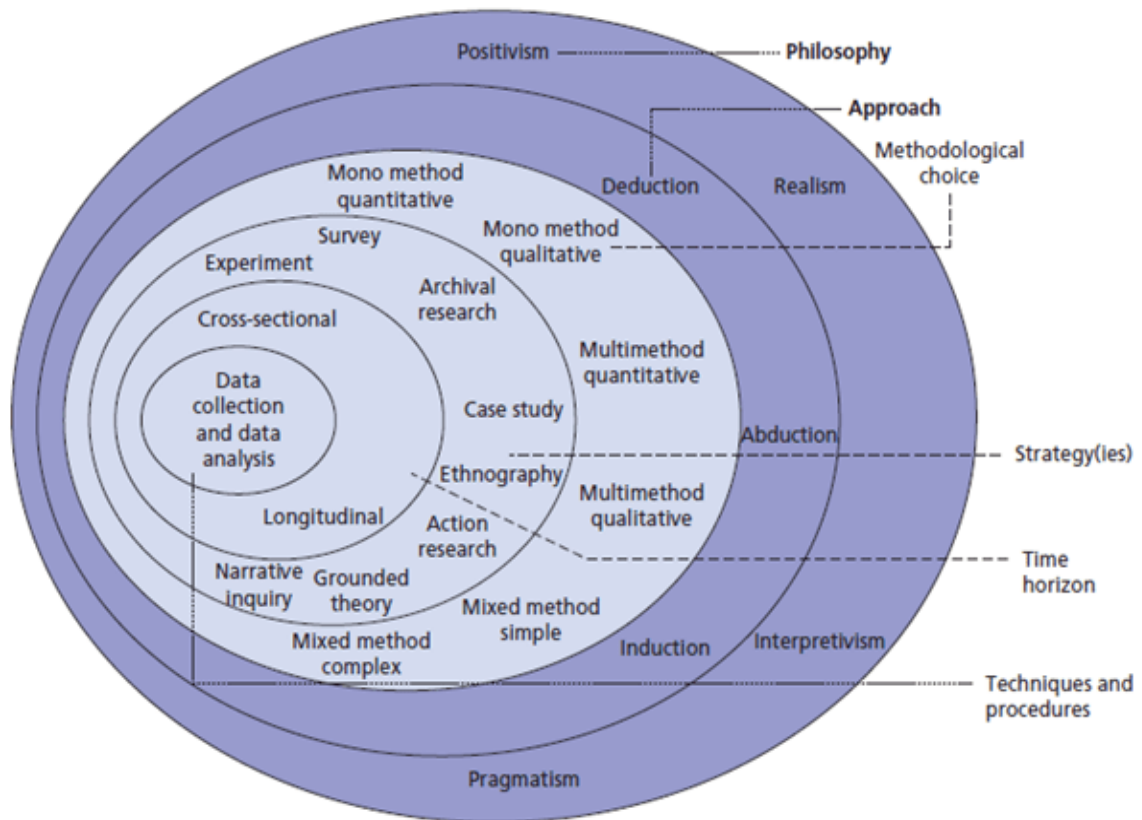
Figure 5: Research onion for futures studies (Source: Saunders et al., 2016)

3.2 Research Philosophy (Paradigm)

Saunders et al. (2016) define research philosophy as a system of beliefs and assumptions about the development of knowledge. Many researchers discussed four main research philosophies in their research, which are (i) positivist research philosophy, (ii) interpretivism research philosophy, (iii) pragmatist research philosophy, and (iv) realistic research philosophy (Melnikovas, 2018). Two research philosophies are used in this research: positivist research philosophy and interpretivism research philosophy.

3.3 Method of Research or Research Choices and Techniques

Saunders et al. (2016) classified the research methods into two main categories, i.e., quantitative and qualitative methods. The quantitative method states to any data analysis procedure or data collection technique that uses or creates numerical data, and the quantitative method involves numbers and mathematical operations. The qualitative method mentions any data analysis procedure or data collection technique that uses or generates non-numerical data; however, qualitative methods imply a collection of vast descriptive data. The mixed-method is used when the research is focused on both quantitative and

qualitative data. Though, both qualitative and quantitative research methods (or mixed-method) are used in this research.

3.4 Research Strategy

A research strategy is a method employed to complete the research; it includes archival and documentary research, experiment, survey, case study, action research, ethnography, and grounded theory (Saunders et al., 2016). The current study is a comparative case study of the Czech organizations as it compares the performance of the Czech organizations.

3.5 Research Time Horizon

Research time horizons generally refer to periods to be studied or chronological horizons of fluctuating range. Kosow and Gaßner (2008) described the three basic time horizons, which are (i) short-term – up to 10 years; (ii) medium-term – up to 25 years; and (iii) long-term – more than 25 years. The research time horizon contains two designs, (i) cross-sectional design and (ii) longitudinal design. According to Burton (2000), the longitudinal design is a design where the data are collected for separate items or variables for two or more distinct time phases. The cases or themes investigated are the same or at least comparable from one period to the next. Bell et al. (2018) stated that cross-sectional design employs data on more than one case and at a single point in time to collect a body of quantitative data in connection with more than one variable. De Vaus (2013) argued that the cross-sectional research design is mostly used in social research to gain the results quickly. The current study employed panel data for the quantitative study, and the data was collected at a limited time or short time from 2015 to 2019.

3.6 Data Collection, Sample Size, and Data Analysis Techniques

Following the research onion step-by-step, the final layer of "research onion" moves the research design towards data collection and analysis. All earlier choices determine the type of basic data collection and analysis procedures, which helps to answer the research question. The data collection procedure is about screening and utilizing two types of data: secondary and primary data. Both types of data are used in this research. The primary data collection was carried out through the interviews for the qualitative analysis, and the sample size is 4 Czech organizations. The secondary data collection was obtained from the Albertina database for the quantitative research, and the sample size is 307 Czech organizations. The number of samples for the quantitative study is taken in

guidelines as recommended by Krejcie and Morgan (1970) and Fleiss et al. (1969). Many scholars have used the secondary data from the Albertina database such as Chandrapala and Knápková (2013); Náglová and Pechrová (2019); Činčalová and Hedija (2020); Vrbka (2020); Kučera et al. (2021); and Hedija and Kuncová (2021).

3.7 Data Triangulation

Triangulation is a method that uses in the research to check and establish the validity of the studies. In qualitative research, validity refers to whether the findings of a study are certain and true. According to Carter et al. (2014), there are many types of triangulation: data triangulation, investigator triangulation, theory triangulation, methodological triangulation, and environmental triangulation; however, data triangulation is used in this research. The researchers use different sources in data triangulation, so this type of triangulation is the most popular and easiest to implement. (Guion et al., 2011 and Johnston et al., 2010). A data triangulation approach is employed to check the reliability and validity of the data. It is a maintained practicing accepted mechanism in research methodology in the process of data collection and processing. Hence, the data triangulation method is used to check the validity and reliability of the data used in the current research.

The complete detail about the research methodology that is used in the current study is given in Table 2.

Table 2: Summary of Research Methodology (Source: Author)

Research Paradigm	Positivism	Interpretivist
Research Methodology or Research Approach	Mixed Methods	
	Qualitative	Quantitative
Research Strategy or Research Methods	Case study	Case study
Data Collection Technique	Interviews	Secondary Data
Sample Size	4 organizations (3 certified from EFQM, 1 non-certified)	307 organizations (20 certified from EFQM, 287 non-certified)

Study Context	Czech Republic	Czech Republic
Data Analysis Techniques	All interviews contents were retyped and saved in a Microsoft Word file - word cloud - content code - code co-occurrence	Measurement assessment - descriptive statistics - correlation analysis - regression analysis

4. QUANTITATIVE AND QUALITATIVE STUDIES

Creswell (2003) argued that the mixed-methods approach combines quantitative and qualitative data collection and analysis procedures within a single study, and the approach can be used either sequentially or simultaneously. Tashakkori and Creswell (2007) claimed that the mixed-methods approach provides better results. Therefore, a mixed-methods is adopted in the current study. This section belongs to the quantitative research and its results.

4.1 Quantitate Study and its Results

About 307 Czech organizations, including 20 certified organizations from EFQM Model, were chosen randomly for the quantitative study from three sectors: automotive, manufacturing, and construction industries. These sectors are selected in the current research as it is easy to compare the financial performance within the chosen sectors. Boulter et al. (2013) argued that it is important to consider financial measures to found the link between TQM and organizational performance. The financial measures of organizational performance are accounting-based measures, including net profits, total sales, total assets, fixed assets, sales growth, tangible assets, and the number of employees. Two different regression estimations are employed to test the hypotheses, i.e., pooled ordinary least square (OLS) and maximum likelihood estimation (MLE).

4.1.1 Descriptive Statistics

All empirical estimations were performed by using STATA 16.0 software in the quantitative research. The descriptive statistics of 307 Czech firms are presented into two groups in Table 3: all firms and certified firms from the EFQM Excellence Model. For all firms, the mean and standard deviation (S.D.) of ROA and ROE are 5.13 and 8.86; 9.99 and 17.34, respectively. The values of S.D. of ROA and ROE are slightly higher than other variables, but the values of S.D. of other variables are almost the same. The mean values of ROA and ROE of all firms are lower than the certified firms. However, all positive values of ROE and

ROA indicate that the Czech firms earned profit during 2015-2019. The values of ROA and ROE of the certified firms are higher than the values of ROA and ROE of all firms. It means that the certified firms earned more profits than all firms during the study period. FATA, FS, and PCI are not volatile, as the variables' standard deviations are lower than their mean values. Conversely, LDR, SG, ROE, ROA, and CTOR are highly volatile as the standard deviations of the variables are greater than their mean values. Most of the values of the selected variables of all firms are slightly different from the certified firms.

Table 3: Descriptive Statistics (Source: Author's calculations)

Stats	Mean	Minimum	Maximum	S.D.	N
For all firms					
ROA	5.13	-47.82	58.50	8.86	1341
ROE	9.99	-84.65	91.40	17.34	1328
LDR	0.13	0	1.07	0.14	1349
FATA	0.44	0	0.88	0.17	1349
FS	5.84	3.97	8.16	0.51	1349
SG	0.05	-0.90	9.46	0.38	1349
CTOR	0.51	0	13.52	0.77	1349
PCI	3.27	-0.43	5.30	0.63	1177
For EFQM certified firms					
ROA	8.49	-6.20	34.07	8.75	83
ROE	17.34	-13.26	63.81	16.62	87
LDR	0.16	0	0.58	0.17	87
FATA	0.47	0.13	0.77	0.19	87
FS	6.45	5.34	8.16	0.75	87
SG	0.03	-0.23	0.26	0.09	87
CTOR	0.70	0.08	6.32	1.26	87
PCI	3.44	2.04	4.80	0.58	71

4.1.2 Correlation Matrix

The correlation coefficients of the selected variables of all 307 Czech organizations from three sectors are presented in Table 4. LDR, FATA, and CTOR are negatively correlated with proxies of organization performance. On the other hand, FS, SG, and PCI are positively correlated with ROE and ROA. DV is also positively correlated with ROA and ROE, which means that there is a positive relationship between the quality certification from the EFQM Excellence Model and organization performance. The multicollinearity between independent variables is diagnosed by the variance inflation factor (VIF) test. Table 4 shows

the results of the VIF test in the last column. If the VIF is smaller, multicollinearity between independent variables will lower (Gujarati & Porter 2009). If the value of the VIF is more than 10, multicollinearity could be a serious problem (Nachane 2006). However, all the values of VIF are lower than 10 in Table 4, which means that there is no multicollinearity issue among independent variables.

Table 4: Correlation coefficients and VIF coefficients (Source: Author's calculations)

	ROA	ROE	LDR	FATA	FS	SG	CTOR	PCI	DV	VIF
ROA	1									
ROE	0.74	1								
LDR	-0.16	0.03	1							1.08
FATA	-0.12	-0.11	0.23	1						1.41
FS	0.23	0.18	-0.12	-0.07	1					1.18
SG	0.03	0.01	0.09	0.01	0.02	1				1.01
CTOR	-0.13	-0.11	0.08	0.41	-0.23	-0.05	1			1.32
PCI	0.07	0.02	0.01	0.37	0.22	-0.03	0.25	1		1.31
DV	0.09	0.12	0.06	0.02	0.27	-0.02	0.04	0.07	1	

5.1.4 Robustness Test for all Firms

To ensure the validity of the regression results, the Breusch-Pagan/Cook-Weisberg test is employed to check the heteroskedasticity in the fitted values of ROA. The null hypothesis of this test is as follows.

Ho: Constant variance

The test produced a chi-square value of 0.71 with a p-value of 0.399. The chi-square value is statistically not significant as the p-value is greater than 0.05. Hence, the null hypothesis of constant variance was not rejected to signify that there is no heteroskedasticity in the data (Poi & Wiggins 2001; Wamugo et al. 2014). The same findings could be noted in Figure 6, where it is clear that there is no clustering in the data.
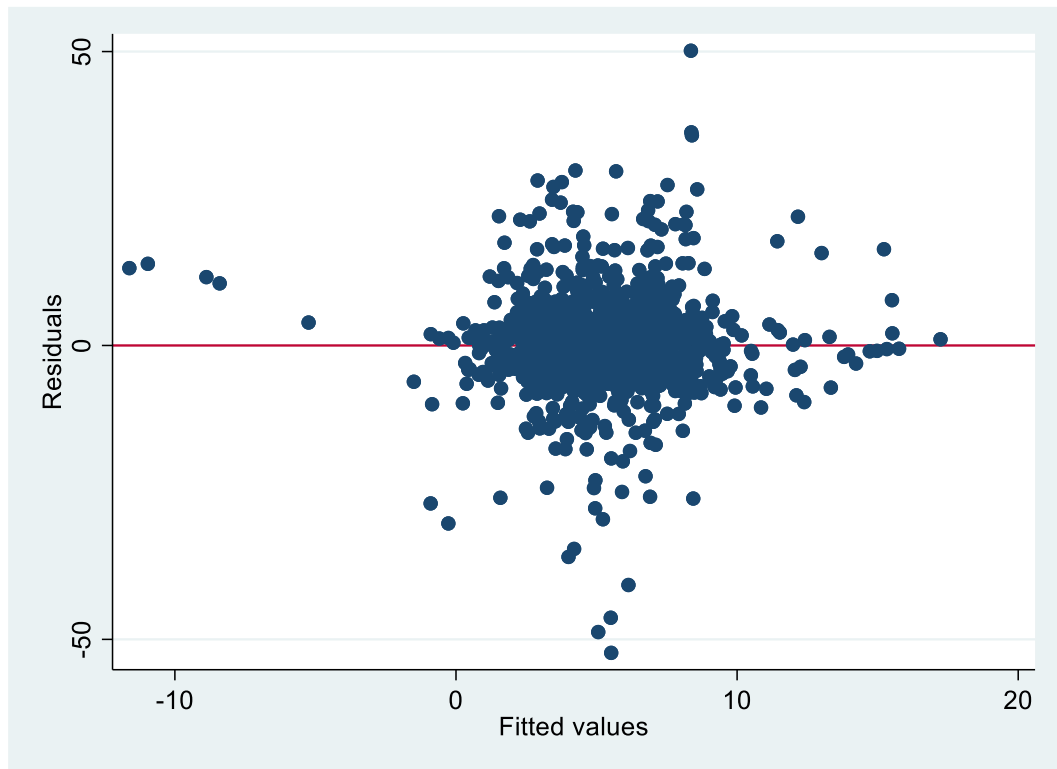
Figure 6: Robustness test for ROA of all organizations (Source: Author)

The same test (Breusch-Pagan/Cook-Weisberg test) is used to test the heteroskedasticity in ROE. The null hypothesis of this test is as follows.

