The association of International Financial Reporting Standards (IFRS) and International Standards on Auditing (ISA) in minimizing the Occupational Fraud Risks within Entities in Developing Countries

D I S S E R T A T I O N
of the University of St. Gallen,
School of Management,
Economics, Law, Social Sciences,
International Affairs and Computer Science,
to obtain the title of
Doctor of Philosophy in Management

submitted by

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Dissertation no. 5251

D-Druck Spescha, St. Gallen 2022

The University of St. Gallen, School of Management, Economics, Law, Social Sciences, International Affairs and Computer Science, hereby consents to the printing of the present dissertation, without hereby expressing any opinion on the views herein expressed.

St. Gallen, May 24, 2022

The President:

Prof. Dr. Bernhard Ehrenzeller

Summary

(English)

This doctoral thesis (to the best knowledge of the author) provides the first empirical research on the relationship between occupational fraud, International Financial Reporting Standards as well as International Standards on Audit - leveraging several neural network-based approaches. The findings demonstrate that International Financial Reporting Standards as well as International Standards on Audit contribute towards reducing occupational fraud risks within entities in developing countries overall.

(German)

Diese Doktorarbeit (nach bestem Wissen des Autors) liefert die erste empirische Forschung über die Beziehung zwischen berufsbedingtem Betrug, International Financial Reporting Standards sowie International Standards on Audit - unter Nutzung mehrerer auf neuronalen Netzwerken basierender Ansätze. Die Ergebnisse zeigen, dass sowohl die International Financial Reporting Standards als auch die International Standards on Audit dazu beitragen, das Berufsbetrugsrisiko innerhalb von Unternehmen in Entwicklungsländern insgesamt zu verringern.

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PhD Dissertation in Management (Accounting)

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0. INTRODUCTION

According to Singleton and Singleton (2010, p. 42), occupational fraud is primarily defined as a form of white-collar crime, which occurs in the internal setting of business corporations. Specifically, occupational fraud is generally defined as an act in which the employees of a particular business corporation, for their own personal enrichment purposes, deliberately misuse or misapply corporate resources and/or assets they have access to, and/or are entrusted with (Singleton & Singleton, 2010, p. 42-43; Wells, 2001, p. 31-32). Consequently, resulting in employees being embedded within the internal setting of those business corporations subject to occupational fraud, obtaining unauthorized economic gains, and/or unjust and illegal competitive advantages (Singleton & Singleton, 2010, p. 41-49; Gottschalk, 2010, p. 442-443). In the context of this doctorate thesis, it is relevant denoting that the unauthorized economic gains and illegal competitive advantages associated with occupational fraud are in some scenarios not only acquired by the employees embedded within the victim business corporations but also the external parties that they collaborate with (Singleton & Singleton, 2010, p.

41-49; Gottschalk, 2010, p. 442-445). Therefore, this doctoral thesis elaborates on several sub-schemes of occupational fraud that although are primarily triggered by employees embedded in the internal setting of victim corporations still largely entail collaboration with external parties.

Nevertheless, regardless of the prior, the fact that employees embedded in the internal setting of business corporations are the main parties that trigger and execute occupational fraud (even in the case of occupational fraud sub-types involving collaboration with external parties), still contributes towards understanding this particular fraud phenomenon as an attack of business corporations from within, i.e. attack that is committed by the very internal parties that are employed for the purpose of adding corporate value to their respective employers (Wells, 2001, p. 31). As a result, indicating that occupational fraud diminishes the overall value that corporations create for their key stakeholder groups – hence, therefore also distorting the strategic outlook of corporations, as well as their bottom-line overall. These prior elaborated indications are further supported by the findings of Peltier-Rivest and Lanoue (2011, p. 54-58), Lookman

and Nurcan (2015, p. 1), Zahra et al. (2005, p. 818-820), Tackett (2013, p. 15), Davis and Pesch (2013, p. 469), Krambia-Kapardis (2003, p. 184-185), Bonny et al. (2015, p. 447-448), Holtfreter (2005, p. 87), Bierstaker (2006, p. 520-521), Mooney et al. (2000, p. 17-18), Lenz and Graycar (2016, p. 613-614), Litzky et al. (2006, p. 91-92), Singleton and Singleton (2010, p. 48-49), Wells (2017, p. 27-36), Cox and Weirich (2002, p. 374-375). The reason for this is that these studies indicate that this type of fraud results in considerable financial losses and distortions in those organizational competencies which aim to create and sustain short-term and long-term value for key stakeholder groups.

In the context of this doctoral thesis, it is relevant to emphasize that previous academic evidence also indicates that business corporations which operate in developing countries are particularly vulnerable to occupational fraud, and the economic consequences associated with its occurrence. Nevertheless, the current state of art provides very little evidence on the occupational fraud phenomenon overall within entities operating in developing countries. Specifically, there is very little research concerning practices which could enable entities operating in this

group of countries (i.e. developing countries) to mitigate the risks associated with the occurrence of occupational fraud in their internal setting. In other words, the current state of art is not enriched with evidence enabling legislators, policymakers, corporations, and investors (amongst others) to acquire an overview on the type of mechanisms or frameworks which could potentially contribute towards minimizing occupational fraud risks within entities operating in developing countries - i.e. entities which vulnerability to risks of this nature, as stated above, contributes towards an overall distortion of the value corporations in developing countries generate for both internal as well as external stakeholders. Consequently, indicating that the lack of empirical evidence on mechanisms or frameworks which could contribute towards minimizing occupational fraud risk, leads towards multiple parties with vested interest in addressing these types of risks within entities in developing counties (i.e. from legislators and policymakers to investors and corporations) have a limited overview on which areas they should dedicate their focus on in order to effectively tackle occupational fraud-risks within entities in countries classified as developing.

Taking the above into account, this doctoral thesis aims to provide the first machine learning-based empirical evidence towards determining the role (including its statistical significance) of International Financial Reporting Standards and International Standards of Audit in deterring occupational fraud risks within entities operating in developing countries[1]. In this context, the decision of the author to select International Financial Reporting Standards and International Standards of Audit as core focal points of reference for this doctoral thesis is based on the fact that these reporting standards have in the current state of art been theoretically considered as practices which could have a significant impact on the occupational fraud-related risks within business organizations overall – in particular business organizations operating in developing countries[i]. However, the previous research has been not enriched with all-encompassing empirical evidence highlighting the role of International Financial Reporting Standards and International Standards of Audit on holistically determining occupational fraud

[1] [1] **In this context it is relevant denoting are a standard amongst all countries which implement International Financial Reporting Standards. In other words, their implementation is often in parallel both in developed and developing countries. Hence, in some cases when the author refers either one or the other instead of both, it can be assumed still as both frameworks being simultaneously references. This applies for the entire thesis as a whole.**

risks within entities operating in developing countries. Multiple standards under International Financial Reporting Standards (IFRS) such as International Financial Reporting Standards for Fair Value Measurement as well as Revenue Recognition have been in particular designed to address the opportunities to commit financial statement fraud (as one of the three key pillars of occupational fraud overall).

Consequently, the core scope of this thesis is to not solely provide the first empirical evidence on how International Financial Reporting Standards and International Standards of Audit impact occupational fraud risks within entities in developing countries, but also deliver a comprehensive overview of all concepts which are the core focal points of occupational fraud as a phenomenon overall.

Therefore, the introductory section of this doctoral thesis is followed with a second section, where the author elaborates in detail on the overall definition and categorization of occupational fraud via leveraging on the Fraud Tree Model developed by the Association of Certified Fraud Examiners. The author in the same section, for the purpose of providing further context on occupational fraud as a phenomenon elaborates on the consequences associated with the occurrence of this

fraud phenomenon within organizations primarily operating in developing countries.

Prior to proceeding further, it is relevant denoting that the current state of art provides a wide range of evidence indicating that occupational fraud as a concept is strongly related to earnings management or earnings manipulation. Specifically, earnings management is generally referred to as the process of leveraging accounting techniques to enable the generation of financial statements that present an artificial (or intentionally distorted view) of the business activities as well as the financial position of corporations overall (Healy & Wahlen, 1999, p. 33; Nugroho & Eko, 2012, p. 18). This definition itself, as well as the definition provided in several other studies (e.g. Erickson et al., 2006, p. 114-117), indicates that occupational fraud has the same objective as earnings management – that is to distorting the outlook of the financial position of a corporation and its activities to achieve the personal enrichment of the firm's core internal stakeholders (primarily, internal employees embedded in the middle and upper management corporate ranks). However, occupational fraud differs from earnings management since

occupational fraud is generally performed outside Generally Accepted Accounting Principles (GAAP), while earnings management is performed exclusively within the Generally Accepted Accounting Principles Framework – hence, in principle earnings management is not classified as a fraud category per se. Nevertheless, in spite of the prior denoted financial statement fraud as well as asset misappropriation as sub-categories of occupational fraud could also often correlate with the manipulation of accounting standards (Generally Accepted Accounting Principles-driven) during the fraud commitment process per se – hence, indicating that occupational fraud could in some cases contain components of earnings management and vice versa.

Consequently, the second part of this doctoral thesis in addition to providing a detailed overview on the Fraud Tree Model, also elaborates on the definition of Earnings Management - its main uses within corporations as well as its core associated techniques. This section as well provides a wide range of academic evidence regarding the interaction between earnings management as well as occupational fraud.

The reason for elaborating on earnings management within the core sub-sections of this doctoral thesis is that the existing synergies between earnings management as well as the occupational fraud component, could contribute towards the empirical evidence embedded in this doctoral thesis be leveraged also in the field of earnings management (in spite of the fact that the core subject of analysis of this doctoral thesis remains occupational fraud exclusively). In particular, given that M-Score (the occupational fraud proxy leveraged in this thesis) is also used as a proxy for evaluating earnings management risks within corporations (Anh & Linh, 2016, p.1; Talab et al., 2017, p. 287; Corsi et al., 2015, p. 65; Ahmed and Azim, 2015, p.265). Additionally, it is relevant denoting that earnings management or earnings manipulation as a concept is significantly more researched from a theoretical and empirical perspective than occupational fraud - in context of both entities operating in developed as well as developing countries. Consequently, enabling the author to leverage in the literature review section of this doctoral thesis the significantly broader array of research associated with how International Financial Reporting Standards and International Standards of Audit

impact earnings management associated risks (both in entities operating in developing countries as well as countries classified as developed).

The thesis proceeds with a section embedding within it an elaboration of the main research questions explored in this doctoral thesis – i.e. research questions based on investigating the role of International Financial Reporting Standards and International Standards of Audit in the context of occupational fraud in entities operating in countries classified as developing. This section specifically provides a detailed overview of the main incentives of the author to focus their doctoral thesis on the selected research questions – while also providing a foundational basis on the manners in which the research questions embedded in this doctoral thesis contribute to the current state of art.

Upon the research questions section elaboration, the doctoral thesis proceeds with a literature review section. The literature review section is divided in three sub-sections; two of which are aimed at providing an overview of the key economic as well as regulation-based incentives which determine the adoption of International Financial Reporting Standards and International Standards of Audit,

particularly in countries classified as developing. In other words, the prior elaborated literature review sub-sections, focus primarily on the economic and political incentives to adopt International Financial Reporting Standards and International Standards of Audit in developing countries. Hence, on incentives that could inherently play a role in determining the risks associated with the occurrence of occupational fraud within entities operating in developing countries. The prior applies if one is guided by the prevailing assumption in the current state of art that International Financial Reporting Standards and International Standards of Audit play a role in the occupational fraud phenomenon.

The third sub-section of the literature review lastly, provides an overview on the full scope of existing research embedded in the current state of art which investigates the relationship between International Financial Reporting Standards and earnings management. This section in addition to also elaborating on the incentives associated with adopting International Financial Reporting which could impact earnings management risks within entities in developing countries, also

provides an overview on the empirical evidence investigating the positive, neutral or negative correlation between these three phenomena.

This literature review section is followed by a methodology section, which provides a detailed overview of the research approach adopted by the author to investigate the main research questions embedded in this doctoral thesis. In addition to a general background overview within the methodology section, the author elaborates in detail the reasoning and approach reflected in the sample size selection as well as the data collection process. Specifically, the author in this section elaborates in detail on the selected research methodology approach, which bases itself on the statistical comparison of the M-score, of companies that have adopted International Financial Reporting Standards and International Standards on Auditing. The statistical comparison is conducted between enterprises that operate in developing and developed countries – and its methodology design is based on the doctoral research proposal initially approved by the thesis supervisor as well as co-supervisor. In this section the author as well provides an overview of the additional methodology approach which has been added to the thesis upon

request of the thesis supervisor and co-supervisor subsequently, for the purpose of further investigating the impact of International Financial Reporting Standards as well as International Standards on Audit on the occupational fraud risks associated with entities operating in countries classified as developing. Specifically, the author in addition adopts a methodology approach which investigates the M-Score of entities operating in several developing countries before and after adopting International Financial Reporting Standards. Consequently, within this elaborated research methodology the author attempts to study the impact of International Financial Reporting Standards on occupational fraud risks within entities in developing countries via comparing the M-Score of over hundred entities before and after their jurisdiction had adopted International Financial Reporting Standards. Consequently, being able to isolate statistical observations as to whether after the adoption of International Financial Reporting Standards the M-Score in entities in developing countries remained the same, improved or worsened. This methodology has been adopted as the primary research methodology in this doctoral thesis.

Given that the M-Score is used as a core benchmark in each of the two methodology approaches the author in this section also explains the reasons behind selecting the M-score as a focal basis for their empirical methodology. Additionally, this section also provides a detailed explanation of M-Score as a financial ratio-based concept and its core elements. The M-score is a statistical model which is based on publicly available accounting data for listed business entities. The elaborated accounting data for which M-score is applied to subsequently calculate financial ratios whether it is likely that the reported earnings are subjected to fraud.

Furthermore, within the methodology section the author also provides a detailed explanation of the neural network-based quantitative approach that is selected to process the M-score-based data points and to obtain statistical insights concerning the impact of International Financial Reporting Standards on occupational fraud in business corporations operating in developing countries.

Consequently, upon the detailed elaboration of the research methodology embedded in the doctoral thesis, the author continues by providing a section

dedicated towards elaborating on the statistical results obtained by the executed empirical study. Specifically, this particular section of the thesis in detail reveals all the statistical results generated with regards to the role (including its statistical significance) that International Financial Reporting Standards and International Standards of Audit play in determining occupational fraud in entities operating in developing countries.

Further, the doctoral thesis proceeds with a conclusive section that provides an overall summary of all the findings and discussed aspects throughout the entire doctoral thesis. The conclusion section also provides a detailed overview of the value add of the conducted research both for the current academic research and practice - for the later particularly in relation to the management of corporations operating in developing countries, their investors as well as law enforcement parties and, policy makers. The conclusive section also provides an overview of the core limitations associated with this doctoral thesis, as well as a qualitative interpretation of all the empirical findings generated through this research endeavor.

1. OCCUPATIONAL FRAUD VIA THE FRAUD TREE MODEL AND ITS INTERACTION WITH EARNINGS MANAGEMENT

1.1 Overview

In general, occupational fraud is regarded as a form of white-collar crime that is relatively broad and complex. Nevertheless, in order to provide all-encompassing research relevant to the main subjects of analysis of this doctoral thesis, it is important to provide a comprehensive definition not only of occupational fraud, but also the main categories that constitute this phenomenon. In this dissertation, the core categories of occupational fraud are based on the Fraud Tree Model developed by the Association of Certified Fraud Examiners (Singleton & Singleton, 2010; p. 71-74).

In this context, it is relevant denoting two specific reasons behind implementing the Fraud Tree Model. The first reason stems from the fact that the Fraud Tree Model is the most utilized framework both in academic, as well as business practice circles; when it comes to defining the categories and sub-categories embedded in occupational fraud (Singleton & Singleton, 2010; p. 71). The second reason on the

other hand stems from the fact that the Fraud Tree Model, in the past decade, has been regarded as a framework which consistently remains capable of encompassing within it all the core categories and sub-categories of occupational fraud -regardless of the expanded scope and complexity of this fraud phenomenon (Singleton & Singleton, 2010; p. 71-72). Taking the prior context into account, it is relevant to denote that technological advancements as well the continuously growing complexity of the business environment overall have largely enhanced the vulnerability of corporations to occupational fraud overall (Gelinas et al., 2011, p. 233-235). The reason for the denoted stems from the fact that occupational fraud offenders have the opportunity to continuously leverage on emerging technological advancements as well as exploit the growing complexity of business models overall in order to develop new methods for committing as well as concealing occupational fraud (Gelinas et al., 2011, p. 233-235; KPMG, 2016; p. 6-8). The prior not only enhances the exposure of corporations to occupational fraud, but also contributes towards expanding the overall scope of this specific internal fraud category. Consequently, making it more challenging for researchers not only to accurately

define occupational fraud, but also identify the full range of sub-categories or fraud commitment methods. Although, according to Singleton and Singleton (2010, p. 72), the Fraud Tree Model still accurately encompasses all relevant methods, and sub-methods embedded in the commitment of occupational fraud – as about 20 of the 49 schemes embedded in occupational fraud, make up over 80 percent of all the frauds committed globally.

As demonstrated by the graph below, the Fraud Tree Model developed by the Association of Certified Fraud Examiners, categorizes individual schemes embedded in occupational fraud into a classification model of categories, subcategories and micro-categories (Singelton & Singelton; 2010; p. 73-74). According to the Fraud Tree Model, the three main top-level categories of occupational fraud are corruption, asset misappropriation, and financial statement fraud (Singelton & Singelton; 2010, p. 73-74). Studies highlight that these three top-level categories of occupational fraud are relatively unique in their characteristics (Singelton & Singelton; 2010, p. 73). Consequently, the characteristics that define financial statement fraud relatively differ from those that

pertain to corruption, or asset misappropriation. Therefore, indicating that prior to exploring in detail any research question pertaining to occupational fraud as well as the corporate methods and frameworks, one must account for the specific characteristics defining each of the main categories of occupational fraud.