Ho: Constant variance

The test produced the following values.

chi2(1) = 0.85

Prob > chi2 = 0.3554

The p-value is greater than 0.05; therefore, there is no heteroskedasticity in the data. The following Figure 7 also shows that the data for ROE is free from heteroskedasticity as there is no pattern in the data.
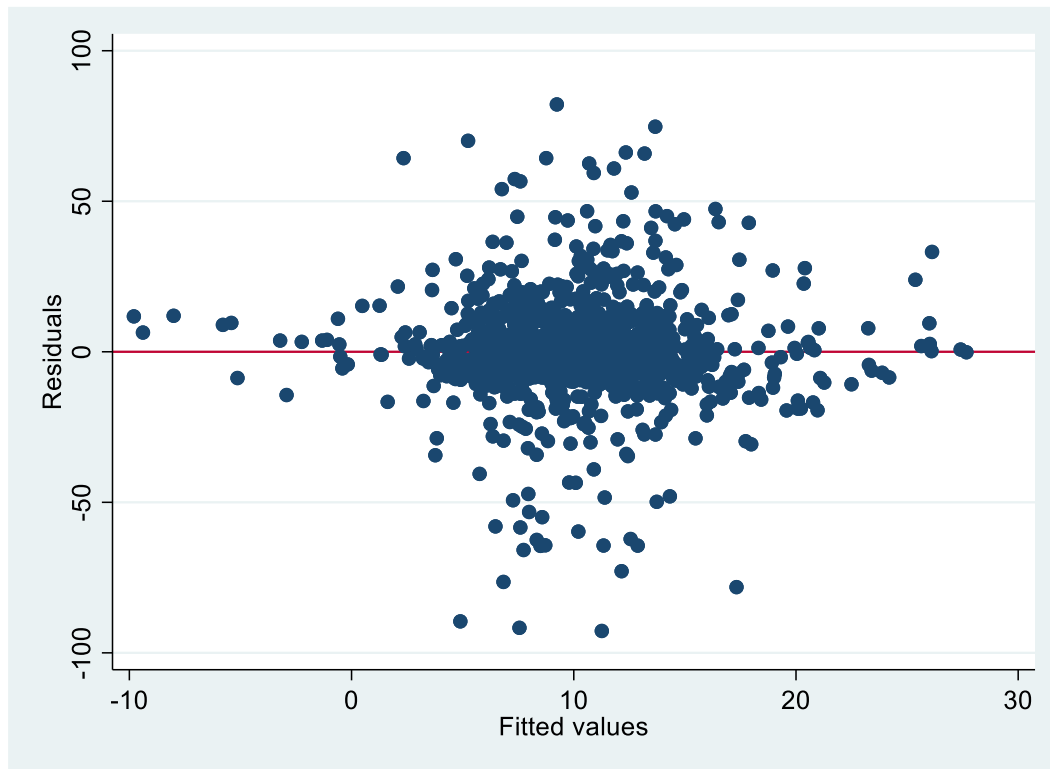
Figure 7: Robustness test for ROE of all organizations (Source: Author)

4.1.3 Stationarity of Data by Unit Root

The stationarity of the data has been tested through Fisher type unit-root test to avoid spurious regression results. There are many advantages to employing the Fisher-type unit root test. The test does not need balanced panel data even though the test applies the individual Augmented Dickey-Fuller (ADF) regression (Maddala and Wu 1999). This fact is also confirmed by Hlouskova and Wagner (2006); Yousaf and Bris (2021b). The authors argued that the Fisher-type unit root test does not require a balanced panel or identical lag lengths in the individual equations. Therefore, the Fisher-type test is applied to all the variables to check the panel unit-roots. The null and alternative hypotheses are:

Ho: All panels contain unit roots

Ha: At least one panel is stationary

The test results are presented in Table 5 with two options, i.e., without time trend and with a time trend.

Table 5: Fisher Type Unit Root Tests (Source: Author's calculations)

Variables	Without t trend	p	With t trend	p	Without t trend	p	With t trend	p
	For All Firms				For EFQM Firms			
ROA	-16.21	0.00	-5.41	0.00	-4.97	0.00	-4.01	0.00
ROE	-14.62	0.00	-3.39	0.00	-2.19	0.00	-6.93	0.00
LDR	-13.51	0.00	-16.29	0.00	-4.11	0.00	-3.12	0.00
FATA	-11.92	0.00	-12.83	0.00	-0.36	0.00	-8.27	0.00
FS	-5.93	0.00	-12.01	0.00	-4.15	0.00	-4.39	0.00
SG	-10.76	0.00	-11.37	0.00	-4.43	0.00	-1.86	0.00
CTOR	-11.41	0.00	-13.90	0.00	0.63	0.00	-3.22	0.00
PCI	-23.24	0.00	-8.68	0.00	-5.30	0.00	-5.54	0.00

According to Table 5, it is clear that most of the data of the selected variables are stationary as the p values are zero. The data is free from multicollinearity, heteroskedasticity, and panel unit-roots. Therefore, it is appropriate to run the regression for Model 1 and Model 2. The outcomes of both Models are presented in Table 6.

4.1.4 Pooled OLS and MLE Results

The models (Model 1 and Model 2) are estimated by Pooled OLS and MLE techniques. MLE is included in the current study as Hsiao et al. (2002) argued that MLE appears to be an excellent model in almost all cases. Binder et al. (2005) described that the MLE performs much better even when the data are generated by small sample size and non-normal disturbance. The same findings are reported by Ramírez-Rondán (2020) and argued that MLE performs well even the sample size is small in the panel data. Table 6 revealed the outcomes of Model 1 and Model 2.

Table 6: Pooled OLS and MLE results (Source: Author's calculations)

Methods	Pooled OLS		MLE	
Variables	ROA (Model 1)	ROE (Model 2)	ROA (Model 1)	ROE (Model 2)
LDR	-4.64** (2.02)	11.34*** (4.22)	-3.25 (2.18)	8.08 (4.94)
FATA	-5.32*** (1.77)	-14.24*** (3.63)	-10.88*** (2.30)	-19.21*** (4.70)
FS	2.51***	5.03***	3.84***	5.77***

	(0.60)	(1.22)	(0.92)	(1.71)
SG	0.39	0.05	0.92**	-2.39**
	(0.61)	(1.34)	(0.42)	(1.15)
CTOR	-0.83**	-0.55**	-0.84	-0.62
	(0.38)	(0.78)	(0.55)	(1.70)
PCI	1.01**	1.24	1.00***	1.46*
	(0.45)	(0.92)	(0.36)	(0.89)
DV	23.66**	47.57**	28.07	52.98*
	(10.70)	(21.52)	(17.13)	(30.17)
DV*LDR	-27.26*	-51.78*	-46.22**	-77.80**
	(14.53)	(28.30)	(20.39)	(39.15)
DV*FATA	30.04	58.72	70.77**	131.11*
	(31.72)	(58.76)	(41.77)	(78.94)
DV*FS	-0.48	-3.82	-2.07	-4.86
	(1.70)	(3.22)	(2.62)	(4.52)
DV*SG	-11.07	-2.74	3.49	18.92
	(11.50)	(23.41)	(7.78)	(19.75)
DV*CTOR	-1.24*	-3.86*	-1.12	-3.35
	(1.10)	(2.24)	(1.59)	(2.98)
DV*PCI	-4.33**	-3.38	-3.07*	-3.87
	(2.10)	(4.04)	(1.71)	(4.05)
Intercept	-9.44***	-18.47***	-14.83***	-20.58***
	(3.43)	(7.03)	(5.34)	(9.96)
N	1171	1159	1171	1159
P-Value	0.000	0.000	0.000	0.000
R²	0.083	0.057		
Adj R²	0.073	0.046		
AIC	8303.825	9871.589	9668.842	7755.452
BIC	8374.743	9942.363	9749.727	7836.502

Note: Standard Errors are in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The results of the pooled OLS and MLE are presented in Table 6. If DV = 0 for non-certified firms, then DV and all interaction terms will be zero. Model 1 and Model 2 of the pooled OLS for the non-certified organizations will be like this:

$$ROA_{it} = \alpha + \beta_1(LDR_{it}) + \beta_2(FATA_{it}) + \beta_3(FS_{it}) + \beta_4(SG_{it}) + \beta_5(CTOR_{it}) + \beta_6(PCI_{it}) + \eta_i + \varepsilon_{it}$$

$$ROA_{it} = -9.44 - 4.64(LDR_{it}) - 5.32(FATA_{it}) + 2.51(FS_{it}) + 0.39(SG_{it}) - 0.83(CTOR_{it}) + 1.01(PCI_{it}) + \eta_i + \varepsilon_{it}$$

ROE$_{it}$ = α + β$_1$(*LDR*$_{it}$) + β$_2$(*FATA*$_{it}$) + β$_3$(*FS*$_{it}$) + β$_4$(*SG*$_{it}$) + β$_5$(*CTOR*$_{it}$) + β$_6$(*PCI*$_{it}$) + η$_i$ + ε$_{it}$

ROE$_{it}$ = *-18.47 + 11.34(LDR*$_{it}$*) − 14.24(FATA*$_{it}$*) + 5.03(FS*$_{it}$*) + 0.05(SG*$_{it}$*) − 0.55(CTOR*$_{it}$*) + 1.24(PCI*$_{it}$*) + η*$_i$* + ε*$_{it}$

In the same way, Model 1 and Model 2 of the MLE for the non-certified organizations will be like this:

ROA$_{it}$ = *-14.83 − 3.25(LDR*$_{it}$*) - 10.88(FATA*$_{it}$*) + 3.84(FS*$_{it}$*) + 0.92(SG*$_{it}$*) − 0.84(CTOR*$_{it}$*) + 1.00(PCI*$_{it}$*) + η*$_i$* + ε*$_{it}$

ROE$_{it}$ = *-20.58 + 8.08(LDR*$_{it}$*) − 19.21(FATA*$_{it}$*) + 5.77(FS*$_{it}$*) − 2.39(SG*$_{it}$*) − 0.62(CTOR*$_{it}$*) + 1.46(PCI*$_{it}$*) + η*$_i$* + ε*$_{it}$

If DV =1 for the certified organizations, then Model 1 and Model 2 for the pooled OLS can be written as follows.

ROA$_{it}$ = α + β$_1$(*LDR*$_{it}$) + β$_2$(*FATA*$_{it}$) + β$_3$(*FS*$_{it}$) + β$_4$(*SG*$_{it}$) + β$_5$(*CTOR*$_{it}$) + β$_6$(*PCI*$_{it}$) + β$_7$(*DV*$_{it}$) + β$_8$(*DV*LDR*$_{it}$) + β$_9$(*DV*FATA*$_{it}$) + β$_{10}$(*DV*FS*$_{it}$) + β$_{11}$(*DV*SG*$_{it}$) + β$_{12}$(*DV*CTOR*$_{it}$) + β$_{13}$(*DV*PCI*$_{it}$) + η$_i$ + ε$_{it}$

ROA$_{it}$ = (α + β$_7$) + (β$_1$ +β$_8$)*LDR*$_{it}$ + (β$_2$ + β$_9$)*FATA*$_{it}$ + (β$_3$ + β$_{10}$)*FS*$_{it}$ + (β$_4$+ β$_{11}$)*SG*$_{it}$ + (β$_5$ + β$_{12}$)*CTOR*$_{it}$ + (β$_6$ + β$_{13}$)*PCI*$_{it}$ + η$_i$ + ε$_{it}$

ROA$_{it}$ = (-9.44 + 23.66) + (-4.64 − 27.26)*LDR*$_{it}$ + (-5.32 + 30.04)*FATA*$_{it}$ + (2.51 − 0.48)*FS*$_{it}$ + (0.39 − 11.07)*SG*$_{it}$ + (-0.83 − 1.24)*CTOR*$_{it}$ + (1.01 − 4.33)*PCI*$_{it}$ + η$_i$ + ε$_{it}$

ROA$_{it}$ = *14.22 − 31.90(LDR*$_{it}$*) + 24.72(FATA*$_{it}$*) + 2.03(FS*$_{it}$*) − 10.68(SG*$_{it}$*) − 2.07(CTOR*$_{it}$*) − 3.32(PCI*$_{it}$*) + η*$_i$* + ε*$_{it}$

ROE$_{it}$ = (α + β$_7$) + (β$_1$ +β$_8$)*LDR*$_{it}$ + (β$_2$ + β$_9$)*FATA*$_{it}$ + (β$_3$ + β$_{10}$)*FS*$_{it}$ + (β$_4$+ β$_{11}$)*SG*$_{it}$ + (β$_5$ + β$_{12}$)*CTOR*$_{it}$ + (β$_6$ + β$_{13}$)*PCI*$_{it}$ + η$_i$ + ε$_{it}$