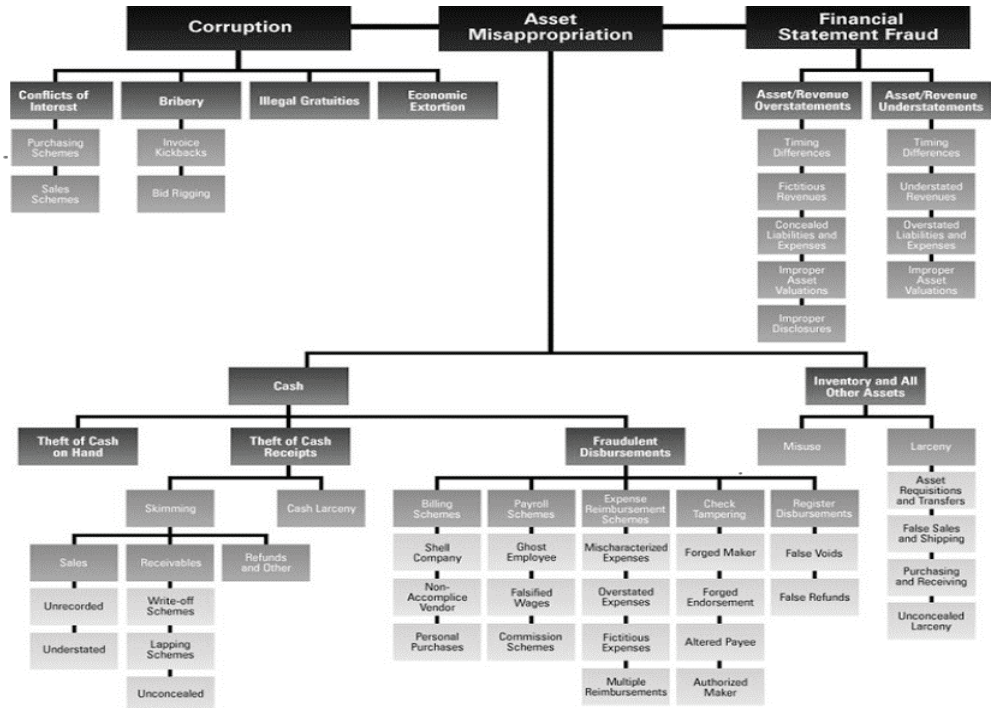


Figure 1. Fraud Tree Model (Singelton & Singelton; 2010, p.73)

1.2. Corruption

1.2.1. General Definition

Specifically, corruption on a high level is defined as an occupational fraud act that specific parties execute for the purpose of influencing official corporate acts and/or business decisions pertaining to the victim organization (Singleton & Singleton, 2010, p. 83; Wells, 2017, p. 250-253). Typically, the parties involved in the corrupt activities are both internal and external to the victim organization. The reason behind it is that in a standard corruption scheme, parties employed internally within the victim corporation, collaborate together with external parties such as vendors, in order to influence corporate acts, as well as business decisions in a manner which results in them receiving direct or indirect economic benefits (Singleton & Singleton, 2010, p. 83; Wells, 2017, p. 250-253). These types of collaborations are kept hidden from the corporate executive management as well as auditors due to being fraudulent in their nature and triggering economic consequences not solely for the victim company but also other external parties i.e. vendors which do not participate in such schemes (Singleton & Singleton, 2010, p.

83). According to the Fraud Tree Model, there are four core sub-categories of corruption: bribery, illegal gratuities, conflicts of interest, and economic extortion (Singleton & Singleton, 2010, p. 83; Wells, 2017, p. 253).

1.2.2 Bribery

Bribery, as one of the most common forms of corruption, is defined as the process of offering, giving, receiving, or soliciting anything of value, in order to influence an official corporate act, or a business decision pertaining to the internal setting of the victim organization (Singleton & Singleton, 2010, p. 110; Blake's Law Dictionary, 2015[2]). In a typical bribery scenario, an employee or employees, operating within the internal setting of the victim corporation, influence business decisions or corporate acts, in a manner that is specifically aimed to providing benefit to other businesses and/or individuals (for example, businesses and, individuals acting as vendors in relation to the victim organization). The employee or employees employed internally within the victim organization, are subsequently provided with a monetary compensation by the business, or individual they

[2] *What is bribery?, Black's Law Dictionary, archived from the original on October 1, 2015, retrieved November 30, 2019*

collaborated with in the bribery scheme (Singleton & Singleton, 2010, p. 110; Albrecht et al., 2011, p. 516). The aforementioned monetary compensation is provided to internal employees in the victim organization, as a reward for their initiative to influence corporate acts, and business decision in a manner which is favorable for the external parties they collaborated with (Singleton & Singleton, 2010, p. 110; Albrecht et al. 2011, p. 516). According to the Fraud Tree Model, bribery as a type of corruption primarily consist of kickbacks, and bid rigging (Singleton & Singleton, 2010, p. 83; Wells, 2017, p. 253).

1.2.2.1 Kickback

In a standard kickback scenario, an employee colludes with a vendor in order for the vendor to be able to charge the victim organization higher than market prices for the services they are providing to them (Singleton & Singleton, 2010, p. 83; Stamler, 2014, p. 275-276; Albrecht et al., 2011, p. 516-517). A portion of the excess generated from the overpricing is distributed to the employee who is employed within the victim corporation in the form of the kickback (Singleton &

Singleton, 2010, p. 83; Stamler, 2014, p. 275-276; Albrecht et al., 2011, p. 516-517).

1.2.2.2 Bid rigging

On the other hand, bid rigging is defined as the process in which an employee for generating personal economic gains colludes with a vendor in order to ensure that a specific vendor is granted the bid in a competitive bidding process over others (Singleton & Singleton, 2010, p. 3; Stamler, 2014, p. 72-78; Albrecht et al., 2011, p. 517). Specifically, in a typical bid rigging processes, the employee becomes a recipient of direct economic gains (triggered by receiving monetary compensation), provided by a specific vendor as a compensation for them engaging in illegitimately disqualifying the other vending parties participating in the competitive bidding process (Singleton & Singleton, 2010, p. 83; Stamler, 2014, p. 72-78; Albrecht et al., 2011, p. 517).

1.2.3 Illegal gratuities

Nevertheless, as previously highlighted, besides bribery and kickbacks, illegal gratuities are also an additional occupational fraud sub-category, which falls under

the umbrella of corruption. Illegal gratuities, in spite of sharing similarities with bribery are still fundamentally different. The reason for the denoted is because this sub-category of corruption is not necessarily executed exclusively via the provision of direct economic gains (by external parties) to employees embedded in the internal setting of the victim organization (Singleton & Singleton, 2010, p. 85; Albrecht et al., 2011, p. 520). The reason for which being, that in a typical illegal gratuities scenario an employee operating within the internal setting of the victim corporation becomes a recipient of a costly gift when engaging in the process of influencing a certain business decision, or corporate act in a manner benefiting the external parties (e.g. vendors) they collaborate with (Singleton & Singleton, 2010, p. 85; Albrecht et al., 2011, p. 520). Hence, unlike in a bribery scenario, they do not become recipients of a monetary compensation resulting in a direct economic gain (Singleton & Singleton, 2010, p. 85; Albrecht, 2010 et al., 2011, p. 520). Taking the prior into account, illegal gratuities are relatively more difficult to be detected when compared to briberies, for two specific reasons. The first reason is that the nature of the economic benefits associated with illegal gratuities is

relatively less tangible. In other words, tracing the provision of costly gifts rather than transactions reflecting direct economic gains, is significantly more challenging (Singleton & Singleton, 2010, p. 85; Albrecht et al., 2011, p. 520). Therefore, the processes for obtaining material evidence aimed at proving the occurrence of illegal gratuities within the victim organization, as well as identifying the internal parties responsible for executing it is relatively more complex, and difficult when compared to other types of corruption, such as bribery in particular (Singleton & Singleton, 2010, p. 85; Albrecht et al., 2011, p. 520). The second reason on the other hand, stems from the fact that the act of engaging in an illegal gratuities scheme is relatively more often taking place after the employee influences a specific corporate act or business decision in a manner which benefits the party they are collaborating with (Singleton & Singleton, 2010, p. 85; Albrecht et al., 2011, p. 520). On the other hand, schemes like bribery often occur prior to internal employees influencing a corporate act or business decision - in a manner benefiting the external parties they are collaborating with. Consequently, posing

relatively higher challenges in back tracing all material information and evidence regarding the occurrence of this corruption sub-category overall.

1.2.4 Economic extortion

As highlighted in the previous paragraphs, besides bribery and illegal gratuities, another core sub-category under the umbrella of corruption is economic extortion. Economic extortion is considered as the opposite of bribery, and illegal gratuities (Singleton & Singleton, 2010, p. 85; Albrecht, 2011, p. 520). In the context of economic extortion, employees in the victim organization demand from other businesses or individuals (e.g. vendors) compensation in return for influencing a business decision or corporate act in their favor (Singleton & Singleton, 2010, p. 85; Albrecht, 2010, p. 520; Singleton et al., 2006, p. 135-136). On the other hand, in the context of bribery and illegal gratuities, the compensation that external parties provide the internal employees in the victim organization is exclusively done on a voluntary basis – without the presence of any act demanding them to engage in providing a compensation of this nature (Singleton & Singleton, 2011, p. 85; Albrecht, 2010, p. 520; Singleton et al., 2006, p. 135-136).

1.2.5 Conflict of interest

As previously highlighted, the last type of corruption that is relevant for the purpose of this dissertation is conflict of interests. Conflict of interest occurs when an employee operating internally within the victim organization has an undisclosed economic or personal interest in a transaction – i.e. a transaction which typically has adverse effects for the corporation itself (Singleton & Singleton, 2010, p. 83; Albrecht, 2010, p. 518-519; Singleton et al., 2006, p. 134). Despite the fact, that the definition of conflict of interests is largely intertwined with the definition of the other previously mentioned sub-categories of occupational fraud, literature suggests that still conflict of interests is fundamentally different from bribery, illegal gratuities, and economic extortion (Singleton & Singleton, 2010, p. 83; Albrecht, 2010, p. 518-519; Singleton et al., 2006, p. 134). The difference between conflict of interest and other forms of corruption stems from the fact that in a conflict of interest scenario the employee operating within the victim organization could abuse their position to influencing a corporate transaction in a manner generating economic gains for them (Singleton & Singleton, 2010, p. 83; Albrecht,

2010, p. 518-519; Singleton et al., 2006, p. 134). On the other hand, in a typical bribery, illegal gratuities and economic extortion scenario, employees within the victim organization do actually abuse their position for personal enrichment purposes (Singleton & Singleton, 2010, p. 83; Albrecht, 2010, p.518-519; Singleton et al., 2006, p. 134). Furthermore, with regards to conflicts of interests, it is relevant denoting that according to the Fraud Tree Model they consist of purchasing schemes as well as sales schemes.

1.2.5.1 Purchasing Schemes

Purchasing schemes generally are executed via overbilling the victim corporations for goods and services they obtain from external parties (e.g. vendor) (Albrecht, 2010, p. 518). In other words, in a purchasing scheme scenario, an internal employee, as a result of having an undisclosed ownership or any other form financial interest in a particular external corporation, overbills the corporation they are employed within for the goods and services they receive from the external party that have interest or ownership in.

1.2.5.2 Sales Schemes

On the other hand, in a typical sales scheme scenario, the victim corporation is subjected to underselling its goods and services (Albrecht, 2010, p. 518). In other words, in a standard sales scheme scenario an employee embedded in the internal setting of the victim organization triggers the underselling of the corporate goods and services to an institution in which they have an ownership or any other form of financial interest (Albrecht, 2010, p. 518).

1.3 Asset Misappropriation

1.3.1 General Definition

Asset misappropriation is primarily defined as an occupational fraud category, in which internal (e.g. employees) and/or external parties (e.g. vendors) to the victim organization employ deceit and/or trickery in order to steal or misuse corporate resources for their own personal enrichment purposes (Albrecht et al., 2008, p. 1-2; Albrecht et al., 2010, p. 506-507; Rasha, 2014, p. 1-2, Singleton & Singleton, 2010, p. 84; Kennedy, 2018, p. 371-372). According to the Fraud Tree Model developed by the Association of Certified Fraud Examiners, asset misappropriation is divided in two main sub-categories: misappropriation of cash and misappropriation of inventory, and all other non-cash assets (Albrecht et al, 2008, p. 3-4; Albrecht et al., 2010, p. 506-507; Singleton & Singleton, 2010, p. 84-94; Kennedy, 2018, p.371-372).

1.3.2 Misappropriation of cash

The misappropriation of cash-based resources, according to the Fraud Tree Model, is categorized under the following schemes: theft of cash on hand, theft of

cash receipts, and fraudulent disbursements (Albrecht et al., 2010, p. 507; Singleton & Singleton, 2010, p. 84-94; Kennedy, 2018, p. 371-372; Association of Certified Fraud Examiners, 2016, p. 75-76).

1.3.2.1 Theft of cash on hand

The concept of the theft of cash on hand is primarily defined as a scheme in which a party internal to the victim organization misappropriates the cash kept on hand within the corporate premises (Albrecht et al., 2010, 507 Singleton & Singleton, 2010, p. 86). A typical scenario, of a theft of cash on hand is when an employee embedded in the internal setting of the victim organization steals cash from the corporate vault – and then subsequently utilizes it for personal enrichment purposes (Association of Certified Fraud Examiners; 2016, p. 75-76).

1.3.2.2 Theft of cash receipts

The concept of the theft of cash receipts primarily refers to the concept in which an employee embedded in the victim organization misappropriates cash receipts associated assets within the corporation. As per the fraud tree model

there are two types of subcategories of theft of cash receipts. The first one is skimming while the second one is cash larceny.

1.3.2.2.1 Skimming

Skimming is primarily defined as a scheme in which cash is removed from the victim organization prior to it entering the corporate accounting systems (Singleton & Singleton, 2010, p. 154-155; Association of Certified Fraud Examiners, 2016, p. 75-76). In other words, skimming is largely defined as an "off the book scheme", due to the fact that the cash receipts neither get reported to the victim corporation, nor are linked to any accounting or financial reporting entry within the organization entry overall (Singleton & Singleton, 2010, p. 154-155; Association of Certified Fraud Examiners, 2016, p. 75-76). In this context it is relevant emphasizing that, regardless of the fact that the cash receipts never get acknowledged by the corporate books, the removal of the cash embedded in a skimming scheme is executed without the will or the consent of the employer (Singleton & Singleton, 2010, p. 90-92; Association of Certified Fraud Examiners, 2016, p. 75-76). According to the Fraud Tree Model, skimming can be executed

via the deliberate non-recording of sales, as well as the understating of the sales revenue prior to it being recorded in the corporate books (Singleton & Singleton, 2010, p. 90-92; Association of Certified Fraud Examiners, 2016, p. 75-76). Additionally, skimming as well can be executed via the fictive write off cash receipts, concealing receivables, as well as lapping (Singleton & Singleton, 2010, p. 90-92; Association of Certified Fraud Examiners, 2016, p. 75-76). In this context, lapping is defined as the process in which an employee in the internal setting of the victim corporation steals cash from one customer and, then subsequently conceals the theft, by diverting cash from another customer in order to offset the receivable from the first customer (Singleton & Singleton, 2010, p. 90-92; Association of Certified Fraud Examiners, 2016, p. 75-76). Lastly, skimming can also be conducted via the exploitation of the typical refund process occurring within a business corporation (Singleton & Singleton, 2010, p. 90-92; Association of Certified Fraud Examiners, 2016, p. 75-76). The exploitation of a typical refund process involves the act of an employee embedded in the internal setting of the victim organization exploiting the occurrence of a sales refund, in order to

personally acquire a part or the full amount of the refund proceeds (Singleton & Singleton, 2010, p. 90-92; Association of Certified Fraud Examiners, 2016, p. 75-76).

1.3.2.2.2 Cash Larceny

Much like skimming, cash larceny is defined as the deliberate taking of the cash which is under the ownership of the victim corporation - against the will or consent of key corporate stakeholders (Singleton & Singleton, 2010, p. 104; Association of Certified Fraud Examiners, 2016, p. 76). Nevertheless, different from skimming, cash larceny-related acts involve the stealing of money which are already recorded in the company books – hence indicating that this scheme represents an "on the book", rather than "of the book" fraud (Singleton & Singleton, 2010, p. 104; Association of Certified Fraud Examiners, 2016, p. 76).

1.3.3 Fraudulent Disbursements

According to the Association of Certified Fraud Examiners (Singleton & Singleton, 2010, p. 86; Association of Certified Fraud Examiners, 2016, p. 77), fraudulent disbursements are defined as acts which take place when an employee

internal to the victim organization exploits their position in order to cause a payment for an inappropriate purpose. Furthermore, fraudulent disbursements alike larcenies, are generally regarded as "on-book" schemes - due to the fact that they represent scenarios in which the corporate cash leaves the victim entity in a fraudulent manner, and it is still recorded in the accounting books of the organization (Singleton & Singleton, 2010, p. 86; Association of Certified Fraud Examiners, 2016, p. 77). In this context, one method through which fraudulent disbursements can occur within a victim organization is through check tampering (Association of Certified Fraud Examiners, 2016, p. 77). Check tampering is in turn defined as a process in which an employee internal to the victim organization either prepares a fraudulent corporate check for their own personal enrichment purposes or intercepts a corporate check initially intended for a third party (Association of Certified Fraud Examiners, 2016, p. 77). Nevertheless, besides check tampering, according to the Fraud Tree Model, fraudulent disbursements can also be executed via register disbursement schemes (Association of Certified Fraud Examiners; 2016, p. 78). Register disbursement schemes occur when an employee

of the victim organization removes cash which is already accounted for in the corporate register and absconds with it during a process of a sales void or a refund (Association of Certified Fraud Examiners; 2016, p. 78). Moreover, fraudulent disbursements can also be executed via billing schemes in which internal and external parties to the victim corporation trigger the purchase of goods and services which either are non-existent, overpriced, or not needed by the corporation (Association of Certified Fraud Examiners; 2016, p. 79). The trigger of such purchases then subsequently provides to the internal and external parties illicit gain of cash, goods, or services (Association of Certified Fraud Examiners; 2016, p.79). Furthermore, an additional alternative for executing fraudulent disbursements can take place through expense reimbursement, as well as payroll schemes (Association of Certified Fraud Examiners; 2016, p.80). Specifically, expense reimbursement schemes happen when the employees of the victim organization falsify information related to their business expenses and consequently trigger their employers to overcompensate them in the form of inflated expense reimbursements (Association of Certified Fraud Examiners; 2016, p.80). On the other hand, payroll

schemes are primarily defined as acts in which employees in the victim organization fraudulently generate compensation on their behalf. As a result, they resemble billing schemes due to the fact that fraudulent disbursement acts are primarily executed via the generation of documents with false contents or through the making of false claims for a distribution of funds by the employer (Association of Certified Fraud Examiners; 2016, p. 80). However, the main difference between billing and payroll schemes in the context of fraudulent disbursements is that in billing schemes the falsified claims or documents come from fraudulent invoices, while in payroll schemes they come from falsified payroll records, timekeeping records, or some other document concerned with the payroll function (Association of Certified Fraud Examiners; 2016, p. 80).

1.3.4 Misappropriation of inventory and all other assets

The previous paragraphs provide a comprehensive overview of all cash-related appropriation schemes. Nevertheless, as indicated in the prior section of the thesis, asset misappropriation could also be conducted through the misappropriation of inventory, as well as other types of assets (Association of

Certified Fraud Examiners; 2016, p. 81). The two key methods for misappropriating inventory as well as all other assets are based on the misuse of inventory and all other assets; as well as larceny, or theft of inventory, and all other assets (Association of Certified Fraud Examiners; 2016, p. 81).

1.3.4.1 Misuse of inventory and all other assets

The misuse of inventory and all other assets is based on employees of victim business corporations, stealing inventory, as well as all other types of non-cash assets under the pretense that they are borrowing them for a certain amount of time (Association of Certified Fraud Examiners; 2016, p. 81). This means that when employees misuse inventory, as well as all other types of non-cash assets, even if they do not end up permanently stealing them (but rather just borrowing them), they still end up exposing them to additional wear and thus contribute to decreasing their overall asset value that can trigger economic damages to the victim organization (Association of Certified Fraud Examiners; 2016, p. 81).

1.3.4.2 Larceny of inventory and all other assets

Larceny of inventory, as well as all other types of non-cash assets, involve the misappropriation of inventory for personal use, the robbery of inventory, and scrap or charging embezzlements to inventory. According to the Association of Certified Fraud Examiners (2016, p. 81), the difference between the larceny and misuse of inventory (as well as all other types of assets), lies on the fact that when larceny occurs the corporate non-cash assets are typically converted into cash, as well as are never returned to the premises of the victim business corporation. On the other hand, in the context of misuse, the inventory, as well as the rest of non-cash assets are typically returned to the victim organization (after being borrowed under false pretexts) (Association of Certified Fraud Examiners; 2016, p. 81; Singleton & Singleton, 2010, p. 94).

1.4 Financial Statement Fraud

1.4.1 General Definition

According to the Rezaee and Rilye (2009, p. 5-7), Singleton (2010, p. 420-421), Ngyen (2010, p. 2-3), Rezaee (2002, p. 1-3) financial statement fraud is primarily defined as a scheme in which employees, in a deliberate manner, misstate or omit information of a material importance from the financial reports of the corporations serving as their employer. The deliberate misstatement or omission of information in standard financial statement fraud schemes occurs through overstating assets, revenues, and profits, as well as understating liabilities, expenses and losses.

According to the current research, financial statement fraud is usually associated as “a means to an end”, rather than “an end” itself (Singleton, 2010, p. 420-421; Rezaee, 2002, p. 1-6). Specifically, financial statement fraud can be conducted in order to obtain or renew financing which would not be granted if the financial statements provided to the loan providers are honest and reflected the actual lower levels of corporate earnings (in contrast the inflated ones presented to

them). Additionally, financial statement fraud can as well be typically conducted in order to reduce the actual earnings for the purpose of lowering the amount of taxes owed to authorities.

Overall, employees in the victim organization, alike in the case of corruption and asset misappropriation, could engage in financial statement fraud due to personal enrichment-related motives (Singleton, 2010, p. 420-421; Rezaee, 2002, p. 1-6).

Nevertheless, in contrast to corruption and asset misappropriation schemes, in the case of financial statement fraud employees might display a tendency to engage in financial statement fraud with experiencing little, or no financial gain on personal terms. Instead, their motive in engaging in financial statement fraud is more of an extrinsic nature such as preserving their status as leaders in the entity in which they are employed as well as driving the bottom-line in a manner aligned with the interests of their key stakeholder groups. In addition, according to Rezaee (2002, p. 66-67), the manipulation of financial statements often occurs due to the lack of adequate accounting controls as well as control reconciliation measures.

Taking the prior into account, one can distinguish two key financial statement fraud schemes: fraud schemes involving the overstating assets and revenues; and fraud schemes involving the understatement of liabilities and expenses (Singleton et al., 2006, p. 102). In this context, it is relevant to denote that both these schemes are primarily executed through the following methods: timing differences, improper disclosures, improper asset valuations, fictitious and overstated revenues; as well as concealed and understated liabilities and expenses (Singleton et al, 2006, p. 102).

1.4.2 Timing Differences

According to Singleton et al (2006, p. 108-109), timing differences in the context of financial statement fraud are defined as the process of recording revenues and/or expenses in improper periods. In other words, it involves the shifting of revenues or expenses between one period and the next, in order to increase or decrease earnings - in a manner aligned with the goals of the fraudster for a particular fiscal quartile. Specifically, fraudsters, due to pressure to meet

budgets constraints as well as revenue targets, engage in manipulating the timing when they record specific revenues and/or expenses (Singleton et. al, 2006, p. 102).

1.4.3 Improper Disclosures

According to Wells (2007, p. 373-374), improper disclosures are embedded in the process of management not disclosing all information with a material significance in the financial statements of the corporation. Improper disclosures primarily relate to the omission of disclosing of certain liabilities in the financial statements of the corporation - as well as the lack of disclosure of subsequent events (e.g. fire damaging most fixed assets) which could significantly impact the bottom-line of the corporation (Wells, 2007, p. 373-374). Furthermore, it is important to denote that improper disclosures also could be based on the omission to revealing that management fraud has occurred within the victim corporation (i.e. a fraud type which occurrence the corporation must disclose to auditors as well as all other shareholder profiles via the published financial statements) (Wells, 2007, p. 373-374). Lastly, improper disclosures can also be conducted through the omission to disclosing related or self-dealing party transactions – i.e. transactions which occur

when a company does business with another entity whose management or operating policies can be controlled or significantly influenced by the company or by some other party in common (Wells, 2007, p. 373-374).

1.4.4 Improper Asset Valuations

Improper asset valuation is primarily defined as a process in which the corporate inventory, account receivables, business combinations, as well as fixed assets are fictitiously valued in order to either overstate or understate key components determining the net income or net worth of a specific business organization (Wells, 2007, p. 375-376). Specifically in the context of inventory, employees embedded in the victim organization could improperly state or value inventory through the manipulation of the physical inventory count, inflation of the unit costs used to price out inventory, failure to relieve inventory for costs of goods sold, and by other methods (Wells, 2007, p. 373-374). On the other hand, the improper valuations of accounts receivable occur primarily through the introduction of fictitious accounts receivables through debiting accounts receivables and crediting sales primarily around the end of the accounting period.

Another common method for disvaluing accounts receivables is through the failure to account for uncollectible accounts, or bad debts (Wells, 2007, p. 373-374).

Moreover, as it was mentioned in previous paragraphs, improper valuations on fixed assets as well as business combinations is also another manner for overstating or understanding the net worth or net income of the corporation. Specifically, in the context of business combinations, one entity acquires part or all of another entity's operations. This type of transaction consequently could be leveraged in order to introduce fraudulent accounting in the allocation of the purchase price across the acquired assets and assumed liabilities – amongst others via manipulating the fair value and overall goodwill accounting principles (Wells, 2007, p. 373-374). Lastly, similar fair value accounting principles can as well be manipulated in order to disclose fixed asset values which are either lower or higher than the actual ones, depending on whether the goal of the fraudster is to overstate or understate the net worth or earnings of the corporation they are employed in (Wells, 2007, p. 373-374).

1.4.5 Fictitious / Overstated Revenues

As highlighted in the general definition sub-section, fraudsters in order to understate or overstate the net worth and net income of a corporation, can engage in applying fictitious or understated revenues, as part of the financial statements of the business organization they are employed within (Wells, 2007, p. 373-374, 361-362). The exercise of understated revenues is typically conducted via cookie-jar accounting practices i.e. practices by which a firm understates revenues in a specified accounting period and maintains them for future periods where relatively lower bottom-line levels are expected overall (primarily via placing the surplus revenue in interest bearing corporate accounts) (Weld et al., 2004, p. 46-48; Wells, 2007, p. 373-374, 361-362). On the other hand, fictitious revenues are applied through recording the sales of goods and services, which have, in reality, not occurred. Specifically, fictitious sales are primarily executed via the recording of revenues against phantom customers, or via issuing fictitious invoices against real customers.

1.4.6 Overstated / Concealed Liabilities & Expenses

The last method through which employees in a certain victim organization can engage in financial statement fraud is either through overstating or concealing the liabilities and expenses incurred by the victim business firm they are employed in (Wells, 2007, p. 370-372).

Considering the prior, liabilities and expenses are concealed in order to reflect a financial position of the victim organization which is relatively more favorable than the actual one. In other words, when employees in the victim organization deliberately engage in excluding or diminishing the liabilities of the corporation, they primarily aim to conceal loans and other debts, which distort the wealthy state of the corporation, as well as the gearing and quick ratio of the firm (Wells, 2007, p. 370-372). For similar reasons, employees in the victim organization engage in concealing expenses as well. Specifically, employees in the victim organization can engage amongst others in capitalizing the expenses incurred in a certain accounting period, in order to overstate current assets and profits, while understating liabilities (Wells, 2007, p. 370-372). In addition to capitalization expenses-related practices, employees in the victim organization can

also engage in ignoring certain expenses for a particular accounting period and then reporting them to the subsequent ones (Wells, 2007, p. 370-372).

On the other hand, employees in the victim organization can as well engage in financial statement fraud through understating the incurred expenses and liabilities. Specifically, employees embedded in the internal setting of a victim organization, in order to avoid distribution dividends (and other forms of funds to shareholders) or reduce the amount of their tax-related obligations, could engage in understating the corporate profit through inflating the actual expenses and liabilities incurred by the victim organization (Wells, 2007, p. 361-362). According to existing studies, expenses and liabilities can, amongst others, be overstated via the inflation of the labor expenses, as well as legal and external consultancy service-related expenses and liabilities (Wells, 2007, p. 361-362).

1.5 Conclusive Statements

The prior discussion on the Fraud Tree Model, demonstrates that occupational fraud is a largely complex and broad phenomenon, which needs to be addressed via adequate accounting processes as well as controls. Furthermore, an additional conclusive statement is that the occurrence of occupational fraud in victim organizations is potentially associated with direct and/or indirect economic losses, as well as distortions of the relationship of the corporation with its key stakeholder groups (i.e. employees, suppliers, customers, investors etc.). Consequently, taking into account the fact that the core scope of this doctoral thesis is identifying practices which enable entities in developing countries to minimize their occupational fraud-related risks, it is crucial to understand the full range of consequences triggered by this fraud phenomenon to organizations overall.

1.5. Consequences Associated with Occupational Fraud

As previously elaborated in prior sections, the occurrence of occupational fraud within corporations is, in general, associated with relatively high economic losses. The prior indications are supported by statistical data published by the Association of Certified Fraud Examiners in their "Annual Report to the Nations" for the 2010-2016 period, which demonstrate that corporations, as a result of occupational fraud, on average experience annual economic losses amounting to five percent of their total revenue (Association of Certified Fraud Examiners, 2016, p. 4; Association of Certified Fraud Examiners, 2014, p. 4; Association of Certified Fraud Examiners, 2012, p. 4; Association of Certified Fraud Examiners, 2010, p. 4). These prior elaborated substantial economic losses in turn contribute towards distorting the value that victim corporations aim to create for all profiles of investors, that have vested economic interest within their entities - i.e. investors whose portfolio returns are impacted by the financial performance of the victim corporation in a particular fiscal year. In addition, according to corporate finance theories, the financial results generated by corporations, besides of determining the

economic benefits or losses acquired by investors, also play a relevant role in the overall perceived welfare of investors. Specifically, prospect theory states that for investors economic losses feel twice as painful as gains feel good (Kahneman & Tversky, 1980, p. 2; Levy, 1992, p.171). Furthermore, the same theory states that some investors have a tendency to be more focused toward the marginal growth of their wealth, rather than the amount of their wealth (Kahneman & Tversky, 1980, p. 277-286). Therefore, in turn indicating that the marginal decrease of their wealth triggered by economic losses (i.e. economic losses of the nature of the prior elaborated ones associated with occupational fraud) further distort their perceived financial welfare.

Furthermore, according to the publication "Corporate Loss Utilization through Aggressive Tax Planning" from Laursen (2012, p.341-46), economic losses that have a similar profile to the ones experienced by corporations as a result of occupational fraud can provide an infrastructure for corporations to reduce their overall tax obligations towards respective governments. Consequently, economic losses triggered by occupational fraud contribute to distorting the value that

corporations create not solely towards their governments, but also towards economic growth and development overall - given that economic growth and development are to a high extent financed by the tax obligations of corporations (Laursen,2012, p.341-46)).

Besides investors and governments, occupational fraud also distorts the value that corporations create for employees, consumers, as well as suppliers. In the context of the suppliers, Fraud Tree Model indicates that occupational fraud as a phenomenon is composed of a wide range of sub-schemes which occurrence within the victim organization results in certain vendors receiving an unfair competitive advantage over others. Consequently, the prior contributes not solely towards economically damaging the victim organization (due to potentially selecting a vendor which is not the relatively most competitive one, neither from a pricing nor from a quality aspect), but also towards distorting the relationship of the corporation with its overall supply chain. In addition, given that occupational fraud is associated with economic losses and may affect supply chain decision-making processes that distort the quality of corporate goods and services, it also contributes

towards distorting the value that organizations aim to create for end consumers. Specifically, given that occupational fraud can contribute towards the victim corporation not engaging with suppliers capable of providing the optimal price and quality, these situations lead towards the phenomenon of potentially distorting the corporate value created for end customers - even if the victim organization does not engage in deliberate cost cutting activities, which might decrease the overall quality of their end output.

Lastly, due to being associated with economic losses up to 5% of the average annual revenues of corporations, occupational fraud could also contribute towards distorting the value corporations create for their employees (as indicated above). Economic losses triggered by occupational fraud could potentially be associated with budget restrictions triggering considerable employee layoffs. Furthermore, Singleton et al. (2010) and Ocansey and Ganu (2017, p. 104) state that there are corporate culture impacts on all three dimensions of the Fraud Triangle i.e. motivation, opportunity and rationalization. Consequently, the occurrence of

occupational fraud could be a reflection of a distorted organizational culture (i.e. a culture which in turn distorts the wellbeing of employees in the workplace).

In the context of the elaborated consequences associated with occupational fraud, it is relevant to emphasize the fact that according to the statistics provided by the Association of Certified Fraud Examiners (2016, p.7) the economic losses (in dollar amounts) associated with occupational fraud are higher in developing countries when comparing against the developed ones. Specifically, despite the fact that the rate of occupational fraud frequency is on average lower in developing countries, the average economic losses expressed in dollar amounts associated with this fraud phenomenon are still relatively higher in developing jurisdictions when compared to developed ones (Association of Certified Fraud Examiners, 2016, p. 7). In other words, the maximum economic dollar losses associated with occupational fraud amounted to USD 275 000 in entities operating in developing countries in the fiscal year 2016 (ibid.). On the other hand, the maximum economic loss triggered as a result of occupational fraud amounted to only USD 263 000 in entities operating in developed countries in the same fiscal year (ibid.).

Consequently this indicates that entities in developing countries have a relatively higher exposure to the economic losses associated with occupational fraud - i.e. economic losses which as indicated in the prior elaborated paragraphs trigger negative bottom-line impact for victim organizations and also distort their overall corporate competency to create value for key stakeholder groups. In this context it is relevant denoting that the statistical data published by the Association of Certified Fraud Examiners in 2016, is consistent with the data published in 2020 as well as 2019. As an example, according to the Report of the Nations published by the Association of Certified Fraud Examiners in 2020 (p.9), the average median economic losses associated with occupational fraud in developing countries for this fiscal year amounted to circa USD 800'000 for entities operating in countries classified as developed (for entities classified in the 75th percentile). On the other hand, in the fiscal year 2020, the median averaged economic losses associated with entities operating in countries classified as developing is circa USD 600'000 – for entities classified in the 75th percentile (Association of Certified Fraud Examiners, 2020, p.9).

1.6 Earnings Management

1.6.1 Earnings Management Overview

Earnings management is in general referred as the process in which managers embedded in the internal setting of a corporation, manipulate financial statements for the purpose of impacting the overall economic results of the firm or specific transactional outcomes associated with it (Healy and Wahlen, 1999, p.33). As indicated in the introductory section of this doctoral thesis, earnings management differs from occupational fraud primarily since it is generally committed within the borders of Generally Accepted Accounting Principles (Ghazali et al, 2015, p. 191). In other words, indicating that earnings management represents a phenomenon under which corporations manipulate financial statements primarily via leveraging a selection of accounting techniques and estimates that conform to Generally Accepted Accounting Principles (Ghazali et al, 2015, p. 191).

One of the key motivations for a manager within a victim organization to engage in earnings management is to meet corporate objectives or benchmarks (Ghazali et al, 2015, p. 191). In other words, according to Nugroho & Eko (2012,

p.18), earnings management associated irregularities occur when the management embedded in the victim corporation attempts to reflect unrealistic or inaccurate results through financial statements in order to meet or exceed certain corporate expectations – i.e. expectations which otherwise they could fail to meet or exceed (in other words, management would fail to comply with corporate or capital market expectations if they present financial results in a manner which does not involve the manipulation of accounting techniques which are embedded within the Generally Accepted Accounting Standards Framework).

Standard scenarios when management within corporations engages in earnings management are scenarios associated with periods of financial distress for the firm (Ghazali et al, 2015, p. 191). The prior mentioned financial distress can be triggered either from general macroeconomic events or internal events related with the performance of the corporation. Specifically, if a particular firm is in financial distress, it is very likely that managers would anticipate their bonuses being reduced or possibility their roles being replaced and suffer damage in their career, personal financial outlook, and reputation (Ghazali et al, 2015, p. 191).

Consequently, in such circumstances managers would take opportunity to conceal the deteriorating financial performance of the firm where they work for - primarily via opting to select accounting methods that reflect in financial statements increased levels of income that could conceal the actual loss (Ghazali et al, 2015, p. 191). This is in line with the findings of Rosner (2003, p. 361) which indicate that firms that become bankrupt ex post (but do not show bankruptcy indications ex ante) engage in income-increasing earnings manipulation practices. Nevertheless, it is also important to denote that earnings management according to findings embedded in the current state of art is also likely to occur in the process when corporations aim to raise additional capital from investors as well as retain their current funding – hence, processes not necessarily associated with a deteriorating financial performance of the firm. Particularly according to Guan et al. (2008, p. 26, 27), management, in order to create a perception amongst new or prospective investors that their corporation is doing well, can often engage in dressing up financial statements in order to make financial results look more appealing. In other words, according to Guan et al. (2008, p. 26, 27), in such

scenarios managers in order to display within financial statements a growth trajectory of the profitability of the firm, could engage in window dressing activities. These window dressing earnings management associated activities could potentially show an artificial financial loss in one reporting cycle for the sole purpose of elevating the profitability growth levels in the next reporting cycles – i.e. cycles corresponding with the timeline when they intend to initiate the fund-raising process. In addition to the denoted, earnings management can also be leveraged for the purpose of neutralizing the impact of volatile macroeconomic as well as microeconomic scenarios in the financial statement of corporations. Specifically, potential investors could display a preference to invest in corporations which are not characterized by volatile economic results, hence, have a preference to invest in corporations that are relatively stable from a growth and profitability perspective amongst others. In order to meet the expectation of such investors, management could engage in performing income smoothing activities, in order to trigger an investor perception that there is steady paced growth and profitability - despite these two metrics actually fluctuating. Lastly, another standard scenario

when corporations engage in earnings management is when departments in the firm are individually competing to meet the corporate benchmarks guiding the expected economic results for a given fiscal year. Specifically, according to (Chhabra, 2016, p. 40), no department wants to be the one to perform below the centrally set thresholds by the corporations. Consequently, they usually apply earnings management or manipulation techniques in order to ensure adherence to the corporate benchmarks for profitability and growth (Chhabra, 2016, p. 40).

The above provided statements indicate that earnings management is primarily used by corporations for four mains purposes i.e. window dressing, income smoothing, meeting internal targets as well as justifying external expectations (Guan et al., 2008, p. 26; Chhabra, 2016, p. 40; Beidleman, 1973, p. 657). Nevertheless, prior to proceeding to elaborating on the interaction between occupational fraud as well as earnings management, it is relevant for the author to briefly elaborate on the specific earnings management techniques corporations (or more specifically the management embedded within corporations) use to perform earnings management for the purpose of achieving their window dressing and

income smoothing objectives - as well as their objectives associated with justifying external expectations while meeting internal targets. According to Rahman et al. (2013, p.27, 28, 29), Strakova (2021, p. 4-7), as well as Omar et al. (2014, p. 90-911) the core techniques associated with earnings management are:

Cookie Jar Technique – via leveraging the cookie jar technique, corporations as part of their earnings management activities attempt to overestimate expenses during their current fiscal period to manage earnings. Consequently, if actual expenses result to be lower than the estimates, the difference can be placed in a "cookie jar" which can subsequently be utilized in the future if the corporation requires a boost in earnings to meet predictions.