ROE$_{it}$ = (-18.47 + 47.57) + (11.34 − 51.78)*LDR*$_{it}$ + (-14.24 + 58.72)*FATA*$_{it}$ + (5.03 − 3.82)*FS*$_{it}$ + (0.05 − 2.74)*SG*$_{it}$ + (-0.55 − 3.86)*CTOR*$_{it}$ + (1.24 − 3.38)*PCI*$_{it}$ + η$_i$ + ε$_{it}$

ROE$_{it}$ = *29.10 − 40.44(LDR*$_{it}$*) + 44.48(FATA*$_{it}$*) + 1.21(FS*$_{it}$*) − 2.69(SG*$_{it}$*) − 4.41(CTOR*$_{it}$*) − 2.14(PCI*$_{it}$*) + η*$_i$* + ε*$_{it}$

In the same way, if DV = 1 for certified firms, then Model 1 and Model 2 for the MLE will be like this:

ROA$_{it}$ = (-14.83 + 28.07) + (-3.25 − 46.22)LDR_{it} + (-10.88 + 70.77)$FATA_{it}$ + (3.84 − 2.07)FS_{it} + (0.92 + 3.49)SG_{it} + (-0.84 − 1.12)$CTOR_{it}$ + (1.00 − 3.07)PCI_{it} + η$_i$ + ε$_{it}$

ROA$_{it}$ = 13.24 − 49.47(LDR$_{it}$) + 59.89(FATA$_{it}$) + 1.77(FS$_{it}$) + 4.41(SG$_{it}$) − 1.96(CTOR$_{it}$) − 2.07(PCI$_{it}$) + η$_i$ + ε$_{it}$

ROE$_{it}$ = (-20.58 + 52.98) + (8.08 − 77.80)LDR_{it} + (-19.21 + 131.11)$FATA_{it}$ + (5.77 − 4.86)FS_{it} + (-2.39 + 18.92)SG_{it} + (-0.62 − 3.35)$CTOR_{it}$ + (1.46 − 3.87)PCI_{it} + η$_i$ + ε$_{it}$

ROE$_{it}$ = 32.40 − 69.72(LDR$_{it}$) + 111.90(FATA$_{it}$) + 0.91(FS$_{it}$) + 16.53(SG$_{it}$) − 3.97(CTOR$_{it}$) − 2.41(PCI$_{it}$) + η$_i$ + ε$_{it}$

The codes were also switched to estimate Model 1 and Model 2, DV = 1 for the non-certified firms, and DV = 0 for the certified firms. In this way, the dummy interaction terms will become zero, and the obtained outcomes for the certified firms could easily examine whether coefficients are significant or insignificant. The findings are presented in Table 18 in the Appendix.

According to pooled OLS findings in Table 6, most of the results of the selected variables are statistically significant. The coefficients of LDR (-4.64 and 11.34) for non-certified firms are statistically significant at 0.05 and 0.01 significance levels. It means that LDR has a negative impact on ROA. If one unit increases in LDR, there will be a decrease in ROA by 4.64 units for non-certified organizations. On the other hand, the relationship between LDR and ROE (Model 2) is positive. For certified organizations, the relationship between LDR and organization performance is statistically significant and negative. The relationship between LDR and organization performance of the non-certified firms is significantly larger than the relationship between LDR and organization performance of the certified firms (-4.64 > -31.90 in Model 1 and 11.34 > -40.44 in Model 2 in pooled OLS technique). The results of LDR revealed that when the organizations accrue more debts, it causes to decrease their performance, specifically of the certified organizations. The reason is that the excess debts raise the financial distress costs and decline the firm's value. The findings of the effect of LDR on organization performance are consistent with Tang and Chang (2015); Khan et al. (2018); Mishra et al. (2020); Fernández-López et al. (2020); Ali et al.

(2021), as these authors also reported the negative relationship between the variables. The same relationship of LDR and organization performance of the certified organizations can be observed in the MLE technique.

The results of FATA in pooled OLS and MLE revealed that the coefficients of FATA are statistically significant at a 0.01 significance level, and all the coefficients have a negative sign which means that the relationship between FATA and organization performance of the non-certified organizations is negative. On the contrary, the relationship between FATA and the organization performance of the certified firms is significant and positive (Model 1 and Model 2 in MLE technique). This negative relationship between FATA and organization performance for the non-certified organizations show that the relationship is significantly smaller than the relationship between the variables of the certified organizations (-10.88 < 59.89 in Model 1 and -19.21 < 111.90 in Model 2 in MLE technique). The positive relationship between FATA and organization performance is consistent with the previous studies (Iltaş and Demirgüneş 2020; Birhan 2017).

Table 6 shows a statistically significant and positive relationship between FS and organization performance of non-certified firms. All positive coefficients of FS exposed that the large Czech organizations perform better and earn more profits than small and medium organizations. However, the coefficients of FS of the certified organizations are statistically insignificant in Model 1 and Model 2 in both techniques. These insignificant outcomes revealed that the size of the certified organizations does not statistically affect their performance. The findings of the effect of FS on organization performance about the non-certified firms are consistent with Ali et al. (2021); Bawazir et al. (2021); Li et al. (2021); Ahmed and Bhuyan (2020); Molodchik et al. (2016); and Chandrapala and Knápková (2013), as the scholars also testified the positive relationship between FS and organization performance.

The coefficients of SG of non-certified organizations are statistically significant at a 0.05 level of significance in the MLE technique. The coefficient of SG is positive in Model 1, which means that there is a positive relationship between SG and ROA. One unit increase in SG will increase ROA by 0.92 units of non-certified organizations. Conversely, the coefficient of SG is negative in Model 2, which revealed a negative relationship between SG and the organization's performance. The coefficients of SG of certified organizations are statistically insignificant in all four cases. Thus, it can conclude that the higher sales growth of the certified organizations does not statistically affect their performance.

In the pooled OLS, the coefficients of CTOR for non-certified firms are negative and statistically significant at a 0.05 level of significance (Model 1 and

Model 2). The negative signs of both coefficients exposed a negative relationship between CTOR and organization performance. The exact relationship between the variables could be observed for certified organizations in the same Models. However, the relationship between CTOR and organization performance for non-certified firms is significantly larger than the relationship between the variables of the certified firms (-0.83 > -2.07 in Model 1 and -0.55 > -4.41 in Model 2).

The coefficients of PCI for non-certified organizations in pooled OLS and MLE are statistically significant at 0.01, 0.05, and 0.10 significance levels. The signs of PCI coefficients are positive, which exposed the positive effect of PCI on organization performance. On the other hand, there is a significant and negative relationship between PCI and organization performance for the certified organizations in Model 1 for both techniques. The relationship between PCI and organization performance is significantly larger for non-certified firms than the relationship between the variables for certified organizations (1.01 > -3.32 and 1.00 > -2.07 in Models 1).

The significant and negative CTOR and significant and positive PCI jointly show that non-certified Czech organizations use labor-intensive technology efficiently. However, the significant and negative CTOR; and significant and negative PCI of the certificate organizations jointly exposed that the certified organizations from the EFQM Excellence Model appear to use capital-intensive technology efficiently. The findings of some results are partially consistent with the study of Chandrapala and Knápková (2013).

The coefficients of DV are statistically significant at 0.05 and 0.10 significance levels in the three cases. All significant coefficients of DV have positive signs, which exposed that quality certificate from the EFQM Excellence Model has a positive impact on organizational performance. The magnitude of the coefficients of DV is also large. The organizations with a certificate from the EFQM Model perform 23.66 and 47.57 units better in pooled OLS (measured by ROA and ROE) than non-certified organizations. According to the MLE technique, the organizations with having a quality certificate from the EFQM Model perform 52.98 units better than non-certified organizations. Hence, the quantitative study findings confirm that the organizations with quality certificates from the EFQM Model perform better and earn more profits than non-certified organizations.

The dummy interaction terms are included to more observe the impact of the quality certificates on organization performance. Most of the signs of significant coefficients of the dummy interaction terms are the same as of non-certified organizations except DV*FATA and DV*PCI. The significant outcomes of both interactions' terms are opposite a sign of coefficients of FATA and PCI.

The p-values of both models (Model 1 and Model 2) show the significance of the models as all the values are lower than the significance level (0.05). Hence, all the formed models are statistically significant. R^2 is the coefficient of determination that indicates how close the data are to the fitted regression line. The values of R^2 and adjusted R^2 of the current study are low in Model 1 and Model 2 (pooled OLS). However, a good model may have a low R^2 value, and a high R^2 value for a model may have a possibility that it does not fit the data (Moksony and Szemle, 1990). Therefore, the values of R^2 and adjusted R^2 do not designate whether a regression model is suitable.

In the literature, many tests and tools for detecting the best model have been suggested. However, two of them are most widely used models to evaluate the validity of the models are the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) (Rossi et al., 2020). Table 6 also reported the model fit statistics: AIC and BIC. The model with the lowest AIC and BIC values is the best (Yang, 2005; Asif et al., 2021). Model 2 (MLE) is the best prediction model to forecast the organization's performance as the AIC and BIC values are the lowest in Model 2 (MLE). The results of the tested hypotheses are described in Table 7.

Table 7: A summary of tested hypotheses (Source: Author)

	Hypotheses	Conclusion	
		Model 1	Model 2
H_1	LDR is associated with the organization's performance for non-certified firms.	Supported	Rejected
H_{1A}	LDR has an impact on organization performance of the certified organizations from the EFQM Model.	Supported	Supported
H_2	FATA has an impact on the organizational performance of non-certified organizations.	Supported	Supported
H_{2A}	FATA has an impact on the organizational performance of certified organizations.	Supported	Supported
H_3	There is a significant relationship between FS and organization performance for non-certified organizations.	Supported	Supported
H_{3A}	There is an impact of FS on organization performance for certified organizations.	Rejected	Rejected
H_4	SG is significantly associated with organization performance for non-certified organizations.	Supported	Supported
H_{4A}	SG is significantly associated with organization performance of the certified organizations.	Rejected	Rejected

H_5	CTOR is associated with organization performance for non-certified organizations.	Supported	Supported
H_{5A}	The is a significant relationship between CTOR and organization performance of the certified organizations.	Supported	Supported
H_6	PCI has an impact on organization performance for non-certified organizations.	Supported	Supported
H_{6A}	PCI is associated with organization performance for certified organizations.	Supported	Rejected
H_7	There is a significant impact of quality certificates from the EFQM Model on the organization's performance.	Supported	Supported

4.2 Qualitative Study and its Results

4.2.1 Object of Analysis, Research Design, and Data Collection

This study adopted a mixed-method approach. This section discussed the qualitative research approach in order to reveal why Czech organizations did not obtain the quality award from the EFQM Excellence Model and to explore the performance of the organizations after obtaining the quality certificates from the Foundation. The research strategy selected is a case study approach that answers the "why" question related to the effects of quality certificates on organization performance. The study selected specifically "why" and "how" questions to deepen understanding of this complex topic (Wilhelmy et al. 2016; Pham et al., 2019), and in turn to expose the organizations implement or not implement the EFQM Excellence Model. Saunders et al. (2016) also mentioned this fact and argued that the researchers should use semi-structured and in-depth interviews, particularly for the case studies, to answer questions about "How" and "What". Moreover, it can help to reveal the answers from the quantitative research of the current research.

For the qualitative research, four organizations were selected for interviews, where three organizations are certified from the EFQM, and one is non-certified. The number of organizations for qualitative study are consistent with existing studies like Pham et al. (2019); Tashakkori and Creswell (2007), which suggested that selecting four cases for the qualitative research is appropriate. This study selected four organizations from different regions of the Czech Republic: one was from Prague, one from Ostrava, one from Zlin, and one from Brno. Additionally, the gender of the interviewee, quality certificate category from the EFQM Model, size of the organization, and respondent's

position in the organization were also considered before the interview. Former studies such as Luu (2017) and Chan and Hawkins (2012) have briefly discussed these requirements. Hence, random sampling was selected as a sample choice strategy. The interviews were conducted using the guidelines settled by Tong et al. (2007) for the qualitative research. The complete list of the questions for the qualitative research is given in Appendix.

The quality managers (QM), general managers (GM), chief executive officers (CEOs), and senior employees (SE) were selected for the interviews who understand the quality award procedure from the EFQM Model and have adequate knowledge about quality management. In this way, 11 interviews of employees, managers, and CEOs were recorded until saturation was reached, as suggested by Glaser and Strauss (1967). Once saturation is reached, the results can be capable of some degree of generalisation (Boddy, 2016). All the interviewees were from front-line managers and front-line employees (senior employees). Each participant was assigned a code (Pham et al., 2019) shown in Table 8.

Table 8: Characteristics of participants

No.	Participants (Code)	Position	Organization	Experience (Years)
1	QM 1	Quality manager	A	5
2	GM 1	General manager	A	6
3	SE 1	Senior employee	A	3
4	CO 1	CEO	B	4
5	FM 1	Financial manager	B	9
6	GM 2	General manager	B	7
7	SE 2	Senior employee	C	4
8	QM 2	Quality manager	C	6
9	CO 2	CEO	C	5
10	GM 3	General manager	D	7
11	FM 2	Financial manager	D	2

All the interviews were conducted through phone calls and recorded with the permission of respondents. The anonymity of interviewees and their companies was ensured as it is really important to establish a comfortable and reliable meeting (Pham et al., 2019). Set of determining questions lead to numerous sub-questions during interview discussions. To improve the quality and credibility and reduce the bias of the research, a member checking process was applied by contacting interviewees again to confirm the information collected as proposed by Baxter and Jack (2015). Therefore, two interviewees were again

telephoned to record the second interview to further explain some of the discussion in the first interview. In total 11 managers, CEOs, and employees were interviewed, out of which two of them were interviewed twice. All the interviews were conducted in English. These requirements aim to ensure that participants understand quality awards/certificates, and in this way, the reliability of our data can be assured. The saturation level is the point in qualitative research when we find no new information in the data. Therefore, the interviews were held until saturation level (Saunders et al., 2018; Mason, 2010; Francis et al., 2009). After completing the interviews of the selected participants, the data were analysed and summarized carefully. The analysis of the qualitative study was conducted through a qualitative data analysis software, ATLAS.ti 9. Many scholars have used ATLAS.ti software in the recent qualitative studies such as Kalpokas and Radivojevic (2021); Nartey and Poll (2021); Rezvani and Hudson (2021). The software is used to code and categorize the transcription.