Big Bath Technique – According to the Big Bath Technique, in case the management of the corporation has to report bad news associated with the financial performance i.e. a loss from substantial restructuring, it is best to report all associated losses at once within a single fiscal reporting period. Consequently, not only ensuring that financial statements issued in the near future are not impacted

by any of the associated negative effects, but also providing an infrastructure for income smoothing in future fiscal periods.

Big Bet on the Future - Big Bet on the Future is a technique associated with the occurrence when one corporation acquires the other. As per Generally Accepted Accounting Principles (GAAP), an acquisition is generally to be reported as a purchase, hence, providing an infrastructure for the management to perform two distinct forms of earnings management. The first form involves the management writing off continuing R&D costs against current earnings in the acquisition year, hence, enabling the type of income smoothing which protects future earnings from these associated charges. The second one on the other hand, is associated with the phenomenon under which when one entity acquires another, the parent company buys a guaranteed boost in current or future earnings – in spite of these earnings not being associated with the successful performance of the parent company itself. Consequently, enabling the corporation (i.e. the parent company) to in fact secure a more optimal infrastructure to meet future expectations of investors and / or

internal earnings thresholds set by the Group (for scenarios where the parent legal entity is embedded in a Group-based organizational structure).

Flushing the Investment Portfolio: This technique is associated with the fact that in certain scenarios corporations invest their excessive funds to purchase the shares of another company, primarily via two specific investment forms i.e. trading securities and available for sale securities. In this process the management of corporations have multiple opportunities to leverage accounting techniques to commit earnings management. The first technique is associated with the timing of sales of securities that have gained value – in this scenario the corporation can sell a portfolio security that has an unrealized gain and can report the gain as operating earnings - if the prior is deemed as required in order to meet the internal as well as external investors & other shareholders expectations regarding the earnings prospect of the firm. The second technique on the other hand, is associated with the timing of the sales of securities that have lost value – in this particular case if the management of the corporation intends to show lower earnings prospects for income smoothing purposes amongst others, they can sell the security that has an

unrealized loss and report the loss in operating earnings. The third technique is associated with the change of holding intent as well as the writing-down "impaired securities. The change of holding intent amongst other entails the process under which management can manage earnings through change of their holdings from "available to sale securities" to "trading securities" and vice versa. This could contribute towards moving any unrealized gain or loss on the security to or from the income statement – consequently, enabling income smoothing in any direction desired by the management of the corporation. The write-down of impaired securities on the other hand, is defined as a technique that can contribute towards the decline in the fair market value of securities. Specifically, securities that have a long-term decline in fair market value can be written down to the reduced value regardless of their portfolio classification.

Throw Out Problem Child: This technique is associated with a scenario under which a company disposes of assets via a sell process to a particular corporate subsidiary which performance is under the thresholds foreseen at a corporate level. Specifically, in such a scenario i.e. a scenario where the earnings of the corporation

overall are being dragged down by an underperforming subsidiary (while also expecting that the dragging down also continues in future reporting fiscal years) the "problem child" is thrown out via a disposition of its associated assets.

Sales / Leaseback and Asset Exchange Techniques: This technique involves the process when the timely disposition of long-term productive assets carried in the balance sheet at a historical cost, could potentially result in unrecognized gains or losses. The prior can be achieved via Sales and Leasebacks, where according to most financial standards, occurring losses are immediately recognized as losses in the books of the seller. On the other hand, gains are amortized into income over the lifecycle of the asset in the case of capital leases, while in the case of operational leases in proportion to the rental payments associated with the asset. Consequently, this provides multiple opportunities for income smoothing as well as adjusting reported profitability in line with internal financial reporting performance benchmarks as well as overall expectations of external investors. In addition to Sales and Leasebacks, another relevant earnings management method relevant to this scenario, is the outright sale. Under an outright sale, the corporation can sell

assets which have unrealized gains or losses in a fiscal year in which it would benefit the corporation most.

Operating vs Non-Operating Income Technique – As per standard financial reporting frameworks, income can be classified as both operating income (recurring income) or non-operating income (non-recurring). Given that both categorizations are permissible as per Generally Accepted Accounting Principles, managers within a given corporation can exclusively on the basis of their discretion classify a certain income item as either operating or non-operating – consequently, impacting performance forecasts in either direction (given that performance forecasts are primarily based on operating or recurring income).

Early Retirement of Debt: This technique is based on the management of the corporation performing earnings management via selecting the fiscal period of debt retirement. The selection of the fiscal period when the debt is retired (e.g. in the context of bonds the corporation can engage in early payment of cash which is different from the book value of long term debt) ensures boosted or diminished earnings which are aligned either with the income smoothing strategy of the

corporation or its ability to manage internal as well as external expectations in terms of performance.

Use of Derivatives: This technique enables corporations to leverage on the notion that derivatives are financial instruments which valuation primarily derives from the value of other assets embedded in their structure. Consequently, managers within a given corporation can leverage them for the purpose of managing earnings (for any of the above-mentioned core reasons as to why managers engage in earnings management) via hedging against future business risks such as exchange rate fluctuations, commodity price changes, foreign exchange rate changes etc. For example, in a scenario when a corporation is facing challenges associated with the large issuance of bonds outstanding at a fixed rate, the firm could enter into an interest rate swap that converts the fix rate components into a variable one. In such a scenario if the interest rate would increase, the corporation would increase the interest rate expense associated with the bond. Alternatively, if the interest rate would decrease, the corporation would decrease the interest rate expense associated with the bond. In both scenarios, earning management infrastructure would be

available, as the interest rate expense increase or decrease will largely depend on the timing when the corporation has entered in the interest swap agreement.

Shrinking the Ship : This technique involves the management of the corporation repurchasing its own shares for the purpose of impacting the earnings per share without impacting the financial statement of the firm overall – given that the repurchasing of shares does not record any gain or loss in financial statements as per Generally Accepted Accounting Principles. Consequently indicating that this technique would be popular amongst corporations associated with investors whose primary financial metrics of importance in terms of their decision making are associated with the earnings per share.

Depreciation, Amortization and Depletion (DAD) Technique: This technique involves the management of a given corporation impacting the economic results reflected in financial statements via selecting the write-off methods and periods as well as changing the estimation methods of salvage values or changing of the asset class or its associated use. The prior mentioned selection is often at the discretion of the management of corporations, hence providing an infrastructure to impact the

economic results in financial statements via manipulating the DAD component associated with the balance sheet.

Change Generally Accepted Accounting Principles: Generally Accepted Accounting Principles are often subject to changes as well as updates with new rules and regulations. When policymakers introduce new rules or updates to the current ones, they usually provide between one to three years for implementation – while allowing corporations in the meantime to go ahead with an earlier voluntary implementation in case they deem it appropriate. The prior denoted voluntary adoption could potentially provide an opportunity for engaging in earnings management. Specifically, in such a scenario the management embedded in the corporation can take advantage to introducing earnings management within financial statements. The prior is accomplished via adopting potentially new revenue and or expenses recognition rules that provide levy for earnings management.

1.6.2 Earnings Management interaction with Occupational Fraud

As indicated in the prior sections of this doctoral thesis, the core difference between occupational fraud and earnings management is that the latter is primarily conducted within the limits of Generally Accepted Accounting Principles – hence, in its nature is not classified as fraud. In other words, different to occupational fraud, earnings management does not incorporate within its framework a fraud component which often results in substantial economic losses for the victim organization (as highlighted in the prior sub-sections of the thesis elaborating on the consequences associated with occupational fraud). Reason of the denoted is that (as indicated in the prior sections) earnings management solely relies in the exploitation of Generally Accepted Accounting Principles in order to reflect in the financial statement of a particular firm an economic outlook which is aligned with the expectations of external investors, as well as internal corporate benchmarks for profitability.

Nevertheless, despite the denoted there are still multiple similarities between occupational fraud and earnings management. These similarities justify

the incorporation of earnings management as a component discussed in this doctoral thesis.

The first similarity between occupational fraud and earnings management is associated with the parties responsible for introducing these two phenomena within their respective organizations, as well as their motivation to do so. Particularly, both occupational fraud and earnings management are conducted by parties embedded in the internal setting of impacted corporations – in spite of the fact that in the case of earnings management internal staff engaged in the process is at a higher hierarchical level (when compared to the internal staff of engaged in occupational fraud which is not necessarily always at a management level within the victim corporation) (Singleton & Singleton, 2010, p. 42-43; Wells, 2001, p. 31-32; Healy & Wahlen, 1999, p. 33; Nugroho & Eko, 2012, p. 18). Additionally, in the prior sections of the thesis it has been in multiple occasions explicitly highlighted that occupational fraud is conducted for personal enrichment purposes (Singleton & Singleton, 2010, p. 42-43; Wells, 2001, p. 31-32; Healy & Wahlen, 1999). In addition to personal enrichment, as indicated in the above sub-sections of

the thesis, fraudsters have the tendency to engage in financial statement fraud (as one of the three categories of occupational fraud) with experiencing little, or no financial gain on personal terms. Instead, their motive in engaging in financial statement fraud is more of an extrinsic nature such as preserving their status as leaders in the entity in which they are employed as well as driving the bottom-line in a manner aligned with the interests of their key stakeholder groups.

Earnings management as well like occupational fraud contains elements of personal enrichment as well as preserving the "status of leaders" when it comes to the reasoning behind why staff embedded in the internal setting of the victim corporation would engage in committing earnings management activities. The reason for the prior stems from the fact that standard scenarios when management within corporations engages in earnings management are scenarios associated with periods of financial distress for the firm (Ghazali et al, 2015, p. 191). If a particular firm is in financial distress, it is very likely that managers would anticipate their bonuses being reduced or possibility their roles being replaced and suffer damage in their career (from a personal financial outlook and reputation perspective)

(Ghazali et al, 2015, p. 191). Consequently, in such circumstances managers would take the opportunity to conceal the deteriorating financial performance of the firm they work for, primarily via opting to select accounting methods that reflect in financial statements increased levels of income that could conceal the actual loss (Ghazali et al, 2015, p. 191). Therefore, to a certain extent indicating that they would engage in earnings management for the purpose of protecting or ensuring their personal enrichment prospects in terms of bonus and preservation of their income-yielding jobs. Additionally, earnings management is often done for the purpose of meeting the expectation of external investors as well as being aligned with internal financial performance thresholds. Consequently, it is very likely that in the context of earnings management as well, corporate staff at management levels sees earnings management as a "means to an end" to preserve their leadership status via continuing to gain the confidence of external investors as well as / or the employees in the internal department they engage with.

A second similarity between occupational fraud and earnings management stems from the fact that both these phenomena distort the value that corporations

create for two key stakeholder groups, i.e. external investors as well as the governments in their respective jurisdictions. Specifically, earnings management in spite of not triggering tangible economic losses for the firm, it still contributes towards creating an inaccurate or distorted reality of the economic outlook of a particular corporation (as indicated in the prior sub-section of the thesis exploring earnings management as a concept). Consequently, indicating that earnings management in spite not impacting the return of investors through tangible economic losses generated against the firm, it still could significantly distort their decision-making process while also triggering opportunity cost consequences within their portfolio. Additionally, in the prior sub-section of the thesis it has been indicated that alike occupational fraud, earnings management as well could contribute towards creating an artificial outlook within financial statements which reflect diminished profitability of the corporation – hence, contributing towards lowering the overall tax obligations of the corporation overall.

A third similarity between occupational fraud and earnings management stems from the fact that M-Score is used as a proxy for evaluating both earnings

management as well as occupational fraud risks within corporations (Anh & Linh, 2016, p.1; Talab et al., 2017, p. 287; Corsi et al., 2015, p. 65; Ahmed and Azim, 2015, p.265)

In this context of this doctoral thesis, it is relevant denoting the findings of Kurniawanl and Hermawan (2017, p.1) who examine the effect of earnings management on fraud, via a logistic regression method with a sample of listed companies in Indonesia Stock Exchange from 2009 to 2013. Their study shows that earnings management increases the probability of fraudulent action. These findings are further supported by the findings of Perlos and Lougee (2011, p. 38-39) who via sample of 54 fraud and 54 non-fraud firms from developed countries, examine how previous earnings management occurrence impacts the likelihood that a firm will commit financial statement fraud. Their findings demonstrate that fraud firms are more likely to have managed earnings in prior years (Perlos and Lougee, 2011, p. 38-39). In this context it is also relevant highlighting the study of Song et al., 2013, p. 542, which studies the relationship between earnings management (using discretionary accruals as proxy for earnings management) and asset

misappropriation across 173 sample firms that announced asset misappropriation in the period from 2006 to 2010 in Korea (processed via a logistic and linear regression model). The study finds that misappropriation of assets has a significant positive association with discretionary accruals i.e. earnings management. Hence, providing further empirical evidence of the statements made in the introductory section of this thesis that asset misappropriation is particularly related to occupational fraud. In this context it also relevant denoting that several additional researchers found a connection between discretionary accruals (proxy of earnings management) in year t1 and fraud overall (not only asset misappropriation) such as Jones et al., 2006. Further, Dechow et al. (1996, p. 21) also demonstrated a substantial direct relationship among total accruals in year t0 and the probability of manipulation in year t0, whereas Beneish (1999, p. 431) notes a direct association among total accruals in year t1 and fraud in year t0, while they investigate total accruals instead of discretionary accruals (although both discretionary and total accruals in the current state of art serve as proxies for earnings management empirical research purposes).

Taking the above into account, it can be derived that in spite of the fact that occupational fraud is inherently different that earnings management, there are still multiple similarities between these two phenomena both conceptually as well as through their interrelated presence within firms as per the above presented empirical studies. Consequently, although earnings management is not embedded in the research questions explored through this doctoral thesis it still is key that the research associated with it in the current state of art is also referenced as complementary in the literature review section.

2. RESEARCH QUESTIONS

2.1 Research Question Definition

The previous sections of this doctoral thesis have shown that occupational fraud as a whole is associated with consequences which from both a long-term as well as short-term perspective distort the competencies of corporations to generate value for the different groups of stakeholders embedded in their value chain. In addition, considering economic losses that are associated with the occurrence of occupational fraud in the workplace, the entities in developing countries have a tendency to be more vulnerable to the negative consequences associated with this type of fraud. Hence, companies in this group of countries have a greater need to introduce practices within their internal setting, which minimize the risk of occupational fraud.

However, the existing research provides a limited number of attempts to identify organizational practices which play a significant role in shaping the occupational fraud behavior, in particular within entities operating in developing countries primarily. Additionally, the literature on occupational fraud does not

provide any empirical evidence to what extent international accounting and auditing practices are applied in developing jurisdictions. Despite that, numerous theories indicate that international accounting could potentially impact the occupational fraud phenomenon in entities operating in developing jurisdictions.

Therefore, this doctoral thesis investigates the role that international standards in the area of financial reporting play in determining the occupational fraud phenomenon in business entities operating in developing countries. Consequently, the formal research questions that are adopted in this doctoral thesis state:

Research Question 1: Do International Financial Reporting Standards and International Standards of Audit play a statistically significant role in determining the occupational fraud phenomenon in entities operating in developing countries overall?

Research Question 2: If statistically significant, does the role of International Financial Reporting Standards and International Standards of Audit contribute towards increasing or decreasing the occupational fraud-related risks within entities operating in developing countries?

2.2 Research Question Relevance

The elaboration in the Fraud Tree section, explicitly demonstrates that asset misappropriation, as well as financial statement fraud (two out the three main schemes associated with occupational fraud) are executed primarily via manipulating financial reporting and auditing practices. The prior denoted fact contributes towards adopting a theoretical assumption that International Financial Reporting Standards (as the world's most widely implemented financial reporting practices) have the potential to play a role in shaping the understanding of the occupational fraud phenomenon. In addition, the theoretical assumption concerning the relevance of International Financial Reporting Standards and International Standards of Audit in the context of occupational fraud is further supported by theoretical studies which demonstrate that the adoption of this regulatory framework is associated with a range of economic and regulation-based incentives – which are in detail elaborated in the literature review section of the thesis below. These economic and regulation-based incentives, in turn, according to the Oxford Handbook of White Collar Crime (2015, p. 417-423 and p. 383-396)

shape the motivation, opportunity, rationalization, as well as the capability dimension embedded in the occupational fraud commitment process overall.

The above indicates that there are multiple theoretical indications that International Financial Reporting Standards and International Standards of Audit play a role in shaping the occupational fraud phenomenon. Nevertheless, none of these theoretical indications can be leveraged for the purpose of conclusively determining the extent to which International Financial Reporting could shape the occupational fraud dimension in countries classified as developing. The first reason for the prior, stems from the fact that none of the studies that elaborate on the economic and regulation-based incentives behind the adoption of International Financial Reporting Standards and International Standards on Auditing do provide any empirical evidence concerning the occupational fraud phenomenon overall (neither in the context of developed nor in the context of developing countries). The second reason on the other hand, stems from the fact that most of white collar-crime-based studies do not account for factors such as financial reporting and auditing frameworks in the fraud commitment process – in addition to the fact that

they are primarily based on investigating developed rather than developing countries.

These prior elaborated research gaps limit the endeavors of business practitioners and researchers aimed to determining the extent to which the financial reporting regulatory requirements that entities in developing countries need to comply with are capable to effectively tackling the occupational fraud risk. Moreover, the lack of empirical evidence concerning the statistical significance of International Financial Reporting in the context of occupational fraud, also provides limited infrastructure for governing regulatory bodies and business entities themselves to assess the economic benefits versus the economic expenses associated with adopting this framework within developing jurisdictions.

In this context it is relevant denoting that previous studies have suggested that the adoption of International Financial Reporting Standards can be associated with lengthy implementation timelines as well as relatively high pre-adoption and post-adoption costs (Fox et al., 2013, p. 86; Dargenidou et al., 2006, p. 409-410; Jermakowicz & Gornik-Tomaszewski, 2006, p.173-74). Therefore, the lack of

empirical evidence establishing the relevance of International Financial Reporting Standards in the context of occupational fraud, limits governing regulatory bodies and corporations to empirically assess the economic gains versus the economic expenses associated with the adoption of these standards. This can be particularly relevant for entities and regulatory bodies operating in developing countries for two reasons. The first reason stems from the fact that entities in developing jurisdictions suffer relatively higher economic losses because of the occurrence of occupational fraud in their settings (Association of Certified Fraud Examiners, 2016, p. 7). The second reason, on the other hand, stems from the fact that entities in developing countries have relatively lower bottom-line compared to their counterparts in developed countries. Thus, for entities in developing countries (as well as the governing regulatory bodies operating in these countries), it is relatively more important to engage in an informed decision-making process when it comes to evaluating the implementation advantages and disadvantages of regulatory frameworks of the nature of International Financial Reporting Standards and

International Standards of Audit that are relatively costly and time consuming by nature.

Lastly, the lack of transparency concerning the statistical significance of International Financial Reporting Standards and International Standards of Audit in the context of occupational fraud also contributes towards the current literature having a limited power in explaining the statistical differences between developing and developed countries that are reflected in the reports of the Association of Certified Fraud Examiners (issued between the 2010-2016 period).