The contents of all interviews are saved and typed in a Microsoft Word file. Data triangulation is employed to determine whether the data from all available resources in the study converged to the same findings (Tharbe et al., 2021). To compare the qualitative data analysis cases, the content analysis is realized to the category of respondents and according to case by case (Pasciak et al., 2021). It also analysed the results to explore differences and similarities in terms of the EFQM Excellence Model. Finally, the final report was prepared, and the main findings are described in the following sub-sections.

According to Pham et al. (2019), a qualitative study provides and helps in better understanding the findings from the quantitative research, precisely with regard to the effects of quality certificates on organization performance. The qualitative outcomes help us better understand because of the fact that different organizations obtained different quality certificates from EFQM. Therefore, qualitative results are discussed through comparison with quantitative outcomes in this sub-section. These outcomes contribute not only to the conclusion of hypothesis 7, but also to the validity, transparency and reliability are important characteristics for the data. Some of the main points of the interviews are also discussed in the following section.

4.2.2 Analysis, Results, and Discussion

4.2.2.1 Organization A

Organization A is selected from the automotive sector, and it has obtained the 4-star certificate from the EFQM Model. There are around 200-250 employees

with a full-time job in the organization. The quality manager of the organization has experienced more than five years in the same place.

To successfully implement the EFQM Excellence Model within an organization, employees should clearly understand the Model (Nenadál, 2020). Organizations thus need to train various internal stakeholders about it and encourage them to gain the relevant training. Such training aims to transform the explicit knowledge of quality awards/certificates into employees' tacit knowledge. Once EFQM Model has been completely instituted within an organization, educational or training programs still need to continuously perform (continuous training) in their everyday operations activities. Managers are also required to take intensive training courses for continuous process improvement from the EFQM Model team. The manager of the organization highlights the implementation of the EFQM Excellence Model as follows:

"I went through a three-day training course with my three workers……course was offered from EFQM team in my company……. this training course was very detailed……many tasks from the Team and we have to follow their instructions…we learned a lot during this session" (QM 1).

Many organizations have adopted a top-down training approach to meet organization-wide training requirements. Precisely, managers, who were first trained as trainees from the Foundation team and then the trained managers gave the training to their staff.

"I got the training from the EFQM team and then I trained the management team. In this way, I trained the plant manager…then the manager trained his own team. If he needs some help sometime…then I go and give my help" (QM 1).

Most of the managers and stakeholders of Czech organizations don't implement the quality models in the organizations and are not aware of the importance and benefits of quality awards (Nenadál et al., 2018). The general manager of organization A explained this situation as:

"There are many reasons not to implement the Model in the Czech organizations………such as process is difficult in the beginning, it consumes time and effort, etc, but we have the certificate and we recommend other organizations to implement the Model……..as it has many advantages" (GM 1).

The quality manager of organization A highlighted the reasons for not receiving the final quality award by Czech organizations from the EFQM Model like this:

"The main reason is that EFQM is not popular quality Model in Czech companies….other is when one Czech company awarded by the Foundation then the organization should get back to the Foundation to obtain the high-quality award…but no Czech company do that… so we don't get the Final award from EFQM" (QM 1).

When the organizations obtain the quality certificate from the EFQM Excellence Model, the certificate is valid for 10 years; however, the organizations could return to the Foundation anytime to improve the certificate category. After obtaining the quality certificate from the Foundation, in order to continuously improve the knowledge and refresh the minds of their employees, various organizations continue to offer some training programs to their staff. The Foundation offers many training programs and courses, which can be found on the Foundation's homepage. Managers and employees can attend these training programs or courses online or have personal participation. Though some courses or training programs are free for the participants (or for members), some courses/programs need to pay a small fee. However, the courses or training programs are very important for continuous training (Cai & Jun, 2018).

"After the implementation of the EFQM Excellence Model in our organization, many financial indicators have improved…….sales, profits, revenues, and assets have increased. We noticed that our product standard has improved……… we observed that we have some advantages of this certificate to our competitive firms" (SE 1).

4.2.2.2 Organization B

Organization B is selected for the interview from the manufacturing sector, and the organization gained 5-Star from the EFQM Excellence Model. The organization has 900 to 1000 employees (have full-time job). The CEO of organization B highlights and notifies the main reasons to implement the Model.

"It was hard….in the beginning (in 2015)……….to implement the Model within our organization. My company obtained 2 times certificate from the Foundation. We obtained 3-Star in 2015, and then we obtained 5-Star in 2017………we will back to the Foundation again to upgrade the award category……… (CO 1).

"We mentioned and advertised on our company's website that we have received the quality certificate from EFQM and our products have a high quality……….we are observing many advantages from the quality certificate from EFQM" (CO 1).

Even though the Czech-based companies did not obtain the EFQM Winner/Prize Award, the Czech companies believe that they are improving the quality of their products. The general manager of organization B indicates it in the following.

"This is true Czech company did not receive the highest category award due to many reasons……….as I know many Czech companies did not implement the Model…if they don't participate, how can they get it…Moreover, training programme is difficult in the start… and many other reasons" (GM 2).

However, the manager hopes that the Czech organizations will receive the Final award soon.

"This year one Czech company (Albert) obtained 7 Star from EFQM, it is a big success……..and I hope that we (Czech companies) will receive the EFQM Excellence Award/Prize Winner very soon" (GM 2).

Most of the previous studies explored that the performance of award-winning firms is better than non-award-winning firms. The financial manager of organization B also described this.

"I observed the improvement in sales, profits, and revenues after the implementation of the Model and having the quality certificate from the Foundation" (FM 1).

4.2.2.3 Organization C

Organization C is selected from the construction sector, and the organization gained a *Committed to Excellence 2-Star* certificate from the EFQM Model. Around 80-100 employees have a full-time job in the organization. The quality manager (QM 2) stated that:

"We obtained a 2-Star certificate from EFQM Excellence Model in 2015, which is valid for 10 years. We mentioned and advertised it on our homepage and also on social media. In this way, we received many benefits from this certificate" (QM 2).

"We are happy and enjoying the benefits of the quality certificate……..I would recommend to other firms to implement the Model within their firms as the managers and staff learn a lot during and after the training" (CO 2).

The senior employee of organization C detailed that his company would continue the implementation of the Model.

"I observed that there were many things improved after obtaining the quality certificate from the Foundation including financial indicators …….. Hence, we would like to continue the implementation of the EFQM Excellence Model" (SE 2).

According to Doeleman et al. (2014), the findings of various studies showed that the EFQM Excellence Model needs to be consistently applied over a lengthy period (5–10 years) for its effective use. However, not obtaining the Winner Award of any Czech organization from the Foundation, the quality manager of organization C argued:

"There could be many reasons………such as not to back to the Foundation for improvement the certificate category……….the number of organizations of implemented the Model is already limited……….the Model is not such popular among Czech organizations (QM 2).

The quality manager of the organization hoped that the Czech organizations would obtain the Winner/Prize Award in the future.

"I know it…. However, I am sure that Czech organizations will obtain the highest award one day…… very soon" (QM 2).

4.2.2.4 Organization D

The organization D is selected from the automotive sector, and there are 200-249 workers are working in the organization. The organization did not implement the EFQM Excellence Model, so this organization has not received any quality certificate from EFQM Excellence Model.

The CEO of organization D specified:

"I have heard about the EFQM Excellence Model…..even though my company didn't implement the Model yet…….however, I believe that the quality awards improve the financial performance and quality of products" (GM 3).

To explain the reasons, no Czech company obtained the Winner Award, the senior employee of the organization D stated:

"It is very interesting to hear that the Czech companies did not obtain the highest quality award from EFQM……….I don't know the reasons…..but, I know that the Czech companies are very popular in the world………." (FM 2).

Figure 8 presents the words cloud to identify the terms or words that were used during the interviews in the qualitative study. Words cloud, also known as "contents cloud", give greater prominence to words that appear more frequently during the interviews (Atenstaedt, 2012; Okoye et al., 2021; Fu et al., 2021). The larger and bigger the words in Figure 8, the more common the words were used in the interviews. As noted in Figure 8, EFQM, Czech, model, certificate, quality, and award are the most frequent terms used during the interviews. These terms are expressively displayed in respondents' interviews, and the terms are highlighted and bigger in Figure 8. On the contrary, start, tasks, offered, years, media, and true are the least frequent words during the interviews as these words are smaller in the outcomes of the text analysis.

Figure 8: Word clouds visualization of the qualitative study (Source: Author)

4.3.1 Further Analysis

A ***content code (or content words) was assigned*** to each interview for further analysis using the above interviews' quotation. By employing the content codes, Figure 9 was prepared by using Atlas.ti software.
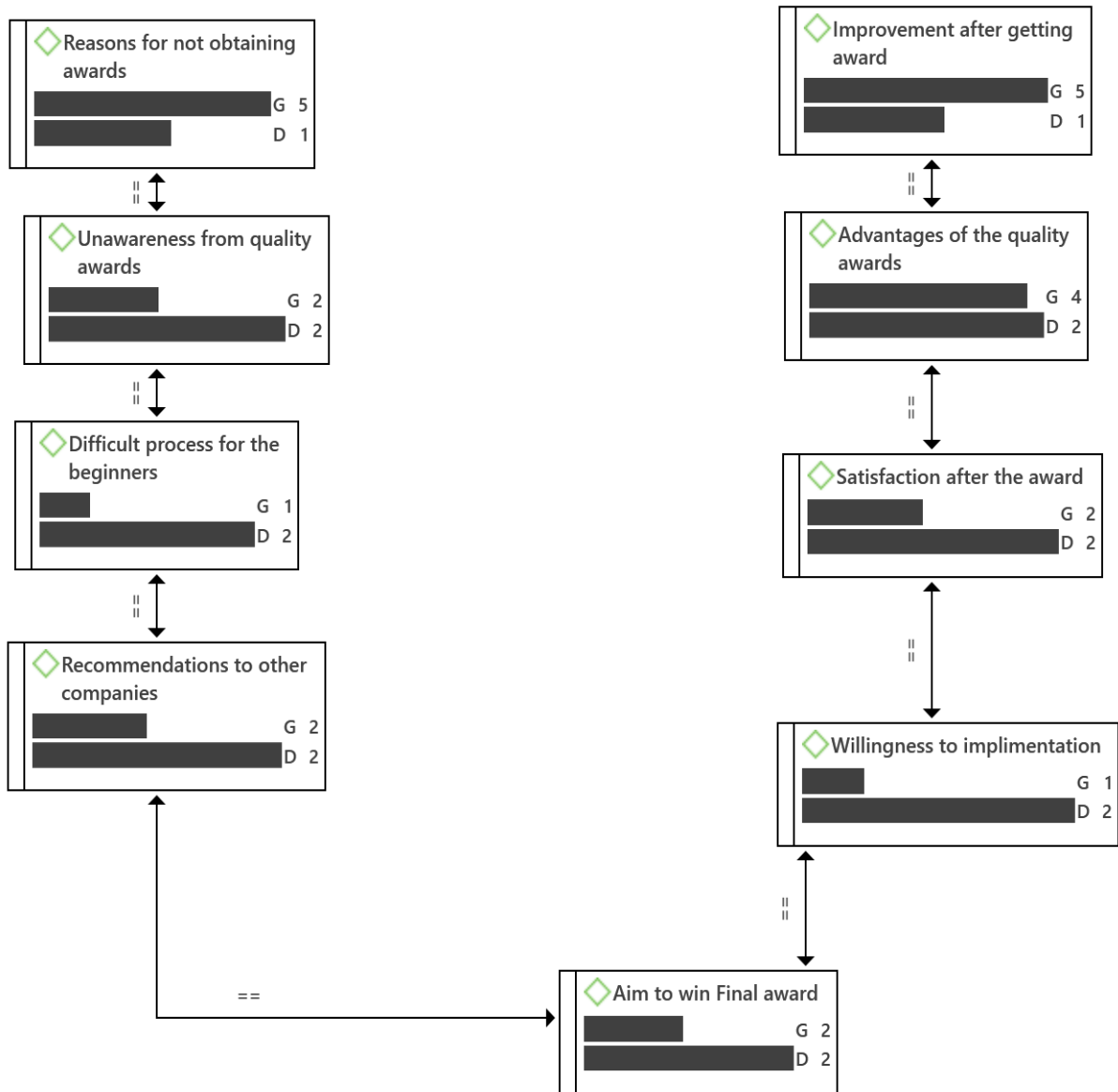
Figure 9: Analysis of the content codes (Source: Author)

In Figure 9, "D" denotes the density, and "G" represents the roundedness. D elaborates how many links of the content codes have with other content codes within the network, whereas G tells us how many quotations are associated with each content code. The findings exposed that the content codes "reasons for not

obtaining awards" and "improving after getting award" have the highest value of G (=5) and D (=1) in both cases. It means that most of the interviewees discussed the improvement after having the quality certificates from the Foundation and the reasons for not getting awards by the Czech organizations. On the contrary, the content codes "difficult process for the beginners" and "willingness to implementation" have the lowest value of G (=1) and D (=2). In the following, Table 9 is prepared by using the same content codes.

Table 9: Table of code co-occurrences

Table 9 indicates the code co-occurrence table. In the code co-occurrence table, two codes are either coding quotations touching each other in some mode (for example, overlapping or enclosing), or coding precisely the similar quotation (Contreras, 2011; Armborst, 2017). Table 9 shows the table of the co-occurrence explorer where the content codes are presented on the vertical (in columns) that are showing the values of D, and codes of interviewees on the horizontal (in rows) that are representing the values of G. It could be observed from Table 9 that CO 1 has discussed "advantages of quality awards" (4.55 %) and "satisfaction after the award" (4.55 %); hence, CO 1 discussed 9.09 % compared to other participants. In the same way, the highest share of content code of "reasons for not obtaining awards" is 20.45 %. The content code "improvement after getting award" also has the highest share (20.45%).

4.3.2 Discussion

This section aims to reveal why Czech organizations did not obtain the Final Award from EFQM Model. Therefore, all the above discussion and in the following section is to shed light on the research question "What are the reasons that Czech organizations did not receive any EFQM Global Excellence Award?".