Specifically, according to the results generated by the Association of Certified Fraud Examiners during the 2010-2016 period, business entities operating in developing countries have started experiencing lower frequency rates of occupational fraud compared to entities operating in countries classified as developed (Associated Certified Fraud Examiners, 2016, p. 6; Associated Certified Fraud Examiners, 2014, p. 7; Associated Certified Fraud Examiners, 2012, p. 24). Specifically, in the fiscal year 2016, the Association of Certified Fraud Examiners (2016) emphasize that 57.7% of the total occupational fraud cases have occurred

in regions which are primarily composed of countries classified as developed (Associated Certified Fraud Examiners, 2016, p. 6; Associated Certified Fraud Examiners, 2014, p. 7; Associated Certified Fraud Examiners, 2012, p. 24). On the other hand, only 42.3% of the occupational fraud recorded cases in the year 2016 occurred in jurisdictions classified as developing (Associated Certified Fraud Examiners, 2016, p. 6; Associated Certified Fraud Examiners, 2014, p. 7; Associated Certified Fraud Examiners, 2012, p. 24). These elaborated statistical observations are consistent with the ones published by the Association of Certified Fraud Examiners in the fiscal year 2020 (p.7) where 53% of the occupational fraud reported cases happened in jurisdictions classified as developed, while 47% in jurisdictions classified as developing.

In this context it is relevant to denote two further facts. The first fact is that the statistical observations for the fiscal year 2016 and 2020 display identical results to the statistical observations published by the Association of Certified Fraud Examiners for the years 2010 – 2015, as well as, 2017-2019. Secondly, the statistical reports, provided by the Association of Certified Fraud Examiners for

the 2010-2020 period, demonstrate that the overall lowest occupational fraud frequency rates have been observed in those developing regions where the adoption of International Financial Reporting Standards (Official Website of International Financial Reporting Standards, 2019[3], International Federation of Accountants, p. 21-28; Association of Certified Fraud Examiners, p. 7). Table 1 presents the occupational fraud frequency rates observed in the fiscal year 2016. This table demonstrates that the overall lowest occupational fraud frequency rates at a global scale are observed in Eastern Europe, Central Asia, Western Asia, Middle East, and North Africa (Association of Certified Fraud Examiners, 2016, p. 6; Association of Certified Fraud Examiners, 2014, p. 7; Association of Certified Fraud Examiners, 2012, p. 24; Official Website of International Financial Reporting Standards, 2019[4], International Federation of Accountants, p. 21-28). These regions according to the International Financial Reporting Standards Official Statistics (2019) and International Federation of Accountants (2019, p. 21-28) have

[3] https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/
[4] https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/

amongst the highest number of developing countries that are adopters of International Financial Reporting Standards and International Standards on Auditing. It is relevant denoting that the above presented statistical observations are consistent with the ones published by the Association of Certified Fraud Examiners for the fiscal year 2020.

In other words, according to the Report to the Nations published by the Association of Certified Fraud Examiners for 2020 (p. 7) the lowest frequency rates of occupational fraud are observed amongst regions composed of Middle East and North Africa, Southern Asia, Latin America and Caribbean, Eastern Europe as well as Western and Central Asia. Consequently, regions also composed by developing countries which have implemented International Financial Reporting Standards (Association of Certified Fraud Examiners, 2020, p. 7; Website of International Financial Reporting Standards, 2019[5], International Federation of Accountants, p. 21-28).

[5] https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/

An illustration of the above presented statistics is available in the tables below – see for further details.

REGION	NUMBER OF CASES	PERCENT OF CASES	MEDIAN LOSS
United States of America & Canada	1124	52,5%	USD 120'000
Sub-Saharan Africa	285	13.4%	USD 143'000
Asia-Pacific	221	10.4%	USD 245'000
Latin America & Caribbean	112	5.3%	USD 174'000
Western Europe	110	5.2%	USD 263'000
Eastern Europe & Central/Western Asia	98	4.6%	USD 200'000
Southern Asia	98	4.6%	USD 100'000
Middle East & North Africa	79	3.7%	USD 275'000

Table 1: Occupational Fraud Frequency Rates and Median Economic Loss across the Globe for the Fiscal Year (Association of Certified Fraud Examiners (2016, p.7)

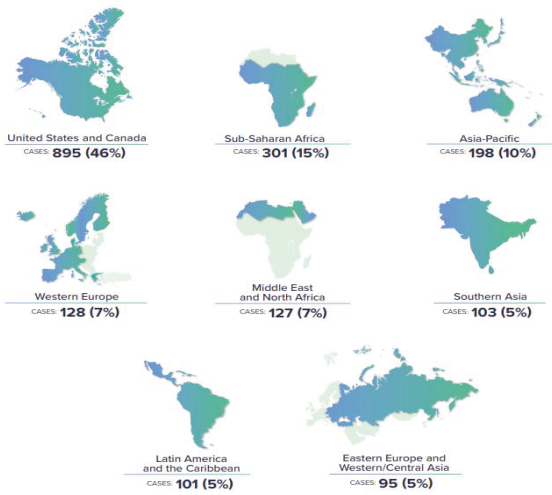


Figure 2. Occupational Fraud Frequency Rates and Median Economic Loss across the Globe for the Fiscal Year (Association of Certified Fraud Examiners (2016, p.7)

The above presented observations are considered as relatively counterintuitive in the context of the theoretical assumptions relevant to the field of criminology and law science. The reason for the denoted stems from the fact that, according to Weingast (2008, p. 1-3) as well as Oxford Handbook of White Collar Crime (2015, p.664, 353-354), institutions in developing countries are theoretically considered less legitimate than their developed counterparts. As a result, developing countries are expected to have higher occupational fraud frequency rates compared to developed countries. Nevertheless, the fact that the lowest occupational fraud frequency rates at a global scale are observed in developing countries that have adopted International Financial Reporting Standards and International Standards of Audit triggers the assumption that these two regulations could be the explanatory factor behind the lower occupational fraud frequency phenomenon in this group of countries. However, due to the lack of empirical evidence related to role of International Financial Reporting Standards and International Standards of Audit in occupational fraud in entities operating in developing countries, this assumption cannot be verified. Therefore, it cannot be utilized for the purpose of generating

conclusive statements concerning what is driving the lower than theoretically expected frequency rates of occupational fraud in entities operating in developing countries (in particular those that are adopters of International Financial Reporting Standards and International Standards on Auditing).

2.3 Challenges-related to investigating occupational fraud-related research questions in the current state of art

For completeness purposes, it is also important to highlight some of the main challenges which contribute towards the limited empirical research of the occupational fraud phenomenon in developing countries. Specifically, the empirical research process of the occupational fraud phenomenon in developing countries is associated with a wide range of data quality and data completeness-related challenges. In other words, according to Button et al. (2009, p. 8), Isenring (2016, p. 373) and Bonny et al. (2015, p. 448-449) white collar crimes amongst which occupational fraud often go unreported, especially in developing countries. Therefore, relying on annual data for cases of the occupational fraud conviction rate in developing countries may lead towards biased results in the context of better understanding the relationship between occupational fraud and International Financial Reporting Standards. On the other hand, the use of alternative data sources (i.e. data sources which compensate for the shortcomings of data deriving from the number of occupational fraud cases recorded in the judicial system of developing countries) is rather costly and time-consuming. Specifically, an

alternative source of reliable data are fraud proxies which can be calculated via relying solely on publicly reliable financial information. Nevertheless, the process of obtaining financial information of this nature from entities that operate in developing countries is rather time-consuming, as well as costly. The first reason behind it stems from the fact that developing countries are highly heterogeneous in the context of the official languages. The second reason is based on the fact that entities operating in these countries often display a tendency to publish their financial statements in their local languages. The third reason on the other hand stems from the fact that the extent of the data quality and data completeness challenges differ from one developing country to another. Consequently, indicating that the country selection process from a data sampling perspective is rather time consuming and intricate.

Nevertheless, in order to overcome obstacles to research the questions in this doctoral thesis, the author implements a set of M-Score data purchased by GuruFocus and FinBox. Specifically, the author attempts to empirically establish the relationship, between occupational fraud International Financial Reporting

Standards and International Standards of Audit in developing countries by comparing the M-Score of entities operating in developing countries that are International Financial Reporting Standards and International Standards of Auditing adopters against the M-Score of entities in developed countries that are adopters of the same standards. Furthermore, the author also introduces an additional research method by comparing the M-Score of entities in developing countries that adopt of International Financial Reporting for the period before and after they had adopted this financial reporting framework – consequently, being able to compare the M-Score changes after the implementation of International Financial Reporting Standards and International Standards of Audit in developing jurisdictions.

In this context, it is relevant denoting that the prior elaborated research method, was selected for three main reasons.

The first reason stems from the decision of the author to select the M-Score as a proxy for occupational fraud. Specifically, M-Score is a statistical model, which has been empirically proven to accurately assess the fraud risks embedded in

corporations (via using a range of financial ratios). The empirical accuracy of the M-Score has been verified by studies which have successfully used this score as an approach to assess the fraud risk embedded in the financial statements of Enron as well as other corporations which have throughout their corporate history actively engaged in fraudulent acts (Mavengere, 2015, p. 4-7; Herawati, 2015, p. 926-928; Omar et al., 2014, p. 184-186; Kamal et al., 2016, p. 26-31; Ofori, 2016, p. 62-64; Mahama, 2015; p. 9-14). In addition to the denoted, besides high chances of empirical accuracy, the author's decision to rely on the M-Score rather than other alternative proxies such as the Altman Z-Score stems from the fact that these proxies are primarily designed to detect the bankruptcy risk in organizations. In contrast, the M-Score is specifically intended to assess fraud risks and earning management risks via the analysis of financial ratios (Altman, 2000; Grice and Ingram, 2001). Furthermore, other proxies incorporate a relatively more narrow scope of financial ratios within their calculation when compared to the M-score.

The second reason guiding the decision to the author to select the aforementioned research setting, stems from the intention to utilize GuruFocus and

FinBox as the source from where all the relevant M-Score data were purchased. In particular, GuruFocus and FinBox are specialized value-investing engine with an Triple A and ISO 27001 Certification. This allows users to automatically purchase reliable M-Score data for a wide range of entities operating both in developing and developed entities. Therefore, this research setting provides the author with an infrastructure to empirically investigate the main research questions, in a manner which is optimal from both a time efficiency as well as accuracy perspective.

The third reason guiding the decision to adopt this research approach, stems from the fact that it minimizes in the most optimal fashion the data quality challenges associated with investigating fraud in developing countries. International Financial Reporting Standards and International Standards on Auditing, due to their strong emphasis on the concept of harmonization, ensure that entities complying with these standards, publish financial statements which are relatively complete and comparable from an accounting aspect. Additionally, focusing on jurisdictions which are late adopters and have high concentrations of Foreign Direct Investment (another driver fostering harmonization), enables the

author benefit from the evolution of the quality of service provided by engines like FinBox and GuruFocus in context of developing countries.

Therefore, minimizing the overall data quality and completeness challenges encountered primarily in developing countries which do not comply with International Financial Reporting Standards and International Standards of Audit have relatively lower relevance for capital markets overall.

In this context, it is also relevant denoting that the quantitative method selected by the author for processing the above-elaborated M-Score data is the multilayer perceptron neural network and basic feedforward neural network. The prior elaborated functionality is relevant as the selected methods the distinguishing of data that is not linearly separable. As elaborated in the previous paragraphs, previous research does not provide empirical evidence concerning the relationship between occupational fraud and International Financial Reporting Standards and International Standards of Audit in the context of developing countries. Consequently, there is no infrastructure in the current state of art to evaluate the extent to which the relationship between International Financial Reporting

Standards, International Standards of Audit and occupational fraud in developing countries has linear or non-linear nature. Therefore, utilizing quantitative models suited for tackling both linear and non-linear dependencies between variables enhances the probability that a statistically accurate output will be generated in the context of determining the statistical significance of International Financial Reporting Standards and International Standards of Audit in shaping the occupational fraud phenomenon in entities operating in developing countries.

Nevertheless, while in the context of this thesis it is relevant denoting that the current state of art, in spite of not providing an infrastructure for generating conclusive statements concerning the research questions in this thesis, it still incorporates studies that are relevant to be considered in the process of investigating the relationship between International Financial Reporting Standards, International Standards on Auditing and occupational fraud overall. Taking this into account, the subsequent section embedded in this thesis, provides an overview of the studies embedded in the current state of art which elaborate on the economic and regulation-based incentives guiding the adoption of International Financial

Reporting Standards and International Standards on Auditing in developing countries. In addition, literature review section also elaborates on studies associating the prior elaborated economic and regulation-based incentives with the motivation, opportunity, rationalization, and capability dimension of the fraud commitment process overall. Further, as also indicated in the prior section of the thesis, the literature review also includes a third component which in particular elaborates on the empirical evidence embedded in the current state of art that explore on the relationship between International Financial Reporting Standards as well as earnings management – while earnings management being a phenomenon related through multiple aspects with occupational fraud.

3. LITERATURE REVIEW ON OCCUPATIONAL FRAUD IN DEVELOPING COUNTRIES

3.1 Economic-based incentives guiding the adoption of International Financial Reporting Standards and International Standards on Auditing in entities operating in developing countries

3.1.1 Overview

The previous research has two streams in understanding the relationship between the implementation of auditing and financial reporting and occupational fraud. The first research stream revolves around elaborating on the economic incentives behind the adoption of International Financial Reporting Standards and International Standards on Auditing in entities operating in developing countries. On the other hand, the second research stream focuses on the regulation-based incentives.

Nevertheless, in the context of the studies elaborating on the economic-based incentives, it is relevant denoting that they are based on the theoretical framework of the capital needs theory, economic theory of networks as well as the signaling theory.

According to the research of Samaha and Khlif (2016, p. 38) and Shehata (2014, p. 20), which represent a synthesis of all disclosure-applicable academic theories and research primarily relevant to developing countries, capital need theory suggests that it is within the core strategic interest of corporations to raise capital at the lowest cost level possible. Consequently, indicating that enhanced levels of compliance with mandatory disclosure requirements as well as increased amount of voluntary compliance elevates the ease (hence, reducing the cost) of raising new capital. The prior elaborated highlights of the capital needs theory were originally developed by Choi (1973, p. 195). Specifically, Choi, (1973, p. 195,167-168) on the basis of an empirical analysis conducted on a population of 239 private industrial companies which tapped the Euro-currency bond market for financing prior July 1971, determined that corporations are motivated to update their overall financial disclosure in order to obtain scarce financial capital as cheaply as possible. The capital need theory-based elaborated statements which are further supported by Ashbaugh and Pincus (2001, p. 418-433), who completed the empirical analysis conducted on 80 non-US companies primarily operating in

developing countries, also argue that the adoption of International Accounting Standards can be highly regarded as a concentrated effort of managers to satisfy the increased demand for information that is standard in scenarios where corporations seek to issue additional equity in capital markets.

Capital need theory-based studies, due to providing evidence on the positive impact of augmented and standardized disclosure in the process of raising money in capital markets in cost efficient manners, indicate that frameworks of International Financial Reporting Standards and International Standards on Auditing, potentially enhance the bottom-line of business corporations. This is relevant in particular to corporations operating in developing countries. The reason for which being is that according to the statistical results provided by the World Bank (2016, https://data.worldbank.org), the economic growth and development in these countries is relatively lower when compared to developed countries. Therefore, the strategic importance of raising capital in a manner which optimizes the corporate bottom-line, (primarily as a result of corporations being able to better meet the information expectations and requirements of external investors), is

relatively higher for entities operating in developing countries. In this context, it is also relevant to add that, according to some studies, International Financial Reporting Standards (hence, and by that extent International Standards on Auditing) are positively associated with profitability levels of entities operating in developing as well as non-Western developed countries. Specifically, Al Mutawaa and Hewiady (2010, p. 46-48) examined a sample of 121 Kuwait-based companies during 2007 comparing the association between corporate size, profitability, leverage and auditor type (i.e. Big Four vs. Others), and compliance with International Financial Reporting Standards. The results of their study demonstrated that corporate size, profitability and auditor type are significantly associated with IFRS compliance. Al-Akra et al. (2010, p. 176-185) in an empirical study investigating 80 non-financial listed Jordanian companies during 2004, also demonstrates that corporate size, leverage ratio, auditor size (i.e. Big Four vs. others), and profitability exert a significant positive effect on compliance with International Financial Reporting Standards. Lastly, Bova and Pereira (2012, p. 90-106) through examining 30 listed companies in Kenya demonstrated that higher

compliance with International Financial Reporting Standards is associated positively with the corporate leverage ratio, corporate size, and profitability ratio.

Overall, studies which follow capital needs theory find that the adoption of International Financial Reporting Standards and International Standards on Auditing is associated with enhanced bottom-lines on behalf of corporations operating in developing countries and are consistent with the findings embedded in studies based of the signaling theory, as well as the economic theory of networks.

Specifically, via a sample of 102 non-European Union emerging countries, and leveraging on the prospective of the economic theory of networks, Ramanna and Sletten (2009, p. 33-34) conclude that developing countries are more likely to adopt International Financial Reporting Standards, if their trade partners or countries within their geographical region are also adopters of the same disclosure frameworks. The prior stems from the fact that if a specific country is cultivating an economic relationship with other countries who are already adopters of International Financial Reporting Standards and International Standards of

Auditing, then this particular country will display a higher tendency to adopt these same standards (Ramanna & Sletten, 2009; p. 33-34, Samaha & Khilf, 2016, p.35). The reason for which being, that adopting regulatory standards is identical to the ones adopted by ones economic partners contributes towards reducing the bias faced by foreign investors and can facilitate cross-border operations (Ramanna & Sletten, 2009, p. 17-18; Samaha & Khilf, 2016, p. 35). These facilitated cross-border operations as well as reduced investor biases consequently are associated with relatively more optimized bottom-lines – in particular for corporations operating in jurisdictions classified as developing overall.

Furthermore, as signaling theory-based studies suggest that reduced information asymmetry is associated with the adoption of International Financial Reporting Standards (as well as their external auditing counterpart framework International Standards on Auditing) (Samaha and Khlif, p. 2016, 37). Specifically, the signaling theory developed by Spence (1973, p. 361-373) suggests that market asymmetry can be reduced via parties holding more of information signal that information to other parties. Consequently, leveraging on this theory as well as

examining a sample of 281 listed companies in Egypt, Samaha and Stapleton (2009), Spence demonstrated that internationality and international audit firms' share trading as well as size are associated with higher level of compliance with standards of International Financial Reporting Standards and International Standards on Auditing. Therefore, factors such as internationality as well as international auditing firms (i.e. parties and factors which can trigger the provision of globally standardized information in capital markets) can reduce market information asymmetry and provide foreign investors with higher levels of transparency as well as knowledge infrastructure that contributes towards optimizing investment and risk management decision-making processes.

Taking into account the information presented above, a conclusion can be generated that the very vast majority of studies embedded in the current state of art concur that the adoption of International Financial Reporting Standards as well as International Standards on Auditing trigger relevant economic benefits (i.e. bottom-line enhancing benefits) for corporations operating in developing countries overall. Findings embedded in the current state of art provide a wide range of

evidence, that the prior elaborated economic incentives associated with the implementation of International Financial Reporting Standards as well as International Standards on Auditing could theoretically contribute towards reducing occupational fraud tendencies within institutions operating in developing countries. Specifically, the study of Bucy et al. (2008, p. 414-416), which is based on 45 lengthy interviews with 45 experts in the area of white-collar crime operating in developed countries, suggests that offenders engaging in white-collar crime, besides personal gain, are also motivated to engaging in occupational fraud in order to enhance corporate success as well as mitigate the risk of failing. The study of Bucy et al. (2008) is further complemented by the studies of Dellaportas (2013, p. 33-36), which was conducted on the basis of an interview with a smalls group of male accountants who were serving a custodial sentence for committing fraud and related offence. Dellaportas finds that personal financial gain is relatively more relevant than corporate financial gain, when it comes to determining motivation when engaging in types of occupational fraud. Lastly, both these studies were further complemented by the study of Hollow (2014, p.174) who on a sample of

64 cases of fraud from the UK financial sector, determined that financial pressures play a significant role in motivating individuals in committing fraudulent acts in the workplace. However, according to Hollow (2014, p.174), the nature of financial pressures appears to differ significantly depending on what role the offender has within the bank. Thus, for cashiers and those in lower positions, personal pressures generally act as the motive, whereas for more senior management offenders, personal financial considerations tend to come second to those of the organization as a whole (Hollow, 2014, p.174). Hence, further indicating that the economic incentives are associated with the implementation of International Financial Reporting Standards and International Standards on Auditing, they could significantly reduce occupational fraud rates within institutions overall.

Nevertheless, most of studies elaborated in this sub-section cannot be leveraged for the purpose of generating empirically supported conclusions regarding the phenomenon of occupational fraud in developing countries as a result of neglecting the potential association of economic incentives and the implementation of International Financial Reporting Standards and International

Standards Auditing. This relationship can shape the occupational fraud phenomenon in developing countries.

The first reason stems from the fact that the studies elaborating on the economic incentives associated with the adoption of International Financial Reporting and International Standards on Auditing in developing countries, do not discuss occupational fraud in great detail. Furthermore, they provide neither theoretical nor empirical indications on how these economic incentives are associated with occupational fraud. Thus, indicating that the economic based-incentive studies (i.e. studies based in the capital needs theory, economic theory of networks as well as signaling theory) cannot be leveraged on their own (i.e. independently) for the purpose of generating conclusive statements concerning the main research questions embedded in this thesis.

The second reason refers to previous criminology-based studies which elaborate on how the economic incentives triggered by the adoption of International Financial Reporting Standards and International Standards on Auditing, and thus,

could impact the fraud commitment process. This group of studies cannot be leveraged for the purpose of generating conclusions relevant to the main research questions of this thesis as well. The main reason behind it is that these studies neither are primarily based on empirical evidence gathered by developing countries (as their primary research focus revolves around developing regions) nor incorporate the concept of financial reporting and auditing practices as part of their primary and secondary research focus.

3.1.2 Conclusive Statement

The previous section of this dissertation shows that the current literature provides a wide range of studies which highlight that the adoption of International Financial Reporting Standards and International Standards on Auditing is associated with economic incentives which in turn could optimize the bottom-line of entities operating in developing countries. Nevertheless, these studies could not be leveraged for the purpose of drawing empirically supported conclusive statements concerning the relationship of International Financial Reporting Standards and International Standards on Auditing and occupational fraud in the

context of entities operating in developing countries. The primary reason for the denoted stems from the fact these economic incentive based studies do not account for the concept of occupational fraud neither in the primary nor secondary focus of their research. On the other hand, the criminology-based studies embedded in the current state of art, which provide an indication on how economic incentives translate to one's motivation to engage in occupational fraud, are contrasting in their conclusions as well as are not based on empirical evidence gathered from developing countries. Furthermore, these criminology-based studies do not account for the role of financial reporting and auditing in the context of the motivation dimension of the fraud commitment process. Consequently, this indicates that the previous studies on the economic-based incentives associated with the adoption of International Financial Reporting Standards and International Standards on Auditing, cannot be leveraged to drive empirically-supported conclusive statements regarding how the adoption of International Financial Reporting Standards and International Standards on Auditing impact the occupational fraud phenomenon within entities operating in developing countries.

3.2 Regulation-based incentives guiding the adoption of International Financial Reporting Standards and International Standards on Auditing in entities operating in developing countries

3.2.1 Overview

The studies that focus on regulation-based incentives for adopting of International Financial Reporting Standards and International Standards on Auditing are primarily based on the theory of isomorphism established in the qualitative research paper of DiMaggio and Powell (1983, p. 149).

Specifically, in the context of isomorphism it is relevant denoting that according to DiMaggio and Powell (1983, p. 149, p.150-154) there are three particular types of isomorphism, which guide the adoption of frameworks of the nature of International Financial Reporting Standards in entities operating in developing countries. These types of isomorphism are coercive, mimetic, and normative one (1983, p. 149, p.150-154).

Coercive isomorphism is defined as the presence or absence of institutions that can force economic actors to align their financial reports with standards of the nature of International Financial Reporting Standards and International Standards

on Auditing (DiMaggio & Powell, 1991, p.150). Mimetic isomorphism on the other hand, refers to the concept of specific jurisdictions deciding to from a regulatory compliance aspect; imitate countries that are considered as more legitimate from a theoretical perspective (DiMaggio & Powell, 1991, p.151). Lastly, normative isomorphism refers to the level of attainment of education within one country when it comes to the adoption to regulatory frameworks of the nature of International Financial Reporting Standards and International Standards on Auditing ((DiMaggio & Powell, 1991, p.152).

In the context of coercive isomorphism, it is relevant denoting, that the study of Judge et al. (2010, p. 161-164) elaborates that the institutions of the nature of International Monetary Fund are often engaged in the process of providing developing countries with different types of foreign aid – primarily for the purpose of boosting their economic growth and development. Consequently, Judge et al. (2010, p.161-164) suggests that institutions of a profile similar to the one of the International Monetary Fund have the authority to impose on developing countries the requirement to adopt frameworks alike International Financial Reporting

Standards and International Standards on Auditing – i.e. frameworks which due to their harmonization focus foster optimal cross-border comparability of financial reports. Developing countries on the other hand, due to considering the foreign direct investment provided by the International Monetary Fund as a key dependency towards their economic growth will be likely to comply. The empirical study of Judge et al. (2010) is based across a wide range of developing and developed countries, where the dependent variable is International Financial Reporting Standards Adoption, while independent variables being coercive isomorphism (with Foreign Aid as a proxy), mimetic isomorphism (with Import Penetration as a proxy) and normative isomorphism (with Educational Level as a Proxy). In context of the prior denoted it is relevant referencing the paper of Agnew et al. (2009, p. 35) which applies general strain theory to the explanation of white-collar crime, including the : a) context of occupational crimes committed by higher class individuals; b) economic offenses such as fraud and embezzlement, which are committed by lower as well as higher class individuals; and c) corporate crimes. Their findings stipulate that there are several strains or stressors relevant to the

explanation of such crimes, including the blockage of economic goals, the experience of a range of other economic problems, the inability of achieve status goals, and a variety of work-related stressors. Consequently, indicating that a set up triggering economic growth (which theoretically provides relatively better infrastructure of eliminating personal economic strains) would contribute towards reducing the motivation within developing countries to engage in occupational fraud.

Nevertheless, in spite of the above denoted stipulation of coercive isomorphism interpreted in light of the strain theory for while collar crime, one still cannot generate conclusive statements relevant to the main subjects of analysis of this thesis through leveraging on the elaborated studies. There are two reasons for the denoted.

The first reason stems from the fact, that the prior elaborated coercive isomorphism-based studies do not provide an indication on occupational fraud-related implications neither from a theoretical nor from an empirical perspective.

The second reason on the other hand, stems from the fact that the existing literature does not have a harmonized view on how the provision of foreign aid overall, shapes the economic growth and development in developing countries. Specifically, from one side the studies of Judge et al. (2010) indicate that foreign aid contributes towards steering the economic growth in developing countries. On the other side, however, the studies of Malik (2008, p.251) as well as Sothan (2018, p. 168) state that economic growth in developing countries is negatively impacted by foreign aid.

Nevertheless, as highlighted above, besides, coercive isomorphism, the existing literature also incorporates additional evidence concerning the concept of mimetic isomorphism associated with the adoption of International Financial Reporting Standards. One of these studies, is the qualitative (interview-based and document analysis-based) study of Hassan (2008, p.468) which explores the process of setting accounting standards in a developing country in transition such as Egypt. The prior is achieved via exploring the social, political as well as economic forces that underlie the development of financial accounting regulations implemented

throughout two longitudinal periods: starting with the beginning of socialism and extending to liberalism (or the period signifying the adoption of the market economy in Egypt in order to establish a model aligned with developed Western countries).

Specifically, Hassan (2008, p. 468-471, 479-484) states that professional accounting and auditing organizations, have the potential to exert pressure in developing countries for them to adopt International Accounting Standards of the nature of International Financial Reporting Standards. The prior elaborated pressure, according to Hassan (2008, p. 468-471, 479-484), is undertaken by accounting and auditing organizations for the purpose of ensuring that developing countries emulate developed ones (i.e. which from a theoretical perspective are perceived as more legitimate) in terms of practices related to financial reporting and external auditing overall – i.e. developed countries whose market economy model Egypt aimed to emulating in its liberalism period.

Specifically, International Financial Reporting Standards have for numerous decades been a standard regulatory practice in developed regions such as the

European Union. These regions from a theoretical perspective are considered to be more legitimate relative to their developing counterparts – especially in context of the adoption of the market economy and the overall privatization prospects. Consequently, according to Hassan (2008, p. 468-471, 479-484), auditing and accounting organizations for the purpose of fostering practices which from a regulatory perspective are associated with relatively higher levels of jurisdictional legitimacy (and represent the cornerstone model of the market economy which developing countries like Egypt attempt to emulate), display the tendency to potentially impose the adoption of International Financial Reporting Standards in entities operating in developing countries overall. Consequently, summing up the findings of Hassan (2008, p. 468) that the core changes enabling the formulation of Egyptian Accounting Standards which are identical to International Accounting Standards, were driven by the major changes in the state's political philosophy and the regulators' motivations to foster amongst Egyptian entities accounting practices that are capable of overcoming pre-existing socialist accounting practices and emulating the set up of developed countries serving as benchmarks for legitimate

adoption of market economy. The findings of Hassan (2008) are aligned with the findings of Judge et al (2010, p. 164) implying in their hypothesis that the more integrated the national economy is within the global marketplace, the more complete the adoption of International Financial Reporting Standards due to mimetic isomorphism – or in other words, due to the encouragement of developing countries to emulate the regulatory infrastructure of their developed counterparts. These findings are aligned with the findings of (El-Gazzar et al., 1999, p. 239) indicating that successful multinationals originating from foreign locations have a higher likelihood to adopting standards of the nature of International Financial Reporting Standards – while on the same time fostering domestic competitors to imitate these successful multinational firms.

Nevertheless, alike the studies in the field of coercive isomorphism, these studies as well, can be minimally leveraged for the purpose of generating conclusive statements concerning the main research questions of this thesis. The primary reason stems from the fact that none of the studies embedded in the prior elaborated paragraphs accounting for the concept of occupational fraud – both

referring to the empirical and quality studies referenced above. Additionally, the above studies infer that developed countries are in general characterized with a more optimal legislative infrastructure when compared to developing countries. Additionally, the interview-based study of Alleyne & Amaria (2013, p. 34), demonstrates that although not as strong as corporate culture, still auditor education and legislation play a relevant role in enabling the identification of corporate fraud risks within corporations. From the above presented studies it can be deducted that the more optimal legislation in developing countries leads towards reducing the opportunity and rationalization dimension of the fraud commitment process. Hence, only relying on the above, deriving the theoretical assumption that occupational fraud frequencies are higher in developing versus developed countries.

Nevertheless, these theoretical expectations, have a limitation as they do not account for factors related to the internal setting of corporations where occupational fraud generally occurs – i.e. factors amongst which financial reporting as well as auditing-related are practices (in spite of the fact that in some of these the concept

of audit capabilities and corporate culture are explored). Furthermore, these theoretical expectations, are not supported by the statistical observations concerning occupational fraud frequency rates across the globe that are published by the Association of the Certified Fraud Examiners in the 2011-2016 period. Specifically, the statistical reports generated by the Association of Certified Fraud Examiners throughout the 2010-2016 period, demonstrate that developed countries have on average the highest frequency rates of occupational fraud at a global scale. In addition, the statistical observations published by the Association of Certified Fraud Examiners also demonstrate that developing countries that have adopted of International Financial Reporting Standards and International Standards on Auditing have the lowest occupational fraud frequency rates, when compared to both developed countries as well as other developing countries that are not International Financial Reporting Standards adopters. These statistical observations consequently trigger the establishment of an assumption that International Financial Reporting Standards could be the factor explaining the lower occupational fraud rates in developing countries complying with them.

Nevertheless, these statistical findings and the accompanying assumptions related to International Financial Reporting Standards cannot not be utilized for the purpose of generating conclusive statements in this doctoral thesis - with regards to the research questions representing main subjects of analysis. The main reason is the fact that as elaborated previously, the existing research does not incorporate any all-encompassing empirical evidence assessing the statistical significance of International Financial Reporting Standards in the context of occupational fraud, neither in developing nor developed countries overall. Consequently, providing no infrastructure for empirically evaluating whether the occupational fraud frequency rates observed across the globe in the past decades, are actually influenced at a statistically significant level by the overall adoption of International Financial Reporting Standards.

Nevertheless, as indicated in the prior paragraphs, besides coercive and mimetic isomorphism, the current state of art incorporates additional evidence concerning normative isomorphism. Specifically, according to Jung et al. (2010, p.164) as well as DiMaggio and Powel (1991, p.152) normative isomorphism

cultivates the concept that the level of education in developing countries does affect the tendency of these jurisdictions to engage in the adoption frameworks of the nature of International Financial Reporting Standards. Specifically, according to Jung et al. (2010, p.164) as well as DiMaggio and Powel (1991, p.152), the more educated a nation is, the higher its probability to adopt frameworks of the nature of International Financial Reporting Standards. The prior is consistent with the studies of Dow and Karunaratna (2006, p. 578) which demonstrated that higher level of education within a nation contributes to relatively higher trade flows in the domestic economy – i.e. higher trade flows primarily experienced as a result of the adoption of international norms and standards. Last in this context it is also relevant to re-highlight the study of Hassan (2008, p.480-484) in his study also highlights that rising educational levels in general (including the influence from the international accounting professions) in particular stimulated Egypt to move towards international accounting standards of the nature of International Financial Reporting Standards.

In this context it is relevant denoting that Benson and Simpson (2009) in their book While Collar Crime – an Opportunity Perspective, in chapters two, three, four and five, in several occasions indicate that higher education rates contribute towards enhancing white-collar crime frequency rates (i.e. crimes amongst which occupational fraud). The prior stems from the fact that increased education levels enable offenders to optimize their skillset as well as their overall professional learning curve, when it comes to conducting crimes of the nature of occupational fraud. According to the statistical reports provided by the World Bank (2021, Education | Data (worldbank.org)), education levels are relatively lower in developing countries when compared to their developed counterparts. Consequently, the average lower levels of education contribute towards increasing the occupational fraud-related risks in entities operating in developing countries. Furthermore, it also triggers the assumption that the principle-based rather than rule-based nature of International Financial Reporting Standards would theoretically contribute towards decreasing rather than increasing the occupational fraud risks in entities operating in developing countries. Specifically, International

Financial Reporting Standards due to their principle rather than rule-based nature, provide relatively higher levels of flexibility when it comes to the valuation processes embedded in financial statements. Therefore, theoretically providing a broader infrastructure for engaging in fraud types of the nature of occupational fraud. However, this prior elaborated broader infrastructure for occupational fraud commitment, is contingent upon offenders having the educational as well as business experience-related prerequisites to engage in financial reporting as well as auditing fraudulent activities that are specifically applicable to International Financial Reporting Standards. As highlighted previously, developed countries besides of having higher levels of education amongst their populations also are equipped with lengthier and broader experience when it comes to the adoption of International Financial Reporting Standards. Consequently, indicating that the theoretical suggestions that higher education levels trigger higher fraud risks, in the context of the main research questions of this thesis, signify that entities in developed countries have a relatively higher tendency to engage in occupational fraud, compared to their counterparts operating in developing regions.

Nevertheless, this theoretical indication, alike the other ones elaborated in this as well as the prior sections of the thesis, cannot be leveraged for generating conclusive statements concerning the main research questions of this thesis.

The first reason is the fact that the evidence from the research of Benson and Simpson (2009) is primarily based on developed rather than developing countries.

The second reason is that the existing studies does not provide any empirical evidence demonstrating how statistically relevant is the role of International Financial Reporting Standards in the context of occupational fraud in entities operating in developing countries. Consequently, posing difficulties for the author to leverage on these studies for the purpose of determining on how the educational capability dimension contributes towards shaping occupational fraud in relation to International Financial Reporting Standards overall.

3.2.2 Conclusive Statement

The prior elaborated section of the doctoral thesis indicates that the current literature provides a wide range of studies highlighting that the adoption of International Financial Reporting Standards and International Standards on

Auditing is associated with regulation incentives which in turn could optimize the bottom-line of entities operating in developing countries. Nevertheless, these studies could not be leveraged for the purpose of drawing empirically supported conclusive statements concerning the relationship of International Financial Reporting Standards and occupational fraud in the context of entities operating in developing countries. The primary reason for the denoted stems from the fact these regulation incentive-based studies do not account for the concept of occupational fraud neither in the primary nor secondary focus of their research. Additionally, in spite of the fact that the criminology-based studies provide an indication on how regulation incentives translate to one's motivation to engaging in occupational fraud, they still are contrasting in their conclusions as well as are not always based on empirical evidence gathered from developing countries. Furthermore, these criminology-based studies do not account for the role of financial reporting and auditing in the context of the motivation dimension of the fraud commitment process. Consequently, indicating that the current state of art elaborating on the regulation-incentives that are associated with the adoption of International

Financial Reporting Standards, cannot be leveraged to drive empirically-supported conclusive statements regarding how the adoption of International Financial Reporting Standards impact the occupational fraud phenomenon within entities operating in jurisdictions classified as developing.

3.3 Interaction between International Financial Reporting Standards, International Standards on Audit and Earnings Management

As indicated in the above sections of the doctoral thesis, the current state of art incorporates a significantly broader array of research investigating the relationship between earnings management and International Financial Reporting Standards. Given the extent to which (as highlighted in the previous second sub-section of the thesis) earnings management is associated with occupational fraud, the author in this sub-section complements the literature review of this doctoral thesis via elaborating on core research studying the relationship between earnings management and International Financial Reporting Standards. The relevant research in this area the author has categorized in three parts.

The first is the category of research indicating that International Financial Reporting Standards have a positive impact on earnings management (i.e. they contribute towards minimizing the risks associated with earnings management within corporations).

The second category indicates that International Financial Reporting Standards have a negative or no impact on earnings management overall.

The third category on the other hand, implies a neutral correlation between International Financial Reporting Standards and earnings management – hence, factors other than financial reporting frameworks and methodologies impact the earnings management tendencies of corporations.