4.3.3 Differences and Similarities

The four cases are investigated with the explanations that the Czech companies did not receive the Final Awards from the Foundation. Even though the selected organizations for the interviews have obtained different category quality certificates from the Foundation, the common reasons for not obtaining the awards are: not implementing the EFQM Model in the organizations; most of the Czech organizations are not aware of the benefits of the quality awards; and the process, in the beginning, is difficult. The qualitative study findings also confirm that the performance of the certified organizations has improved after obtaining the quality certificates from the EFQM Model.

The study did not observe too many differences in the findings among participants. However, many similarities from interviewers were observed. For example, every participant was aware of the benefits of the quality certificates/awards. Most of the respondents recommend to other Czech organizations to implement the EFQM Excellence Model within their organizations, as their organization performed better after obtaining the quality certificates from the Foundation. The participants argued that the Czech organizations did not obtain the Global Winner/Prize Award as most organizations don't implement the Model, and the organizations are not aware of the benefits of the quality awards. However, the managers and CEOs of the selected organizations hope that the Czech organizations will obtain the EFQM Excellence Award/Prize Winner very soon.

5. CONCLUSIONS

This chapter discusses the results of the current study. The quality certificates and awards provide a competitive advantage because these are what make one organization different from other organizations in the certain marketplace that provide the same products or services. This research's main aim, research questions, hypotheses, and objectives have been completed by applying qualitative and quantitative methods.

For the quantitative research, secondary data of 307 Czech companies were retrieved from the Albertina database. In the sample, 20 organizations were certified from EFQM Model, and the remaining 287 organizations were non-certified organizations. The data were gained from the three sectors: manufacturing, construction, and automobile, and the data covered the time period from 2015 to 2019. Two different regression techniques were used to investigate the main goal of the current study. Most of the significant results of the quantitative research revealed that leverage, tangibility, capital turnover ratio, and physical capital intensity are negatively correlated with organizational performance. On the other hand, sales growth and firm size have a positive effect on organization performance. The findings of the dummy variable are statistically significant and have a positive relationship with organization performance. Therefore, it is clear from the outcomes that the organizations with quality certificates perform better than non-certified organizations.

By employing the qualitative approach, this study investigated why the Czech organizations did not receive the EFQM Global Excellence Award even though Czechia has an export-oriented economy. A case study in the qualitative research was employed and collected data through interviews from 4 organizations where three organizations were certified from the EFQM Model, and one organization was non-certified. The findings of the qualitative method exposed that the organization's performance was improved in many aspects after receiving the quality certificates from the EFQM Model. Moreover, the main reasons are not obtaining the EFQM Excellence Award Winner or/and Prize Winner by the Czech organizations are: firstly, most Czech organizations don't implement the EFQM Excellence Model in their organizations. Secondly, the Czech organizations are not aware of the benefits and importance of having a quality award from the EFQM Model. Thirdly, before going to have EFQM Excellence EFQM Excellence Award/Prize Winner (or Finalist), there are a few steps towards Excellence, and the process is very important. But many Czech organizations don't implement the Model. In this way, the Czech organizations don't receive the EFQM Excellence Prize/Award Winner.

The current study results show that the quality certificates are also the same important as the quality awards because the certificates help to improve the organization's performance. Previous studies showed that the EFQM Excellence Model needs to be consistently applied in organizations over a lengthy period (5–10 years) for its effective use. The level of knowledge and overall people awareness of the Excellence Models is very low in Czech organizations. We recommended that the Czech organizations should change organization culture towards systematic knowledge (including best practices) and participate in the quality awards.

6. CONTRIBUTION, LIMITATION AND FUTURE RESEARCH DIRECTIONS

This chapter highlighted the contribution in the theory and practice, limitations of the study, recommendations to the Czech Quality Society, and suggestions to future research directions.

6.1 Contribution

The Czech Republic is an export-oriented economy, and its manufacturing-based exports are very popular not only in Europe but also in the whole world due to high-quality products. The current study is based on Czech organizations for their quality products. The quality concepts with economic impacts have been studied in this study. Therefore, the expected benefits of the study contribute to the body of knowledge and provide guidelines to academics, stakeholders, managers, and policymakers.

After implementing the EFQM Model in the organizations, the Foundation gives some levels, certificates, and points. These levels, points, and certificates are very important to be on the Finalist list and obtain the Global Awards from the Foundation. Different publications showed that the award winner organizations perform better and achieve significantly better results than their competitors. Up to now, research has not been conducted about quality certificates. Therefore, the present study filled the gap and investigated the impacts of the quality certificates from the EFQM Model on the performance of Czech organizations.

The Czech organizations are not interested and don't participate in the quality awards like EFQM Excellence Model. No research investigated and highlighted the reasons that why the Czech organizations do not implement the quality models even though the quality awards have a positive impact on organization performance. Therefore, the current research also filled this gap by conducting research covering quality certificates winning Czech organizations. This study investigated the reasons why the Czech organizations are little interested in the EFQM Model. This research is a different context and uniquely to achieve a complete understanding of the dynamics of the organization's performance.

6.1.1 Theoretical Contribution

This study contributes to the literature in various ways as the study is unique in many aspects.

Firstly, the current research contributes to the finance literature as it covers the characteristics of non-certified and certified organizations from the EFQM Excellence Model. The study discussed comprehensively that which factors affect positively or negatively the organization's financial performance. Hence, it also provides guidelines to those organizations which are trying (or will try) to get quality awards.

Secondly, most of the previous studies were done in Germany, Spain, and the U.K. and addressed only the EFQM Excellence Model and its relationship between the criteria (Yousaf and Bris, 2019). However, the current study focused for the first time on the Czech organizations that have different quality certificates from the EFQM Model. These quality certificates are very important to consider the Finalist in the Global Award category and obtain a Global Award from the Foundation. The impacts of the quality certificates are very positive in terms of economic and financial.

Thirdly, the literature is very limited in quality management that helps to measure and estimate the organization's performance by employing panel data. The current study also filled this gap by using pooled OLS and MLE estimation. MLE estimation is specifically used to estimate the organization's performance as the estimation was not much used in the prior studies.

Fourthly, the present study contributes to the quality management literature. The dummy variable is used to measure the certification effect on the organization's performance. The study explored that the organizations with quality certificates perform better than non-certified organizations.

Fifthly, the current study also contributes to the literature by exploring why the Czech organizations did not obtain the Global Award from the EFQM Excellence Model. The study conducts the qualitative research approach to explore the reasons.

6.1.2 Practical Contribution

The main results obtained in this study have important implications for certified organizations and for non-certified organizations as the policymakers and managers use these findings to improve the organization's performance in the long run. The results are useful for learning developments for other organizations that are trying (or will try) to get an EFQM Global Excellence Winner/Prize Award. Empirically and practically, the findings will help to understand the excellent way and common features and characteristics of the Czech organizations that have obtained the quality certificate (or trying to obtain the certificate) from the EFQM Model. Therefore, the findings of this study are beneficial to organizations and authorities who give certificates/awards to other organizations.

The empirical findings clearly mentioned which factors impact the organization's performance. For instance, the labour-intensive is better for non-certified organizations to improve their performance. On the other hand, the capital-intensive technology is better for certified organizations to improve their origination performance. Considering the firm size, the large non-certified firms earn more profits than SMEs; conversely, the firm size does not matter for the certified firms. Financial leverage has a negative impact on the organization's performance. All the factors should be considered by the certified and non-certified organizations which factor in which direction will be useful for improving their performance.

The current research findings are fruitful for policymakers, stakeholders, managers, academics, and investors. The results are important for investors as they consider organization performance to make investment decisions. The outcomes are significant for policymakers and managers as they make policies and decisions to improve the financial performance of the organizations. This research highlighted the impacts of quality certificates on the organization's performance; therefore, the findings are also crucial for academics.

The empirical findings also contribute to the existing literature in Statistics and Econometrics. The study used a dummy variable and dummy interaction terms to examine the impacts of different variables on the organization's performance. Existing literature briefly gives theoretical explanations, but the empirical explanations specifically interpreting the dummy variable and dummy interaction terms are very ambiguous and rare. However, the current study explains the concepts comprehensively.

6.2 Recommendations to the Czech Society for Quality (CSQ)

Czech Society for Quality (CSQ) is the authority to implement the EFQM Excellence Model and gives different quality certificates to the Czech organizations. The current study explored why the Czech organizations did not obtain the Global Awards from the EFQM Model. In the light of findings, it is recommended to the Czech Society for Quality (CSQ) that CSQ should encourage to implementation of the EFQM Excellence Model into the Czech organizations. By implementing the Model, the organizations will improve the product or service quality, be aware of considering total quality management, increase assets, raise sales, promote profits, and get EFQM Global Winner Award in the future. So, by implementing the EFQM Excellence Model in the organizations, the Czech organizations will get more benefits than their competitors and help in the growth and performance of the organizations. Therefore, the CSQ should pay

considerable attention to motivating Czech organizations to implement quality models, such as the EFQM Excellence Model.

6.3 Limitations

The limitations are defined as limits that the researcher cannot control while undertaking the research. There are a number of limitations to the current research that warrant consideration. These limitations are presented in the following points:

- The research focused on the performance of Czech organizations. Hence, 307 organizations are selected randomly from 3 sectors: automotive, manufacturing, and construction. These sectors are selected in the current study as it is easy to compare the financial performance within the selected sectors instead of services, educational, banking, or agriculture sectors.
- The gained data covered a short time period, from 2015 to 2019, due to the availability of the data from the Albertina database.
- The consequences and impacts of coronavirus disease (COVID-19) could be felt around the world. The Czech Republic is also severely affected by the pandemic. However, the current study did not include any factors which are related to the pandemic.
- There are many cultural, social, macro, financial, and economic variables and factors that affect the organization's performance. However, only the most important variables are selected to explore the organization's performance in the present study based on the previous literature and available data.

6.4 Further Research Directions

The current study focused on investigating the relationship between quality certificates and organization performance. However, there is a lot of scopes to conduct further research on this topic. In the current study, one country and a limited time period were included. Further research can be conducted by considering more countries and a longer time period. There are many financial, cultural, social, and economic factors and variables that were not included in the current study: however, these factors impact the organization's performance. These factors can be included in further research to study a comprehensive overview of the organization's performance.

Different levels of quality certificates from the EFQM Excellence Model by involving three sectors of the Czech economy were studied in the current research. Future research can be conducted by comparison of ISO certificates and certificates from the EFQM Excellence Model. Future research is also possible to consider other dependent variables and different methodologies that are not used in this study. For example, other dependent variables can be return on capital employed (ROCE), return on invested capital (ROIC), return on sales (ROS), and total assets turnover (TAT) included; and other methodologies can be dynamic panel data models, statistic panel models, machine learning models included in the future research.

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APPENDIX

Table 10: Brief Description of selected articles

No.	Publication	The main aim of Research	Journal
1	Ahmed and Bhuyan (2020)	This study examines the relationship between capital structure and firm performance of service sector firms from Australian stock market.	Journal of Risk and Financial Management
2	Akgün, & Karataş (2020)	This study examines the relationship between working capital management and business performance using panel data analysis for a sample of EU-28 listed firms	International Journal of Managerial Finance
3	Al-Gamrh et al. (2020)	This study examines the impact of two different types of foreign ownership—by Arab and non-Arab investors on firms' financial and social performance.	Journal of Applied Accounting Research
4	Al-Gamrh et al. (2020)	This paper examines the influence of investment opportunities on firm performance and evaluates	Journal of Accounting in

		corporate governance practices in the United Arab Emirates (UAE) to determine whether corporate governance quality moderates that influence.	Emerging Economies
5	Ali et al. (2021)	This study aims to find the influence of corporate governance on firm performance for the listed non-financial firms on the Pakistan Stock Exchange (PSX) for the period 2005-2015.	Journal on Innovation and Sustainability RISUS
6	Altaf (2020)	This article examines the relationship between working capital financing and firm performance for a sample of 185 Indian hospitality firms.	Global Business Review
7	Anarfi and Boateng (2016)	this paper analyses the relationship between working capital management and profitability of firms operating in the Czech Agric and Forestry sector for the period of 2005- 2014 using Net Operating Profitability (NOP).	Researchers World: Journal of Arts, Science and Commerce
8	Anton (2021)	Using panel data of 147 European listed firms active in the energy and gas sectors over the period 2009–2016, this study aims to analyze the impact of temperature change on firm profitability while controlling for firm-specific and energy market-related factors.	Applied Energy
9	Appiadjei (2014)	The study examined the relationship between capital structure and firm performance, using secondary data covered all the 35 listed companies in accordance with the Ghana Stock Exchange (GSE)	Research Journal of Finance and Accounting
10	Aquilani et al. (2017)	The purpose of this paper is to present a systematic literature review to identify new avenues of research in line with the ongoing changes in quality and	The TQM Journal

		management required to firms, especially regarding customers.	
11	Armborst (2017)	This article explains how to calculate thematic proximity within a mixed methods content analysis approach	SAGE Open
12	Arshad (2021)	In this paper, the fundamental valuation (FV) perspective has been extended to the Shenzhen Stock Exchange (SZSE) in China by focusing on the role of forecasted earning-to-price ratio and return on equity (ROE).	Journal of Corporate Accounting & Finance
13	Asadi (2020)	This paper focuses on a conceptual analysis of the relations among establishing an excellence model in organizations and gaining competitive advantage.	Journal of Economic Development, Environment and People
14	Asif et al. (2021)	To give a statistical understanding of the wealth disparity, this study investigates the tail behavior of world billionaires' data 2010–20 taken from Forbes magazine.	Physica A: Statistical Mechanics and its Applications
15	AttaUllah et al. (2021)	The impact of capital structure on the financial performance of firm is the key purpose of this study by using a sample of 60 firms of textile industry in Pakistan for the period of 2010-2014.	KASBIT Business Journals (KBJ)
16	Augustyn et al. (2019)	Six competing models of quality management and financial performance improvement are hypothesized and statistically tested, using data from a survey of general managers of 288 four- and five-star hotels in Egypt and structural equation modeling.	Service Industries Journal
17	Barbosa and Louri (2005)	The paper investigates whether multinational corporations (MNCs) operating in Portugal and Greece perform differently than domestic firms. Departures	Review of Industrial Organization

18	Bawazir et al. (2021)	The main purpose of this paper is to examine the linkage between corporate governance and the performance of non-financial firms listed on Muscat Securities Market over the period 2007-2017.	Entrepreneurship and Sustainability Issues
19	Baxter & Jack (2015)	The purpose of this paper is to guide the novice researcher in identifying the key elements for designing and implementing qualitative case study research projects.	The Qualitative Report
20	Berger and Patti (2006)	This paper takes a different approach and employ profit efficiency as main performance measure i.e., frontier efficiency computed using a profit function by employ a simultaneous equations model	Journal of Banking and Finance
21	Binder et al. (2005)	This paper considers estimation and inference in panel vector autoregressions by using Generalized method of moments (GMM) and quasi maximum likelihood (QML) estimators.	Econometric Theory
22	Birhan (2017)	This study was focused on the micro level (internal to the company) factors of profitability to study the determinants of Insurance Company profitability in Ethiopia	International Journal of Scientific and Research Publications
23	Blackmore and Douglas (2003)	This paper examines the use of the EFQM Model in higher education Institutions in the UK and offers a case study of how one University used the Excellence Model as a means to change the way it operated.	International Journal of Quality Innovation
24	Boddy (2016)	This paper addresses the issue of which sample sizes are appropriate and valid within different approaches to qualitative research.	Qualitative Market Research
25	Boulter, Bendell, and	The purpose of this paper is to assess whether the implementation of a total quality management	International Journal of Operations and

		(TQM) approach positively affects the financial performance of European companies.	Production Management
26	Bou-Llusar et al. (2009)	The purpose of this paper is to analyze the extent to which the EFQM Excellence Model captures the main assumptions involved in the TQM concept, that is, the distinction between technical and social TQM issues, the holistic interpretation of TQM in the firm, and the causal linkage between TQM procedures and organizational performance.	Journal of Operations Management
27	Cai and Jun (2018)	In this paper, drawing on data collected from 47 quality managers via semi-structured interviews and follow-up surveys, the authors identify four major ISO 9000 internalization processes, such as documentation, process improvement, education, and auditing.	International Journal of Production Economics
28	Carter et al. (2014)	The current article presents the four types of triangulation followed by a discussion of the use of focus groups (FGs) and in- depth individual (IDI) interviews as an example of data source triangulation in qualitative inquiry	Oncology Nursing Forum
29	Carvalho and Lara (2003)	In the present study, the authors tried to examine the influence of the capital structure of Brazilian companies regarding the factor profitability.	Academy of Business and Administrative Science Conference
30	Chan and Hawkins (2012)	This study aims to address the research gap by exploring and evaluating the application of EMSs (environmental management systems) in a hotel context.	International Journal of Hospitality Management
31	Chandrapalaand Knápková (2013)	The objective of this study is to investigate the role of internal factors in generating financial	Acta Universitatis Agriculturae et Silviculturae

		performance of fi rms in the Czech Republic.	Mendelianae Brunensis
32	Činčalová and Hedija (2020)	The paper aims to examine the relationship between selected characteristics of firms (firm age, firm size, firm performance, and gender diversity of boards) and the application of a corporate social responsibility concept in the Czech transportation and storage industry.	Sustainability
33	Corbett et al. (2005)	In this paper, we track financial performance from 1987 to 1997 of all publicly traded ISO 9000 certified manufacturing firms in the United States with SIC codes 2000–3999, and test whether ISO 9000 certification leads to productivity improvements, market benefits, and improved financial performance.	Management Science
34	Dahlgaard et al. (2013)	In this study, a new overall business excellence framework (BEF) has been developed which recommends adaption instead of adoption of existing BEM. The suggested overall BEF helps to integrate BEM with management tools/techniques and the organisational culture/ characteristics for guiding an organisation towards business excellence.	Total Quality Management and Business Excellence
35	Davies (2004)	The aim of this research was to examine how the EFQM Excellence Model implementation process had been conducted in a number of cases in UK University academic units with a view to developing a guidance framework for implementation of the EFQM Excellence Model in this particular context.	(Doctoral dissertation, University of Salford)

36	del Alonso-Almeida & Fuentes-Frías (2012)	The aim of this paper is to find a logical structure to evaluate and apply the Total Quality Management in any company around the world despite cultural and geographical situations.	Quality and Quantity
37	Deloof (2003)	In this paper, the relation between working capital management and corporate profitability is investigated for a sample of 1,009 large Belgian non-financial firms for the 1992-1996 period.	Journal of Business Finance and Accounting
38	Doeleman et al. (2014)	In this article, the authors present a literature review based on the following research question: 'What empirical evidence is available that performance is enhanced through interventions in the criteria of the EFQM Excellence Model?'	Total Quality Management and Business Excellence
39	Espín et al. (2020)	The aim of this study is to analyst precisely what kind of culture is best suited to the EFQM Excellence Model, using an empirical study to demonstrate the links, it is proposed a model whose relationships have been tested using structural equations.	II Jornadas Doctorales de La Universidad de Murcia
40	Fama and French (1999)	The main aim of this study to judge whether nonfinancial corporate investments on average generate value in excess of cost, Therefore, the authors calculate another internal rate of return, on the cost of corporate investments.	The Journal of Finance
41	Farhan et al. (2021)	The main aim of this paper is to evaluate the impact of working capital policies on firms' profitability.	Sustainability (Switzerland)
42	Fernández-López et al. (2020)	Using a sample of 444 Spanish cheese-manufacturing companies during the period 2010–2016 and applying a dynamic panel data methodology, this paper analyzes	Agribusiness

		the extent to which the main components defining the WCM policies.	
43	Fleiss et al. (1969)	In this paper, 2 statistics, kappa and weighted kappa, are discussed to measuring agreement between 2 raters on a nominal scale.	Psychological Bulletin
44	Francis et al. (2009)	In interview studies, sample size is often justified by interviewing participants until reaching 'data saturation'. However, there is no agreed method of establishing this. In this study, the authors propose principles for deciding saturation in theory-based interview studies.	Psychology and Health
45	Fu et al. (2021)	this study conducts a systematic literature review based on 115 related articles retrieved from the Web of Science database and CNKI database to study ecosystem services and ecological compensation research at World Heritage sites.	Journal for Nature Conservation
46	Getahun (2016)	The major focus of this study is to investigate empirically firm specific factors such as, firm leverage, growth opportunities, size, risk, tangibility and liquidity were impacts on performance in Ethiopian insurance companies	Global Journal of Management and Business Research
47	Gharaibeh and Khaled (2020)	This study investigates the effect of financial characteristics and capital structure on the profitability of all 46 services companies listed on the Amman Stock Exchange over the period 2014–2018.	Investment Management and Financial Innovations
48	Ghosh et al. (2000)	This paper examines the pricing of seasoned equity offers by equity Real estate investment trusts (REITs) during 1991-1996.	Real Estate Economics
49	Guion et al. (2011)	If researchers decide that triangulation is desired, there are several types of triangulation that	EDIS

		can be used; and all these types are discussed in this study.	
50	Gulzar et al. (2020)	This article endeavours to study the relationship between corporate governance and performance for a sample of 11 textile firms listed on Nifty 500 Index in India.	Indian Journal of Corporate Governance
51	Hadlock and James (2002)	This study examines the incremental financing decisions of a set of 500 firms over the 1980 to 1993 period by estimating logit models predicting financing choices.	The Journal of Finance
52	Hedija and Kuncová (2021)	Aim of study is to examine the link between economic efficiency and profitability of firms belonging to the swine sector for the period 2008-2017.	Spanish Journal of Agricultural Research
53	Hides et al. (2004)	The aim of this paper is to examine issues in the implementation of EFQM Excellence Model self-assessment within UK Higher Education and identify the lessons learned in the implementation of EFQM Excellence Model self-assessment in the public sector.	TQM Magazine
54	Hlouskova and Wagner (2006)	This paper presents results on the size and power of first-generation panel unit root and stationarity tests obtained from a large-scale simulation study.	Econometric Reviews
55	Hsiao et al. (2002)	In this paper, the authors suggest-ed a transformed likelihood approach to overcome the incidental parameters problem	Journal of Econometrics
56	Iltaş and Demirgüneş (2020)	This paper analyzes the effect of asset tangibility on financial performance of Turkish manufacturing sector covering 1990.Q3-2016.Q4.	Ahi Evran Üniversitesi Sosyal Bilimler Enstitüsü Dergisi
57	Jacob et al. (2004)	This study examines how Baldrige Award winners perform with respect to several accounting and	International Journal of Quality

		financial metrics. Specifically, assesses Baldrige Award winners' financial performance relative to industry benchmarks and a control group of similar firms.	and Reliability Management
58	Jencova et al. (2021)	The aim of this work is to examine the relationship between return on assets and total indebtedness of companies.	Montenegrin Journal of Economics
59	Johnston et al. (2010)	This research used data from ICDDR, B's Matlab study area in rural Bangladesh to compare direct estimates of abortion rates with indirect estimates obtained from the residual estimation technique based on rearranging the Bongaarts proximate determinants of fertility model.	New York: Guttmacher Institute-IUSSP
60	Jyoti and Khanna (2021)	This paper examines the impact of the firm's sustainable performance on the financial performance of service sector companies listed on the Bombay Stock Exchange.	Sustainable Development
61	Kalpokas and Radivojevic (2021)	This article provides guidelines for researchers to familiarise themselves with widely used qualitative analysis strategies, and learn how ATLAS.ti, MAXQDA, and NVivo can be used in each phase of the qualitative analysis process.	Sociological Research Online
62	Kayani et al. (2020)	This paper examines the empirical relationship between working capital management (WCM) and firm performance (FP) for Australasian publicly listed firms.	Review of Pacific Basin Financial Markets and Policies
63	Khan et al. (2018)	In this study, an attempt has been made to study the financial health of companies belonging to Indian telecom industry. For this purpose, a balanced panel dataset of five Indian telecom companies listed on	Theoretical Economics Letters

		National Stock Exchange (NSE) has been used to examine the determinants of profitability over the period of 2004-2017.	
64	Kim et al. (2010)	The purpose of this paper is to explore the nature of the research topics and methodologies used in the European Foundation for Quality Management (EFQM) Business Excellence Model studies, as well as to suggest a future research agenda.	International Journal of Quality & Reliability Management
65	Kiprotich et al. (2014)	This study aimed to provide empirical evidence about the impact of Working Capital Management on corporate financial Performance of tea firms in Kenya for the period 2005 to 2012.	Research Journal of Finance and Accounting
66	Kuntluru et al. (2008)	This study examined whether foreign ownership has any impact on financial performance of firms in India by conducted a pooled cross section time series analysis of 102 Indian pharmaceutical firms for the period 1998–2005.	Journal of Asia-Pacific Business
67	Kučera et al. (2021)	The objective of the contribution is to propose a new methodology for determining the optimal credit absorption capacity of an enterprise while maintaining the positive function of financial leverage, i.e., the maximum possible loan that would continuously bring benefit to the enterprise.	Sustainability
68	Li et al. (2021)	This paper contributes to the literature by using the financial constraints and market advantages as a dual mediating process in this relationship. An empirical test using a sample of Chinese manufacturing enterprises listed in	International Journal of Environmental Research and Public Health

		the Shanghai and Shenzhen exchange from 2011 to 2018 is established.	
69	Li et al. (2021)	Using China Industrial Enterprise Database (CIED) from 1998 to 2007, this paper investigates the influence of firm location on its performance mainly from two channels: selection effect and agglomeration effect.	Research in International Business and Finance
70	Luu (2017)	The aim of this study is to investigate how corporate social responsibility (CSR) contributes to organizational citizenship behaviour for the environment (OCBE) among employees in hotel industry.	International Journal of Contemporary Hospitality Management
71	Maçãs et al. (2009)	Based on various panel models, this study examines the profitability determinants of Portuguese service industries.	Service Industries Journal
72	Maddala and Wu (1999)	The paper compares the Levin-Lin and Im-Pesaran-Shin (IPS) panel data unit root tests with the Fisher test which was suggested over 60 years ago by R. A. Fisher and has a celebrated history in the statistical literature.	Oxford Bulletin of Economics and Statistics 61 (SUPPL.)
73	Magd et al. (2021)	This paper aims to explore the framework, practices, and implementation of total quality management (TQM) in the service industry.	Quality Innovation Prosperity
74	Marimon et al. (2019)	The aim of this study is to analyse the impact of both internal and external motivations on the benefits of the EQUASS (European Quality in Social Services) standard; and to analyse the mediation of the implementation process of the standard between the motivations and the benefits.	Total Quality Management and Business Excellence