One of the research papers indicating that International Financial Reporting Standards have a positive impact on earnings management is the research of Dimitropoulos et al. (2013, p. 108) which using a sample of 101 firms listed in the Athens Stock Exchange for a period of eight years examines the impact of International Financial Reporting Standards on the quality of accounting information. According to Dimitropoulos et al. (2013, p. 108) the implementation of International Financial Reporting Standards in Greece contributed to less earnings management, more timely loss recognition, and greater value relevance of accounting figures, compared to the local accounting standards. His findings also highlight that audit quality further complements the beneficial impact of

International Financial Reporting Standards given that the corporations embedded in the sample are audited by Big 5 Audit Firms adhering to International Standards on Auditing (Dimitropoulos et al., 2013, p. 108). These findings are consistent with the ones of Cai et al. (2013, p. 147). Specifically, Cai et al. (2013, p. 147) studies the effect of International Financial Reporting Standards on earnings management in over 100,000 firm-year data observations from 2000 to 2006, across 32 countries (both developed and developing). The findings of Cai et al. (2013, p. 147) demonstrate that earnings management in countries that have adopted International Financial Reporting Standards has been decreasing in recent years. These prior denoted findings are consistent with the qualitative research of Păşcan (2015) who based on analyzing and drawing conclusions on twenty-two empirical research papers, indicates that International Financial Reporting Standards do improve the overall quality of accounting information, and by that extent reducing earnings management prospects. In this context it is also relevant denoting the findings of Baig & Khan (2016, p. 343-45, 346-48) who conducted an experiment on the effect of International Financial Reporting on earnings management with an empirical

model based on 100 private firms registered on the Karachi Stock Exchange of Pakistan. Their findings demonstrated that International Financial Reporting Standards contribute towards reducing earning management prospects overall.

In the context of research shedding light on the positive effect of International Financial Reporting Standards on diminishing earnings management associated risks within corporations, it is also important to elaborate on the study of Barth (2008, p. 467). Barth (2008, p. 467), incorporated circa 320 firms from both developing and developed countries (processed via a regression statistical model) following International Accounting Standards such as International Financial Reporting Standards. His findings demonstrated that entities within both developed and developing countries that adhere to International Financial Reporting Standards have less income smoothing, less monitoring of earnings against a target, more timely identification of losses, and a stronger correlation between accounting amounts as well as stock values and profits (Barth, 2008, p. 467). Consequently, indicating that the financial statements of corporations based on the framework of International Financial Reporting Standards are less likely to reflect earnings

management tendencies. The findings are consistent with the empirical study of Khoo (2015, p.75) who through leveraging an empirical study based on a sample of 231 publicly listed Malaysian companies over the 2005-06 period found that International Financial Standards Reporting convergence reduced the extent of earnings management in the jurisdiction. The prior elaborated findings are consistent with the findings of Hasan and Rahman (2020, p. 329) who investigate the role of Corporate Governance on the relationship between International Financial Reporting Standards adoption and earnings management in Bangladesh. In particular, the empirical study of Hasan and Rahman (2020, p. 329) is based on 94 firms listed in Dhaka Stock Exchange (DSE) for 6 years i.e. - over the period of 2004-06 prior to Bangladesh having adopted International Financial Reporting Standards, as well as the period 2013/14-2015/16 reflecting the timeline after Bangladesh had adopted International Financial Reporting Standards. Their empirical results demonstrate that International Financial Reporting Standards implementation has a negative relationship with earnings management – while also indicating that a strong corporate governance infrastructure even further enables

International Financial Reporting Standards to reduce the tendency of firms to engage in earnings management (Hasan and Rahman, 2020, p. 329). In this context it is also relevant highlighting the findings of Allehaidan (2020) who studies the impact of International Financial Reporting Standards adoption and audit quality on earnings management in the Saudi Stock Exchange (Tadawul) – leveraging as a sample 16 firms listed in Saudi Arabia which financial data analyzed in the paper is for the 2014-2019 period (processed via t-test and linear regression). His findings as well indicated that there is a negative relationship between earnings management and International Financial Reporting Standards adoption - particularly if the implementation of these standards is accompanied with strengthened and internationally driven audit quality practices. Similar findings are embedded in the empirical findings of Yahaya (2015, p. 70) who investigated the impact of International Financial Reporting Standards on earnings management in Nigeria – via a data sample composed by15 deposit money banks listed on the floor of the Nigerian Stock Exchange (NSE) for the period 2004 to 2008 (indicating the period prior the implementation of International Financial Reporting Standards) and 2009

to 2013 (the period after the implementation of International Financial Reporting Standards) in Nigeria. The findings of Yahaya et al. (2015, p. 70) indicate that the implementation of International Financial Reporting Standards reduces the tendency of Nigerian banks to engage in earnings management.

As previously indicated the current state of art also incorporates a second stream of research which findings are contrary to the prior elaborated one. Specifically, the second stream of research embedded in this thesis argues that Internal Financial Reporting Standards do in fact increase earnings management tendencies of corporations in developing countries. Specifically, Setiawan et al. (2019, p. 37), investigates the effect of adoption of International Financial Reporting Standards and earnings management via a sample of non-financial firms with 1,127 firm-based data observations the during 2007 – 2010 period, from the Indonesian Stock Exchange. The results of their study in spite of indicating that accrual earnings management decreases after the adoption of International Financial Reporting Standards, also conclusively demonstrate that real earnings management increased after the adoption of International Financial Reporting

Standards. In this context, it is relevant denoting that the prior elaborated findings are consistent with the research conducted by Callao & Jarne (2010, p.159). Specifically, Callao & Jarne (2010, p.159) investigated how International Financial Reporting Standards impacted earnings management in the European Union via considering a sample of non-financial firms listed on 11 European Union stock markets. The empirical results obtained by Callao & Jarne (2010, p.159) demonstrate that earnings management has intensified since the adoption of International Financial Reporting Standards in the European Union, as discretionary accruals (as earnings management proxy) have increased in the period following implementation. In this context of the doctoral thesis it is relevant to also highlight the findings of Klann and Beuren (2018, p. 13). Specifically, Klann and Beuren (2018, p. 13) investigated the effect of International Financial Reporting Standards on earnings management in both Brazilian and British companies. Their empirical study was based on the Barth model (2008) and incorporated data of 721 British companies and 170 Brazilian companies. The results showed reduction in the earnings management levels in British companies

with the adoption of International Financial Reporting Standards. On the other hand, their empirical results demonstrated an increase of earnings management tendencies within Brazilian companies after obligatory adoption of International Financial Reporting Standards. Their finding is not consistent with the implications of the statistical data published by the Association of Certified Fraud Examiners in their reports from 2012 – 2021 demonstrating that occupational fraud frequencies are lower in developing countries implementing International Financial Reporting Standards, when compared to their developed counterparts implementing the same standards. However, this is to be attributed to the inherently different nature of earnings management and occupational fraud. In this context it is also relevant to highlight the studies of Ahmed et al. (2013, p. 1344, p. 1369-1372). Specifically, Ahmed et al. (2013, p. 1344, p. 1369-1372) investigated the impact of International Financial Reporting Standards on earnings management, via a set of firms from 20 developing and developed countries that adopted International Financial Reporting Standards in 2005. These were investigated relative to a benchmark group of firms from both developing and developed countries that did not adopt International

Financial Reporting Standards (matched on the strength of legal enforcement, industry, size, book-to-market, and accounting performance). The findings of Ahmed et al. (2013, p. 1344, p. 1369-1372) indicate that corporations which have adopted International Financial Reporting Standards demonstrate significant increases in income smoothing and aggressive reporting of accruals and a significant decrease in timeliness of loss recognition. In this context it is also relevant denoting the findings of Ekalla and El-Diftar (2019, p. 519) which investigate via a two pooled regression model the relationship between earnings management as well as International Financial Reporting Standards on multiple entities operating in the Middle Eastern and North African region. Specifically, Ekalla and El-Diftar (2019, p. 519) show a significant negative impact of International Financial Reporting Standards on the value relevance of accounting information in the Middle Eastern and Norther African region. Consequently, indicating that the adoption of International Financial Reporting Standards diminishes the value relevance of accounting information in the Middle Eastern

and Norther African region – i.e. a region primarily populated by developing countries.

As demonstrated from the above presented elaborations, the current state of art has multiple contradicting views regarding the impact that International Financial Reporting Standards have on earnings management in countries classified as developing. Consequently, in the context of this doctoral study it is highly relevant for the author to account for the underlying reasons which could contribute towards International Financial Reporting Standards either increasing or decreasing the tendencies of firms to engage in earnings management.

Particularly, research embedded in the current state of art indicates that the implementation of International Financial Reporting Standards overall contributes to improvements in analyst forecast accuracy and reduction in dispersion when it comes to accounting data (Brown, Preiato, and Tarca 2009, p. 1; Horton, el al. 2013, p.388; and Byard et al. p.69). Additional research in similar topics also demonstrates that the implementation of International Financial Reporting Standards also contributes to improvements in liquidity as well as an overall

reduction in cost of equity capital (Daske et al. 2008, p. 1065; Li, 2010, p.607). In this context it is relevant denoting that the findings of Armstrong et al. (2010, p. 31) also indicate that the implementation of International Financial Reporting Standards is associated with positive price reactions in markets.

All the prior denoted studies explicitly indicate that the adoption of International Financial Reporting Standards is associated with multiple economic benefits for corporations. The presence of these economic benefits in turn, could be interpreted as reducing the motivation of corporations to engage in earnings management. The reason for the denoted being that as highlighted in the prior sub-sections of the doctoral thesis, earnings management is primarily used by corporations for four mains purposes i.e. window dressing, income smoothing, meeting internal targets as well as justifying external expectations – often in scenarios of marcoeconomic and microeconomic events distorting the economic outlook that corporations would like to reflect towards their shareholders (Guan and Aono, 2008, p. 26; Chhabra, 2016, p. 40; Beidleman, 1973, p. 657). Hence, indicating that the economic benefits associated with International Financial

Reporting Standards could contribute towards reducing the motivation or need of corporations to engage in earnings management. Additionally, indicating that the capital need theory implications elaborated in the section pertaining to the economic incentives associated with the adoption of International Financial Reporting Standards in the context of occupational fraud within countries classified as developing, also could be relevant in the context of earnings management.

In this context it is relevant denoting also the findings of Barth et al. (2008) who indicates three additional reasons as to why International Financial Reporting Standards could contribute towards improving accounting data quality and by that extent reducing earnings management tendencies. First, is that the framework of financial reporting standards stipulated by International Financial Reporting Standards can contribute towards eliminating certain accounting alternatives, thereby reducing the discretion of the management of corporations when selecting their methodologies and approaches for presenting economic information in financial statements (Brath et al, 2008, p.468). This could reduce the extent of opportunistic earnings management and thus improve accounting quality. Second

reason stems from the fact that International Financial Reporting Standards different to the United States Generally Accepted Accounting Standards, are principle based rather than rule based (Brath et al, 2008, p.468). Hence, by that extent posing greater challenges for management to circumvent them (e.g. under a principle-based standard it should be more difficult to avoid recognition of a liability through transaction structuring). The third reason on the other hand, stems from the fact that International Financial Reporting Standards provide an infrastructure for the implementation of concepts which in general provide a more accurate reflection of the underlying economic outlook of corporations – i.e. concepts such as Fair Value Accounting (Brath et al, 2008, p.468-9). The prior is in addition indicating that the implications of the signaling theory (that International Financial Reporting Standards would be associated with reduced information asymmetry) discussed in the context of the economic incentives associated with International Financial Reporting Standards in light of occupational fraud would also apply here.

In this context it is also important denoting that Barth et al. (2008, p.468-9) also noted two additional reasons which could contribute towards International Financial Reporting Standards to increase the tendency of firms to engage in earnings management. The first reason stems from the fact that International Financial Reporting Standards can contribute towards eliminating the ability of firms to leverage approaches for financial reporting which reflect in a more optimal fashion the actual economic outlook – hence, reducing accounting quality overall. The second reason on the other hand stems from the fact that International Financial Reporting Standards are principle based instead of rule based. Consequently, they can contribute towards providing further grounds of manipulation of earnings. Nevertheless, in this context it is relevant denoting the elaborations provided in the prior parts of the literature review which indicate that the principle-based nature of International Financial Reporting Standards could enhance the tendency of occupational fraud or earnings management primarily in developed countries that are early adopters of these framework – given that they have more elaborate learning curves associated with leveraging International Financial Reporting

Standards in a fashion enabling misrepresentation of the economic outlook of corporations. In this context it is important denoting as well the studies of Christensen (2015, p. 31) which indicate that International Financial Reporting Standards lead to an improvement of accounting quality (i.e. lower earnings management) only with corporations and / or jurisdictions that are voluntary adopters of these standards. Consequently, in context of the findings of Barth (2008) implying that the tendency of corporations to engage in earnings management is primarily driven by the reporting incentives of corporations rather. In this context it is also relevant denoting that the empirical study of Christensen (2015, p.31) is primarily based on developed countries overall. Nevertheless, the reasoning behind the decision of the author to elaborate on it is based on the fact that these findings are consistent with ones of Hasan and Rahman (2020, p. 329) – indicating that corporate governance structures driven towards providing optimal accounting quality overall (i.e. governance structures placing accounting quality as a core priority) are key drivers of the extent to which International Financial

Reporting Standards reduce earnings management tendencies amongst corporations.

In conclusion it is relevant denoting that compared to occupational fraud in the current state of art there are significantly wider empirical studies investigating the empirical relationship between earnings management and International Financial Reporting Standards in the context of developing countries. Specifically, to the best knowledge of the author unlike in the scenario for occupational fraud, for earnings management there are multiple empirical studies directly exploring the relationship between earnings management as a phenomenon and International Financial Reporting Standards in developing countries – while this not being the case to the same extent in context of occupational fraud. Given the synergies between occupational fraud and earnings management the above denoted studies complement to the doctoral thesis - in particular as most of these empirical studies are largely based on comparing earnings management benchmarks for periods before and after International Financial Reporting Standards implementation in developing countries, as well as comparing earnings management benchmarks

between developing and developed countries that have adopted these framework equally. Hence, they are based on empirical approaches similar to the ones that the author embeds in this thesis for the purpose of empirically investigation their core research questions. In the conclusive statement however it is relevant denoting that in spite of the broader coverage, still developed countries are significantly more researched in context of earnings management and International Financial Reporting Standards – when compared to their developing counters. Additionally, it is relevant denoting that multiple of the studies embedded in this literature review subsection reflecting that International Financial Reporting Standards enhance the tendency of corporations to engage in earnings management are either based exclusively on empirical data obtained from developed countries or a mix of developed and developing countries. Consequently, indicating that the findings embedded in the current state of art pertaining to earnings management are consistent with the statistical observations of the Association of Certified Fraud Examiners (elaborated in the Research Questions section) that occupational fraud frequency rates are the lowest amongst countries which are developing and

adopters of International Financial Reporting Standards. In this context it is also relevant denoting that none of the studies embedded in the earnings management relevant current state of art (pertaining to International Financial Reporting Standards) make a connection between earnings management and occupational fraud – i.e. they do not explore the synergies between these two phenomena. Further, to the best knowledge of the author none of the studies embedded in the current state of art studies earnings management, International Financial Reporting Standards as well as developing countries leveraging neural network techniques which are in general deemed as a core trend in business practice for the effective tackling of fraud risks. Consequently, indicating that this doctoral study amongst others contributes as well to the earnings management literature review via : a) elaborating on the synergies between occupational fraud and earnings management in context of International Financial Reporting Standards implementation in developing countries; b) implementing advanced predicative analysis models for the purpose of detecting the relationship between occupational fraud and International Financial Reporting Standards in developing countries via leveraging

the M-Score (which as indicated in the above sections of the thesis equally also is used as a proxy or benchmark for earnings management).

4. METHODOLOGY

4.1 Background

The methodology selected by the author for the purpose of investigating the main research questions embedded in this doctoral thesis, is primarily based on two separate empirical methodology approaches – both leveraging neural networks for statistically processing the empirical data.

The first empirical methodology approach revolves around obtaining empirical data for entities operating in Middle Eastern and Latin American developing countries for a period of time before they had implemented International Financial Reporting Standards, as well as a period of time after they had Implemented International Financial Reporting Standards. In other words, as indicated in the prior sections of the doctoral thesis the author leverages the M-Score concept as a benchmark for measuring occupational fraud risk within entities in developing countries. Hence, the first empirical approach is primarily selected to comparing the M-Score of entities in developing countries before and after International

Financial Reporting Standards were adopted in their jurisdictions - in order to determine the extent to which the adoption of this framework contributed towards impacting the occupational fraud risks incurred within entities operating in the developing countries embedded in the data sample of this thesis. Therefore, to the best knowledge of the author providing to the current state of art the first cross-regional empirical evidence investigating the relationship between occupational fraud and International Financial Reporting Standards in countries classified as developing.

The second methodology on the other hand, revolves around obtaining empirical data from both developing as well as developed countries that have adopted International Financial Reporting Standards. In other words, like the first methodology approach in this empirical context as well the author relies on the M-Score concept - as a benchmark for measuring the occupational risk associated with entities operating in countries classified as developing, as well as developed. Consequently, in this second methodology approach the author compares the M-Score of developing countries that have adopted International Financial Reporting

Standards against the M-Score of developed countries that have adopted the same International Financial Reporting Standards. Therefore, enabling an observation on the role that International Financial Reporting Standards play in the M-Score of entities in developing countries in comparison to their counterparts in developed jurisdictions (i.e. jurisdictions which as highlighted in multiple sections of the doctoral thesis serve as a benchmark for International Financial Reporting Standards implementation practices). Further in the context of this doctoral thesis it is relevant to denote that the second methodology approach (as indicated in the Research Questions section of this doctoral thesis) complements to the statistical observations published by the Association of Certified Fraud Examiners throughout the 2011-2020 period which imply that the countries with the lowest occupational fraud frequency rates are countries which are classified as developing and have implemented International Financial Reporting Standards. In spite of the fact that their statistical observations are not made with any reference to International Financial Reporting Standards or any policy or framework-driven mechanism that could theoretically impact occupational fraud overall.

Consequently, a comparison of the M-Score (as a standardized benchmark for occupational fraud) across developing and developed countries in the context of International Financial Reporting Standards contributes towards enriching the context of the statistical observations of the Association of Certified Fraud Examiners. In other words, it contributes towards shedding light in terms of what the statistical observations of the Association of Certified Fraud Examiners might mean in light of legislative frameworks for financial reporting i.e. frameworks such as International Financial Reporting Standards. Last in this context of the doctoral thesis it is crucial to also highlight that another reason for the inclusion of this elaborated secondary methodology approach within the doctoral thesis stems from the fact that it originally represented the sole basis for empirically investigating the main research questions embedded in this doctoral thesis. Specifically, the PhD Proposal associated with this doctoral thesis which was accepted by the Committee in 2016-2017 period focused on empirically investigating the research questions of the doctoral thesis primarily via this second elaborated methodology approach. Additionally, the denoted PhD Proposal was also presented in one of the obligatory

courses of the Research Phase in the University of St. Gallen – during which no remarks were received by the academic staff leading the course. Consequently, despite altering the research approach to the first methodology as a primary one (as per recommendation of the PhD Supervisor and Co-Supervisor in 2020), the author is incorporating here as well this second elaborated methodology approach for consistency purposes.