75	Masnoon and Saeed (2014)	This study aims to explore the various factors that determine the choice of financing sources for public limited companies in the automobile sector of Pakistan.	European Scientific Journal
76	Mason (2010)	A number of issues can affect sample size in qualitative research; however, the guiding principle should be the concept of saturation. This has been explored in detail in this paper.	Forum Qualitative Sozialforschung / Forum: Qualitative Social Research
77	Medcalfe and Miralles (2021)	The purpose of this paper is to determine the relationship between sustainable practices and financial performance in fashion firms.	Journal of Fashion Marketing and Management
78	Melnikovas (2018)	This article explores the issues of developing the research methodology and construction of research design within the field of futures studies by using "research onion" model and examines the relevance and appropriateness of this model for futures studies.	Journal of Futures Studies
79	Mishra et al. (2020)	This study tries to examine the empirical relationship between corporate governance and financial performance of Indian firms by developing a corporate governance index (CGI) based on a variety of corporate governance characteristics.	International Journal of Disclosure and Governance
80	Moksony and Szemle (1990)	In this paper the authors discussed about R^2 that in research aimed at the test of a theory, R^2, whether big or small, is, in general, completely irrelevant.	Szociológiai Szemle (Special issue)
81	Murthy et al. (2021)	The purpose of this paper is to examine how sub-criteria of the European Foundation for Quality Management (EFQM) model is structurally connected and influence each other. This paper	International Journal of Quality & Reliability Management

		also tries to find the underpinning logics in the EFQM model.	
82	Náglová and Pechrová (2019)	The main aim of the paper is to evaluate the technical efficiency of food processing firms by using Stochastic Frontier Analysis applying True Fixed Effect model on production function.	Agricultural Economics (Czech Republic)
83	Nartey and Poll (2021)	The aim of the research was to identify which innovative management accounting practices can be integrated into manufacturing SMEs' strategies to overcome the challenge of being blamed by stakeholders as contributors to social and environmental problems.	Environment, Development and Sustainability
84	Nenadál (2020)	The paper is based on critical analysis of description two last versions of excellence models presented by the EFQM and to present the main advantages and weaknesses of the latest version of The EFQM Model.	Quality Innovation Prosperity
85	Nenadál et al. (2018)	The paper brings a set of original information related to analysis and description of the current state in the area of excellence model's implementation in Czech organisations.	Quality Innovation Prosperity
86	Nguyen (2020)	The paper aims to examine the impact of human capital, capital structure choice and firm profitability of Vietnamese construction firms.	Accounting
87	Nguyen and Nguyen (2015)	This paper examines what impact capital structure has on firms' performance in selected firms listed on HCMC (Vietnam) Stock Exchange	International Journal of Economics and Finance
88	Nyeadi et al. (2018)	The main aim of this study is to empirically investigate the determinants of working capital	Cogent Economics and Finance

		requirement on the listed firms in Ghana.	
89	Okoye et al. (2021)	This study determines how educational supporting services and mentoring programs can be improved based on the users; preferences and perception by benefiting from a data-driven design model and process innovation.	IEEE Access
90	Onaolapo and Kajola (2015)	The purpose of this paper is to examine the determinants of working capital requirements of thirty non-financial firms listed on the Nigerian Stock Exchange	Research Journal of Finance and Accounting
91	Pais and Gama (2015)	The purpose of this paper is to provide empirical evidence on the effects of working capital management on the profitability of small and medium-sized Portuguese firms.	International Journal of Managerial Finance
92	Pasciak et al. (2021)	This study discussed the qualitative analysis of reasons for hospitalization for severe hypoglycaemia among older adults with diabetes	BMC Geriatrics
93	Periañez-Cristobal et al. (2020)	The aim of this research is to identify the organisational profiles; that is to say, the key management factors and the results which characterise them.	Total Quality Management and Business Excellence
94	Pham et al. (2020)	This study examines the influence of working capital management (WCM) factors on the profitability of steel companies listed on the Stock Exchange of Vietnam. Data	The Journal of Asian Finance, Economics and Business
95	Pham et al. (2019)	This study aims to explain the relationships between green human resource management (GHRM) practices and organizational citizenship behaviour for the environment (OCBE). Additionally, the interactive effects	Tourism Management

		of the GHRM practices of green training, green performance management, and green employee involvement on OCBE are investigated through a mixed-methodology approach applied to hotels located in Vietnam.	
96	Przasnyski and Tai (2002)	This paper examines the impact the MBNQA has had on the stock performance of its recipients (1988- 98) by carrying out four different types of analysis.	Total Quality Management
97	Ramírez-Rondán, (2020)	In this paper, threshold estimation methods are developed for dynamic panels with individual specific fixed effects covering short time periods.	Econometric Reviews
98	Rezvani and Hudson (2021)	This study explores the process of middle management decision-making in actual conditions within the oil and gas industry by applying multiple methods including interviews, audio task recording, and activity theory.	Safety Science
99	Rodríguez-González et al. (2020)	The aim of the present article is to describe the long-term value of implementation of the EFQM Excellence model in a hospitalpharmacy.	Research in Social and Administrative Pharmacy
100	Saini and Singhania (2018)	The purpose of this paper is to examine relationship between corporate governance and firm performance for a set of 255 foreign-funded firms in the form of foreign direct investment and private equity.	International Journal of Productivity and Performance Management
101	Samo and Murad (2019)	This study aims to determine the impact of liquidity and financial leverage on the profitability, using a sample of 40 selected publicly quoted companies in the textile sector of the Pakistani economy.	Research Journal of Textile and Apparel

102	Santos et al. (2012)	The aim of this paper was to estimate the return on investment in QMS (quality management systems) certification undertaken in Portuguese firms, according to the ISO 9000 series.	International Journal of Engineering, Science and Technology
103	Saunders et al. (2018)	In this paper, the authors look to clarify the nature, purposes and uses of saturation, and in doing so add to theoretical debate on the role of saturation across different methodologies.	Quality & Quantity
104	Shamsuzzoha, and Tanaka (2021)	This study examines the role of top managers' human capital and other exogenous determinants of the efficiency of manufacturing firms in Bangladesh by using heteroscedastic single-step stochastic frontier analysis.	Managerial and Decision Economics
105	Sharma et al. (2020)	The paper investigates the determinants of working capital to forecast the future requirement of working capital of BSE-listed top 150 companies for the time period of 2009–2017 in India.	Cogent Economics & Finance
106	Simionescu et al. (2021)	The essence of this study is to investigate the influence of the board gender diversity on firms' accounting and market-based performance using a sample of Standard & Poor's 500 companies belonging to the information technology sector over 12 years.	Financial Innovation
107	Singh and Kumar (2017)	The purpose of this paper is to analyze the effects of various factors like profitability, growth opportunity, financial leverage, assets tangibility, operating cash flows, age and size of firm on working capital requirements of manufacturing SMEs in India.	Review of International Business and Strategy

108	Subedi and Maheshwari (2007)	This paper compares the performance of Baldridge Award winners to their counterparts in similar industry.	Delhi Business Review
109	Tahir et al. (2016)	The aim of this study is to determine the relationship of working capital management and the firm's profitability in the textile sector of Pakistan by using a sample of 127 textile firms listed in the Karachi stock exchange for the period 2001–2012 are used in the study.	Quality & Quantity
110	Tang and Chang (2015)	This study investigates whether corporate governance affects the relationship between earnings management and firm performance by using Taiwanese data.	Review of Quantitative Finance and Accounting
111	Tharbe et al. (2021)	This study explores the idea of emotional intelligence (EI) from the perspective of professional helpers in Malaysia through a qualitative research design.	Pertanika Journal of Social Sciences and Humanities
112	Titman and Wessels (1988)	This paper analyzes the explanatory power of some of the recent theories of optimal capital structure and extends empirical work on capital structure theory in three ways.	The Journal of Finance
113	Tong et al. (2007)	This article aims to develop a checklist for explicit and comprehensive reporting of qualitative studies (indepth interviews and focus groups).	International Journal for Quality in Health Care
114	Tran and Vo (2020)	This paper is conducted to examine the contribution of human capital efficiency to firm performance across 12 sectors in the Vietnamese economy for the period 2011 to 2018 by the generalized method of moments (GMM) technique.	Cogent Business & Management
115	Ullah et al. (2020)	The study aimed to analyse the role of the capital structure in the	Heliyon

		financial performance of 90 textile firms listed in Pakistan Stock Exchange during the period 2008–2017.	
116	Vrbka (2020)	The objective of the contribution is to determine through the use of artificial neural networks the relationship between business value drivers, or value-based drivers, and EVA Equity, which is economic value added (EVA), of small and medium-sized enterprises operating in the rural areas of the Czech Republic.	Oeconomia Copernicana
117	Wamugo et al. (2014)	This study therefore investigated the relationship between capital structure on the performance of non-financial companies listed in the Nairobi Securities Exchange (NSE), Kenya for the period 2006-2012.	European Journal of Business and Management
118	Wang et al. (2021)	This research is based on a data set comprising 6260 firm-year observations from listed companies on the Shanghai and Shenzhen Stock Exchanges during 2009–2015; the study employs 3SLS and 2SLS simultaneous equation models to examine the logical and reciprocal nesting of other comprehensive income (OCI) disclosure, earnings management, corporate governance, and firm performance.	Managerial and Decision Economics
119	Westlund (2001)	This paper focuses on quality and quality development for better economic performance where the study focuses on some of the Swedish EFQM companies.	Total Quality Management
120	Wilhelmy et al. (2016)	This qualitative study elaborates signalling theory in the interview context by identifying the broad range of impressions that	Journal of Applied Psychology

		interviewers intend to create on applicants, what kinds of signals interviewers deliberately use to create their intended impressions, and what outcomes they pursue.	
121	Yanadori et al. (2021)	The current study identifies a top management team (TMT) level phenomenon that prevents firms from capitalizing on the advantages of gender diversity within a TMT and causes negative firm performance, namely a gender pay disparity.	Human Resource Management
122	Yousaf (2021)	The main purpose of this study is to investigate the impacts of intellectual capital (IC) on the firm's performance., including 20 certified firms from the European Foundation for Quality Management (EFQM) Excellence Model.	Total Quality Mangement and Business Excellence
123	Yousaf and Bris (2019)	The aim of the paper is to present a systematic literature review (SLR) for EFQM Excellence Model from the period 1991–2019 that will guide future research lines in this field.	International Journal of Applied Research in Management and Economics
124	Yousaf and Bris (2021a)	This study provides a comprehensive review regarding the empirical research of bankruptcy prediction of Czech companies. The main goal of this research is to investigate the financial risks of Czech companies.	Problems and Perspectives in Management
125	Yousaf and Bris (2021b)	This study is carried out to examine the effects of working capital on firm performance in the context of certified firms from the EFQM Excellence Model.	Cogent Economics and Finance
126	Yousaf et al. (2021)	The main aim of this research is to explore the relationship between working capital management (WCM) and firm profitability of	Cogent Economics and Finance

		the Czech firms, including the certified Czech firms from the EFQM Excellence Model.	
127	Yousefie et al. (2011)	The aim of this research is to propose an original approach for the management tools selection based on the quality function deployment (QFD) approach, a methodology which has been successfully adopted in new products development.	Expert Systems with Applications
128	Zeitun and Tian (2007)	This paper examines the impact of ownership structure on firm performance and the default risk of a sample of 59 publicly listed firms in Jordan from 1989 to 2002.	Corporate Governance
129	Zhang and Xia (2013)	Using replication research, the authors re-examine the impact of an effective total quality management (TQM) program on a firm's operating performance in the new competitive environment based on data from more than 500 firms, for over a 10-year period.	Production and Operations Management
130	Zhang et al. (2020)	The purpose of this study is to analyse the internal relationships between the five enablers of the EFQM Excellence model, based on a market-oriented strategy, to serve as a framework for managing and improving quality.	Engineering, Construction and Architectural Managemen
131	Zhang et al. (2019)	The research objective is to identify the enablers of the current level of implementation of EFQM in the whole construction industry, and develop strategies for their amelioration to improve overall quality development.	International Journal of Construction Management

Table 11: EFQM Global Recognition Excellence Award by Sector for Czech Organizations (From 1992 to 2020) (Source: efqm.org)

Sector	Count of Sector
Automotive	11
Banking / Financial Services / Insurance	1
Construction	2
Consultant	2
Consumer Products	1
Education / Educational Services	21
Government / Local authorities	11
Healthcare Services	3
Hotels / Hospitality / Leisure	1
Manufacturing - Other	5
Not for profit	4
Other / Not Classified	13
Public sector	22
Retail	5
Services	10
Grand Total	**112**

Table 12: EFQM Global Recognition Excellence Award by Category for Czech Organizations (From 1992 to 2019), Source: efqm.org

Award by Category	Count of Category
Committed to Excellence	4
Committed to Excellence 2 Star	15
Committed to Sustainability 1 Star	11
Committed to Sustainability 2 Star	48
EFQM Excellence Award Finalist	1
Recognized for Excellence 3 star	5
Recognized for Excellence 4 star	15
Recognized for Excellence 5 star	12
Czech Society for Quality	1
Grand Total	**112**
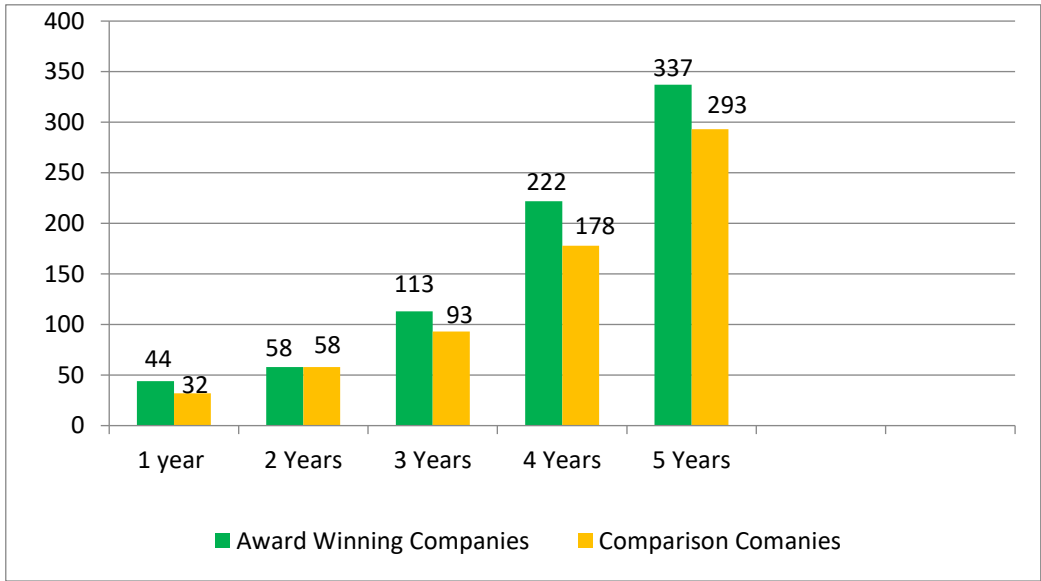
Figure 10: Mean % Change in Assets, Source: Boulter et. al., 2013
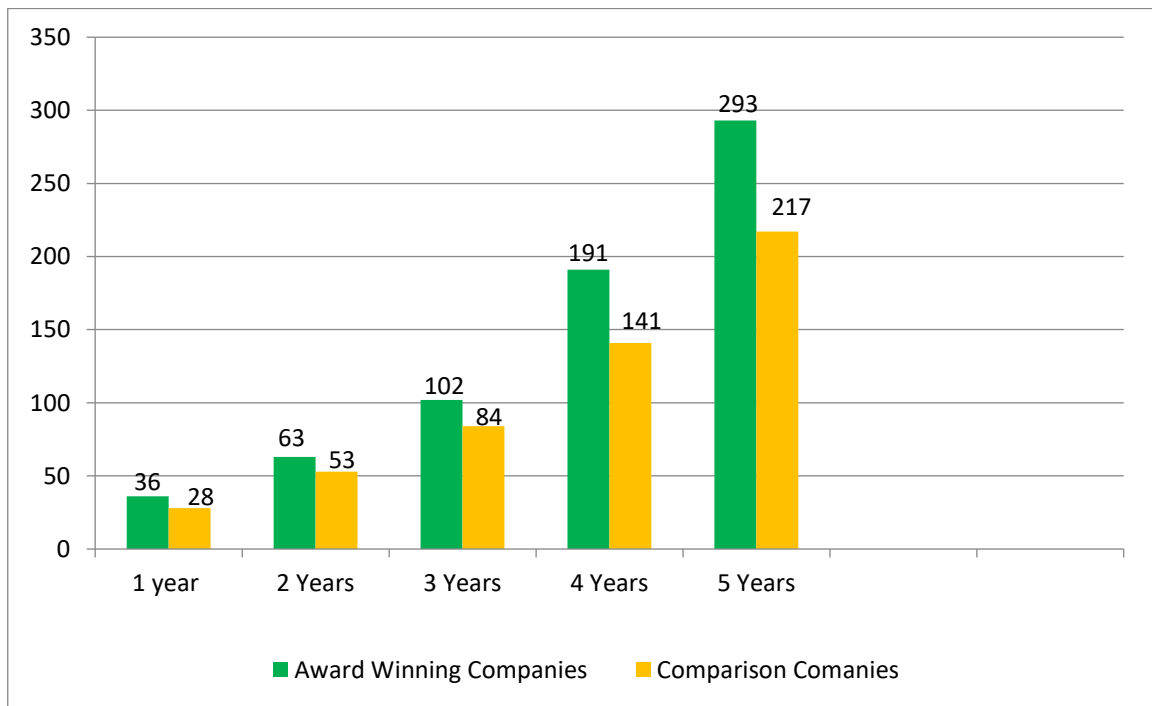
Figure 11: Mean % Change in Sales, Source: Boulter et. al., 2013

Table 13: EFQM Excellence Award History (Award Winners, Finalist, Prize Winners) by Country from 1992 to 2020, (Source: efqm.org)

Country	Award	Country	Award	Country	Award
U.K.	75	Austria	15	Netherland	6
Spain	55	Greece	9	Estonia	2
Italy	14	Hungary	18	Poland	6
Belgium	12	Ireland	3	Russia	7
Germany	42	Switzerland	10	Luxembourg	5
Sweden	3	Denmark	9	Global	2
France	22	Slovenia	3	Czech Republic	1
U.A.E.	1	Finland	3		
Turkey	38	Portugal	5		

Figure 12: EFQM Global Excellence Index: Different Levels of Recognition, (Source: efqm.org)

Figure 13: EFQM Supports the United Nations 17 Sustainable Development Goals (SDG), Source: United Nations (un.org)

A.A Questionnaire for interview

1- How have you prepared your organization for the EFQM Excellence Model and how was the experience in the beginning?
2- Which effects on your products or services did you expect from getting the quality certificate/award from the EFQM? Which of them has happened in the reality?
3- After getting the EFQM certificate, why are you continuing the implementation of the EFQM model in your firm?
4- Which financial indicators of organization performance have changed? In which direction have these indicators changed?
5- If you compare your competitive ability before and after getting the quality certificate, what has changed?
6- Why do you recommend other Czech organizations to apply and implement the EFQM award/certificate in their firms?
7- How would you evaluate the overall process of getting the quality certificate from EFQM?
8- What are the reasons that the Czech organizations have not obtained the Award/Prize Winner from the EFQM Model?

Table 14: Pooled OLS complete results: dependent variable: ROA

STATA Code: reg ROA LDR FATA FS SG CTOR PCI DV DVLDR DVFATA DVFS DVSG DVCTOR DVPCI

```
      Source |      SS          df      MS              Number of obs  =   1,171
-------------+----------------------------------        F(13, 1157)    =    8.10
       Model | 7316.15576   13    562.781213             Prob > F      =  0.0000
    Residual | 80422.5794  1,157  69.50957              R-squared      =  0.0834
-------------+----------------------------------        Adj R-squared  =  0.0731
       Total | 87738.7352  1,170  74.990372             Root MSE       =  8.3372
```

ROA	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
LDR	-4.637	2.022	-2.29	0.022	-8.604	-0.669
FATA	-5.322	1.770	-3.01	0.003	-8.794	-1.850
FS	2.512	0.597	4.21	0	1.340	3.683
SG	0.387	0.608	0.64	0.524	-0.806	1.581
CTOR	-0.833	0.381	-2.19	0.029	-1.580	-0.086
PCI	1.008	0.449	2.25	0.025	0.128	1.889
DV	23.656	10.699	2.21	0.027	2.664	44.647
DVLDR	-27.260	14.527	-1.88	0.061	-55.763	1.243
DVFATA	30.042	31.723	0.95	0.344	-32.199	92.283
DVFS	-0.484	1.703	-0.28	0.776	-3.826	2.858
DVSG	-11.074	11.503	-0.96	0.336	-33.643	11.494
DVCTOR	-1.245	1.104	-1.13	0.026	-3.411	0.922
DVPCI	-4.334	2.096	-2.07	0.039	-8.447	-0.221
_cons	-9.437	3.426	-2.75	0.006	-16.159	-2.715

Table 15: Pooled OLS complete results: dependent variable: ROE

STATA Code: reg ROE LDR FATA FS SG CTOR PCI DV DVLDR DVFATA DVFS DVSG DVCTOR DVPCI

```
      Source |      SS         df      MS               Number of obs  =    1,159
-------------+----------------------------------        F(13, 1145)    =      5.36
       Model | 20150.0073    13   1550.00056            Prob > F       =    0.0000
    Residual | 331243.852  1,145   289.295941           R-squared      =    0.0573
-------------+----------------------------------        Adj R-squared  =    0.0466
       Total | 351393.859  1,158   303.448929           Root MSE       =    17.009
```

ROE	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
LDR	11.344	4.221	2.69	0.007	3.061	19.626
FATA	-14.236	3.626	-3.93	0	-21.350	-7.123
FS	5.032	1.223	4.11	0	2.633	7.432
SG	0.045	1.338	0.03	0.973	-2.580	2.671
CTOR	-0.549	0.778	-0.71	0.048	-2.076	0.978
PCI	1.237	0.919	1.35	0.179	-0.566	3.039
DV	47.574	21.520	2.21	0.027	5.351	89.796
DVLDR	-51.783	28.302	-1.83	0.068	-107.312	3.746
DVFATA	58.722	58.761	1	0.318	-56.569	174.013
DVFS	-3.820	3.217	-1.19	0.235	-10.132	2.492
DVSG	-2.744	23.411	-0.12	0.907	-48.677	43.190
DVCTOR	-3.865	2.236	-1.73	0.084	-8.252	0.522
DVPCI	-3.378	4.035	-0.84	0.403	-11.295	4.539
_cons	-18.471	7.032	-2.63	0.009	-32.268	-4.675

Table 16: MLE complete results: dependent variable: ROA

STATA Code: xtreg ROA LDR FATA FS SG CTOR PCI DV DVLDR DVFATA DVFS DVSG DVCTOR DVPCI, mle

Fitting constant-only model:

Iteration 0:   log likelihood = -3911.3176

Iteration 1:   log likelihood = -3911.2711

Iteration 2:   log likelihood = -3911.2711

Fitting full model:

Iteration 0:   log likelihood = -3870.5961

Iteration 1:   log likelihood = -3861.8621

Iteration 2:   log likelihood = -3861.726

Iteration 3:   log likelihood = -3861.7259

Random-effects ML regression   Number of obs   =   1,171

Group variable: ID   Number of groups =   304

Random effects u_i ~ Gaussian   Obs per group:

                                                     min =   1

                                                     avg =   3.9

                                                     max =   5

                                                LR chi2(13)   =   99.09

Log likelihood = -3861.7259   Prob > chi2   =   0.0000

ROA	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
LDR	-3.249	2.180	-1.49	0.136	-7.521	1.023
FATA	-10.878	2.297	-4.74	0	-15.380	-6.375
FS	3.840	0.916	4.19	0	2.045	5.635
SG	0.920	0.419	2.2	0.028	0.099	1.740
CTOR	-0.843	0.548	-1.54	0.124	-1.917	0.230
PCI	0.999	0.360	2.78	0.005	0.294	1.704
DV	28.071	17.130	1.64	0.101	-5.502	61.645
DVLDR	-46.217	20.393	-2.27	0.023	-86.186	-6.247
DVFATA	70.769	41.768	1.69	0.09	-11.095	152.633
DVFS	-2.069	2.624	-0.79	0.43	-7.212	3.074
DVSG	3.490	7.783	0.45	0.654	-11.765	18.745
DVCTOR	-1.116	1.595	-0.7	0.484	-4.241	2.009
DVPCI	-3.066	1.713	-1.79	0.073	-6.424	0.291
cons	-14.830	5.343	-2.78	0.006	-25.302	-4.358
/sigma_u	6.792	0.325			6.184	7.459
/sigma_e	4.993	0.121			4.761	5.236
rho	0.649	0.025			0.598	0.698

LR test of sigma_u=0: chibar2(01) = 552.37   Prob >= chibar2 = 0.000

Table 17: MLE complete results: dependent variable: ROE

STATA Code: xtreg ROE LDR FATA FS SG CTOR PCI DV DVLDR DVFATA DVFS DVSG DVCTOR DVPCI, mle

Fitting constant-only model:

Iteration 0:   log likelihood = -4844.1599

Iteration 1:   log likelihood = -4844.1393

Iteration 2:   log likelihood = -4844.1393

Fitting full model:

Iteration 0:   log likelihood = -4822.9657

Iteration 1:   log likelihood = -4818.4519

Iteration 2:   log likelihood = -4818.4209

Iteration 3:   log likelihood = -4818.4209

Random-effects ML regression   Number of obs   =   1,159

Group variable: ID   Number of groups =   305

Random effects u_i ~ Gaussian   Obs per group:

                                              min =   1

                                              avg =   3.8

                                              max =   5

                                          LR chi2(13)   =   51.44

Log likelihood = -4818.4209   Prob > chi2   =   0.0000

ROE	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
LDR	8.076	4.939	1.64	0.102	-1.604	17.757

FATA	-19.214	4.698	-4.09	0	-28.422	-10.006
FS	5.767	1.710	3.37	0.001	2.416	9.119
SG	-2.394	1.147	-2.09	0.037	-4.643	-0.145
CTOR	-0.624	1.074	-0.58	0.561	-2.729	1.481
PCI	1.458	0.885	1.65	0.1	-0.277	3.193
DV	52.975	30.169	1.76	0.079	-6.154	112.105
DVLDR	-77.803	39.150	-1.99	0.047	-154.536	-1.070
DVFATA	131.113	78.937	1.66	0.097	-23.600	285.825
DVFS	-4.857	4.519	-1.07	0.283	-13.715	4.001
DVSG	18.923	19.751	0.96	0.338	-19.788	57.634
DVCTOR	-3.346	2.982	-1.12	0.262	-9.190	2.499
DVPCI	-3.869	4.053	-0.95	0.34	-11.813	4.075
_cons	-20.575	9.957	-2.07	0.039	-40.090	-1.060
/sigma_u	10.990	0.638			9.807	12.315
/sigma_e	13.028	0.318			12.420	13.667
rho	0.416	0.033			0.353	0.480

LR test of sigma_u=0: chibar2(01) = 206.75   Prob >= chibar2 = 0.000

Table 18: Pooled regression and MLE results: when DV = 1 for non-certified firms

Methods	Pooled Regression		MLE	
ROA	ROA (Model 1)	ROE (Model 2)	ROA (Model 1)	ROE (Model 2)
LDR	-20.27*** (6.09)	-15.56** (12.12)	-18.99** (8.67)	-12.14 (16.61)
FATA	-11.83 (6.76)	21.77* (12.51)	3.74** (9.07)	10.53** (16.68)
FS	1.30 (1.71)	1.21 (3.01)	2.50 (2.50)	2.50 (4.14)
SG	-10.39 (11.50)	-4.24 (23.30)	4.00 (7.78)	14.63 (19.71)
CTOR	-2.05** (1.04)	-4.19** (2.11)	-1.96 (1.52)	-3.77 (2.81)
PCI	-1.63** (2.19)	-0.22 (4.13)	-1.98* (1.72)	-1.89 (4.09)
DV	-25.58** (11.11)	-44.76** (21.18)	-19.92 (17.82)	-37.20* (29.93)

DV*LDR	15.43**	26.50**	15.70*	20.02
	(6.42)	(12.83)	(8.94)	(17.33)
DV*FATA	7.25	8.96	-6.97	-7.81
	(7.00)	(13.04)	(9.40)	(17.40)
DV*FS	1.21	3.83	1.33	3.25
	(1.81)	(3.25)	(2.66)	(4.47)
DV*SG	10.78	4.27	-3.08	-17.02
	(11.52)	(23.34)	(7.79)	(19.75)
DV*CTOR	1.16	3.54	1.10	3.07
	(1.11)	(2.25)	(1.62)	(3.01)
DV*PCI	2.58	1.35	2.98*	3.31
	(2.23)	(4.23)	(1.76)	(4.19)
Intercept	16.06	26.10	5.07	16.54
	(10.57)	(19.97)	(17.03)	(28.25)
R^2	0.083	0.057		
Adj R^2	0.073	0.046		
P-Value	0.000	0.000	0.000	0.000
Observations	1171	1159	1171	1159

Note: Standard Errors are in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

RESEARCH WORK/PUBLICATIONS

Abdurohman Ali Hussien, Shakeel Ahmed, **Muhammad Yousaf**. 2012. "The Impact of Trade Liberalization on Trade Share and per Capita GDP: Evidence from Sub Saharan Africa." *International Journal of Economics and Research* 3(3):44–51.

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The European Foundation for Quality Management (EFQM) Excellence Model and the Czech Organizations

Model Evropské nadace pro řízení kvality a české organizace

Doctoral Thesis