The below subsections of the doctoral thesis provide a detailed overview of both empirical methodologies as well as the neural network based statistical modelling approach leveraged to process the M-Score data obtained in the context of both developing and developed countries.

4.2 Methodology Set-Up Primary Approach – Comparison of the M-Score Prior and After International Financial Reporting Standards Implementation in a selected number of Developing Countries

In the first methodology approach the author generated empirical data for 123 randomly selected corporations operating in three specific developing countries i.e. United Arab Emirates, Saudi Arabia, as well as Colombia. According to the World Economic Situations Prospects (United Nations, 2021, p. 123-127), Colombia, Saudi Arabia as well as United Arab Emirates are each classified as Developing Countries (see Table 3 Below).

In this context it is important denoting that for the categorization of jurisdictions into “developed”, “developing” or “in transition” the author relies on the methodology published jointly by the United Nations Department of Economic and Social Affairs Economic Analysis, the United Nations Conference on Trade and Development, and the five United Nations Regional Commissions in their yearly World Economic Situations Prospects Report (United Nations, 2021, p. 123-127). The decision of the author to rely on the United Nations-driven World Economic Situations Prospects methodology derives from the fact that it is largely

considered as a standardized nomenclature across the globe, both amongst policymakers as well as economists. Additionally, in the context of this doctoral thesis it is relevant to state that the classification of Colombia, Saudi Arabia as well as United Arab Emirates into developing countries is consistent with other leading methodologies and benchmarks focusing on the type of country classifications relevant to the main subjects of analysis of this doctoral thesis. Specifically, the FTSE Russell Equity Country Classification (FTSE Russel being a subsidiary of London Stock Exchange) classifies stock markets as Developed, Advanced Emerging, Secondary Emerging or Frontier. The methodology behind the later three classifications is to a certain extent corresponding to the "Developing" and "In Transition" country classification of the United Nations. According to the FTSE Russell Equity Country Classification (2021, p. 4), Saudi Arabia, Colombia and United Arab Emirates are all classified as Secondary Emerging Countries – hence, not developed. Consistent classification is published by MSCI Inc. in their Official Website in 2021 (another global provider of market indexes, multi-asset portfolio analysis tools and ESG products), who alike the FTSE classify Saudi

Arabia, Colombia as well as United Arab Emirates as emerging countries. Prior to further elaboration it is important denoting that the FTSE and MSCI Inc. classification is also consistent with the S&P Dow Jones methodology which classifies United Arab Emirates, Saudi Arabia, and Colombia outside of the developed country cluster – hence, classifying them as emerging.

Developing economies by region[a]

Africa		Asia	Latin America and the Caribbean
North Africa	**Southern Africa**	**East Asia**	**Caribbean**
Algeria	Angola	Brunei Darussalam	Barbados
Egypt	Botswana	China	Cuba
Libya	Lesotho	Hong Kong SAR[b]	Dominican Republic
Mauritania	Malawi	Indonesia	Guyana
Morocco	Mauritius	Malaysia	Haiti
Sudan	Mozambique	Myanmar	Jamaica
Tunisia	Namibia	Papua New Guinea	Trinidad and Tobago
Central Africa	South Africa	Philippines	**Mexico and Central America**
Cameroon	Zambia	Republic of Korea	Costa Rica
Central African Republic	Zimbabwe	Singapore	El Salvador
Chad	**West Africa**	Taiwan Province of China	Guatemala
Congo	Benin	Thailand	Honduras
Equatorial Guinea	Burkina Faso	Viet Nam	Mexico
Gabon	Cabo Verde	**South Asia**	Nicaragua
Sao Tome and Prinicipe	Côte d'Ivoire	Bangladesh	Panama
East Africa	Gambia	India	**South America**
Burundi	Ghana	Iran (Islamic Republic of)	Argentina
Comoros	Guinea	Nepal	Bolivia (Plurinational State of)
Democratic Republic of the Congo	Guinea-Bissau	Pakistan	Brazil
Djibouti	Liberia	Sri Lanka	Chile
Eritrea	Mali	**Western Asia**	Colombia
Ethiopia	Niger	Bahrain	Ecuador
Kenya	Nigeria	Iraq	Paraguay
Madagascar	Senegal	Israel	Peru
Rwanda	Sierra Leone	Jordan	Uruguay
Somalia	Togo	Kuwait	Venezuela (Bolivarian Republic of)
Uganda		Lebanon	
United Republic of Tanzania		Oman	
		Qatar	
		Saudi Arabia	
		Syrian Arab Republic	
		Turkey	
		United Arab Emirates	
		Yemen	

Table 2. List of Developing Countries as per the World Economic Situation Prospectus (World Economic Situation Prospectus Statistical Annex 2021, p. 126)

Developed	Advanced Emerging	Secondary Emerging	Frontier
Australia	Brazil	Chile	Bahrain
Austria	Czech Republic	China	Bangladesh
Belgium/Luxembourg	Greece	Colombia	Botswana
Canada	Hungary	Egypt	Bulgaria
Denmark	Malaysia	India	Côte d'Ivoire
Finland	Mexico	Indonesia	Croatia
France	South Africa	Kuwait	Cyprus
Germany	Taiwan	Pakistan	Estonia
Hong Kong	Thailand	Philippines	Ghana
Ireland	Turkey	Qatar	Iceland
Israel		Romania	Jordan
Italy		Russia	Kazakhstan
Japan		Saudi Arabia	Kenya
Netherlands		UAE	Latvia
New Zealand			Lithuania
Norway			Malta
Poland			Mauritius
Portugal			Morocco
Singapore			Nigeria
South Korea			Oman
Spain			Palestine
Sweden			Peru
Switzerland			Republic of North Macedonia
UK			Serbia
USA			Slovak Republic
			Slovenia
			Sri Lanka
			Tanzania
			Tunisia
			Vietnam

Table 3. FTSE Equity Country Classification September 2020 (FTSE 2021, p. 4)

MSCI WORLD INDEX			MSCI EMERGING MARKETS INDEX			MSCI FRONTIER MARKETS INDEX			
DEVELOPED MARKETS			EMERGING MARKETS			FRONTIER MARKETS			
Americas	Europe & Middle East	Pacific	Americas	Europe, Middle East & Africa	Asia	Europe & CIS	Africa	Middle East	Asia
Canada	Austria	Australia	Argentina	Czech Republic	China	Croatia	Kenya	Bahrain	Bangladesh
United States	Belgium	Hong Kong	Brazil	Egypt	India	Estonia	Mauritius	Jordan	Sri Lanka
	Denmark	Japan	Chile	Greece	Indonesia	Iceland	Morocco	Oman	Vietnam
	Finland	New Zealand	Colombia	Hungary	Korea	Lithuania	Nigeria		
	France	Singapore	Mexico	Kuwait	Malaysia	Kazakhstan	Tunisia		
	Germany		Peru	Poland	Pakistan	Romania	WAEMU[2]		
	Ireland			Qatar	Philippines	Serbia			
	Israel			Russia	Taiwan	Slovenia			
	Italy			Saudi Arabia	Thailand				
	Netherlands			South Africa					
	Norway			Turkey					
	Portugal			United Arab Emirates					
	Spain								
	Sweden								
	Switzerland								
	United Kingdom								
			MSCI STANDALONE MARKET INDEXES[1]						
						Americas	Europe & CIS	Africa	Middle East
						Jamaica	Bosnia Herzegovina	Botswana	Lebanon
						Panama	Bulgaria	Zimbabwe	Palestine
						Trinidad & Tobago	Malta		
							Ukraine		

Table 4. MSCI Country Market Classification 2021 (MSCI, 2021, https://www.msci.com/our-solutions/indexes/market-classification)

S&P Developed BMI	
Country	Weight
Australia	2.26%
Austria	0.11%
Belgium	0.32%
Canada	3.35%
Denmark	0.71%
Finland	0.42%
France	3.02%
Germany	2.67%
Hong Kong	0.96%
Ireland	0.26%
Israel	0.28%
Italy	0.81%
Japan	7.74%
Luxembourg	0.07%
Netherlands	1.22%
New Zealand	0.12%
Norway	0.28%
Portugal	0.06%
Singapore	0.53%
South Korea	2.10%
Spain	0.73%
Sweden	1.27%
Switzerland	2.72%
UK	4.43%
US	63.56%

S&P Emerging BMI	
Country	Weight
Brazil	6.59%
Chile	0.52%
China	40.38%
Colombia	0.23%
Czech Republic	0.11%
Egypt	0.11%
Greece	0.32%
Hungary	0.24%
India	13.25%
Indonesia	1.36%
Kuwait	0.64%
Malaysia	1.93%
Mexico	1.87%
Pakistan	0.09%
Peru	0.19%
Philippines	0.81%
Poland	0.85%
Qatar	0.73%
Russia	3.64%
Saudi Arabia	3.04%
South Africa	4.06%
Taiwan	15.73%
Thailand	2.07%
Turkey	0.49%
UAE	0.71%

S&P Frontier BMI	
Country	Weight
Argentina	29.80%
Bahrain	3.26%
Bangladesh	4.14%
Botswana	0.37%
Bulgaria	0.53%
Cote d'Ivoire	0.80%
Croatia	1.82%
Cyprus	0.53%
Estonia	0.66%
Ghana	0.40%
Jamaica	1.48%
Jordan	2.49%
Kazakhstan	2.11%
Kenya	3.06%
Latvia	0.03%
Lithuania	0.33%
Mauritius	1.78%
Morocco	8.41%
Namibia	0.23%
Nigeria	4.67%
Oman	2.11%
Panama	3.37%
Romania	3.64%
Slovakia	0.04%
Slovenia	2.50%
Sri Lanka	1.68%
Trinidad & Tobago	1.74%
Tunisia	0.98%
Vietnam	16.99%
Zambia	0.03%

Table 5. S&P Dow Jones Indices' 2021 Country Classification (S&P, page 7)

In this context it is relevant denoting that the author primarily bases its analysis on the United Nations Country Classification. The reason for the denoted is that United Nations' endorsed methodologies serve as relatively more standardized

practices amongst policymakers – while also being focused to reflect basic economic country conditions overall, rather than primarily focusing only on capital markets as it is the case with FTSE, S&P as well as MSCI (World Economic Situation and Prospects, 2014, p.144; MSCI, 2021, p. 3-9; S&P, 2021, p. 3-4; FTSE, 2021, p. 6). Nevertheless, in spite of focusing primarily on the United Nations' Country Classification methodology, the author as well considers the implications of the alternative leading methodologies for country classification such as MSCI, FTSE as well as S&P. Consequently, the selection of Saudi Arabia, Colombia and United Arab Emirates in this first empirical methodology approach is primarily driven by the fact that these countries are not associated with any contradictions across the different country classification methodologies in the market. Specifically, across all above mentioned methodologies these three specific countries are consistently classified as "non-developed" i.e. consequently developing or emerging.

The data span for which the M-Score was calculated for Saudi Arabia, Colombia and United Arab Emirates was for the 2012-2020 period. Consequently,

providing an infrastructure to obtaining a range of M-Score data for randomly selected entities from Colombia, United Arab Emirates as well as Saudi Arabia both from the period before they had adopted International Financial Reporting Standards, as well as the period after they had adopted International Financial Reporting Standards. Specifically, according to the International Financial Reporting Standards Application around the World Official Website (2020), Saudi Arabia adopted International Financial Reporting Standards in 2015. On the other hand, according to the same website United Arab Emirates and Colombia also adopted International Financial Reporting Standards on the same year, specifically 2015 (International Financial Reporting Standards Application around the World Official Website, 2020). Consequently, enabling the author to generate a comparable data set across each of the three countries both for the period before they had adopted International Financial Reporting Standards, as well as the period after they had adopted International Financial Reporting Standards. In other words, for all three countries enabling the author to compare the M-Score prior International Financial Reporting Standards implementation (i.e. 2012-2014),

relative to the M-Scores generated post International Financial Reporting Standards implementation (i.e. 2015-2020).

In the context of this doctoral thesis it is key to denote that the elaborated data structure of 117 corporations with corresponding calculated M-Scores for 2012-2020 period, enables the author to derive an infrastructure of 1’053 data points. If compared with the empirical studies embedded in the literature review section of this doctoral thesis, the elaborated data points size is comparable and often exceeding the volume of data used in studies relevant to the main subjects of analysis of this doctoral thesis which have been referenced in the thesis. Taking into account the data points another key relevant factor to be denoted is the fact that the current state of art does not have a framework capable of guiding academics as well as practitioners on the manner in which they should determine the optimal sample size for their neural network-based models. Consequently, the author selected the size of their data sample by running their neural network hundreds of times through utilizing a wide spectrum of data sample variations ranging from 11 to 131 business entities (maximum sample size provided by Fin Box).

The decision of the author to primarily focus on entities operating in Colombia, United Arab Emirates and Saudi Arabia, was primarily to circumvent the standard data quality and data completeness challenges associated with the process of conducting empirical research of this nature in developing countries. Specifically, International Financial Reporting Standards as well as International Standards on Auditing, due to their continuous emphasis on the harmonization of financial statements, have contributed towards compliant entities publishing relatively more complete and cross-border comparable financial statements – i.e. relative to their counterparts in developing countries that are not compliant with these standards (as indicated in the literature review section of the doctoral thesis). This prior elaborated statement does consequently indicate that there is potentially a very significant data quality difference between the M-Scores obtained post versus prior the implementation of International Financial Reporting Standards within developing jurisdictions. The decision of the author to focus on countries which are the most recent adopters of International Financial Reporting Standards (i.e. jurisdictions which have adopted these standards post 2015) has been one of the

ways on how the author circumvents the data quality and completeness issues associated with research of this nature. Specifically, an evaluation of leading ISO Certified and Compliant financial data providers demonstrated that there are significantly less data quality and completeness challenges when it comes to obtaining the M-Score of corporations operating in developing jurisdictions which have adopted International Financial Reporting Standards in more recent years; particularly in the past five to eight years (GuruFocus Official Website, 2021; Fin Box Official Website; 2021; Yahoo Finance Official Website, 2021). The prior is most likely associated with the growing interest of investors across the globe in developing economies in the past decade (as demonstrated by the World Investment Report, 2021, p.20-65), as well as the technology optimizations and data advancements in the past decade which have enabled data providers improve on the quality of their data services overall. Colombia, Saudi Arabia as well as United Arab Emirates due to having adopted International Financial Reporting Standards as recent as 2015 were deemed as the best fit to the prior elaborated criteria for data sample selection. On the other hand, the evaluation of the data

services of leading providers also demonstrated that developing jurisdictions with relatively higher rates of Foreign Direct Investments are associated with less data quality and completeness challenges, when it comes to M-Score data availability. The prior is consistent with the remarks in the literature review section of this doctoral thesis which indicates that countries with higher Foreign Direct Investment tendencies have a higher propensity to publish data with higher levels of accounting quality as well as comparability. Colombia, United Arab Emirates as well as Saudi Arabia in addition to fitting with the recent adopters' criteria, were also deemed by the author as an optimal fit to the prior elaborated Foreign Direct Investment driven criteria. In particular, according to the World Investment Report (2020, p.44) published by the United Nations Conference on Trade and Development Turkey, the United Arab Emirates and Saudi Arabia accounted for the majority of inflows in 2019 for the entire region of West Asia. Turkey has been excluded as a candidate due to the fact that according to International Financial Reporting Standards - Application around the World Website (2020), they have adopted International Financial Reporting Standards as of 2005 to 2008 (depending

on the corporation type) – hence, not an optimal fit with the first "recent adopter driven" criteria. In other words, there would be multiple data quality and completeness challenges in the process of obtaining M-Score data for Turkish companies for the period before they would have implemented International Financial Reporting Standards.

Colombia on the other hand, according to the World Investment Report (2020, p.46) published by the United Nations Conference on Trade and Development is the fourth largest Foreign Direct Investment economy in Latin America and the Caribbean. The first top three jurisdictions are Mexico, Brazil and Chile, which according to International Financial Reporting Standards – Application around the Word Website (2020), have adopted International Financial Reporting Standards between 2011 to 2012 primarily. Hence, alike Turkey it would be rather challenging to obtain M-Score data for Brazilian, Chilean and Mexican corporations for the period prior International Financial Reporting Standards were adopted in their jurisdictions.

To sum up, the first approach of the author to investigate the research questions posed in this doctoral thesis is via comparing the M-Score of entities in three developing countries (i.e. Colombia, United Arab Emirates as well as Saudi Arabia) before and after they had adopted International Financial Reporting Standards. This approach enables the author to provide to the current state of art with the first empirical evidence (to their best knowledge) on the relationship between International Financial Reporting Standards and occupational fraud in developing countries – via relying on the M-Score as a standardly recognized benchmark or proxy of occupational fraud, as well as a data set least impacted by the data quality and completeness challenges associated with financial reporting empirical research in developing countries overall.

In this context and prior proceeding with the subsequent subsections of this doctoral thesis, it is important to additionally emphasizing that the decision of the author to opt for an empirical research model is primarily guided by the fact that this is the only approach which provides an infrastructure for evaluating the statistical significance of International Financial Reporting Standards as well as

International Standards on Auditing in the context of occupational fraud risks embedded within entities in developing countries. Specifically, as highlighted in the prior sections of this thesis, the current state of art provides a range of theoretical indications that International Financial Reporting Standards as well as International Standards on Auditing have a positive impact in shaping the occupational fraud phenomenon in entities operating in developing countries overall. In addition to these theoretical indications, the statistical data published by the Association of Certified Fraud Examiners in the 2010-2016 period, does demonstrate that developing jurisdictions which are compliant with International Financial Reporting Standards as well as International Standards on Auditing have in the past years consistently displayed the lowest level of occupational fraud frequency rates overall (relative to the rest of the jurisdictions worldwide). Nevertheless, neither the elaborated theoretical indications nor the statistical reports published by the Association of Certified Fraud Examiners, can be leveraged for the purpose of generating conclusive statements concerning the empirical relationship between occupational fraud, International Financial

Reporting Standards as well as International Standards on Auditing- in the context of developing countries. As highlighted in the literature review thesis, the same applies for the vast majority of empirical and qualitative studies embedded in the current state of art.

Specifically, the lack of empirical evidence concerning the relationship between occupational fraud, International Financial Reporting Standards as well as International Standards on Auditing, contributes towards the current state of art being limited in explaining the statistical extent to which the lower occupational fraud rates in developing countries that are International Financial Reporting Standards/International Standards on Auditing adopters , are actually triggered by these two standards – as opposed to other factors such as economic growth, foreign direct investment, culture etc. Therefore, contributing towards creating an overall lack of transparency concerning whether the adoption of International Financial Reporting Standards and International Standards on Auditing has an actual statistically significant impact (i.e. impact suggested by the prior elaborated theoretical indications and statistical reports) when it comes to minimizing the

occupational fraud risks within entities operating in jurisdictions classified as developing.

The prior elaborated, in turn indicates that the only optimal methodological approach capable of addressing the research gaps embedded in the current state of art, is an empirical approach which is particular designated to studying the direct statistical relationship between occupational fraud, International Financial Reporting Standards as well as International Standards on Auditing, in entities operating in developing countries. As elaborated in the subsequent sections of this doctoral thesis, the statistical modelling approach selected by the author for the purpose of this doctoral thesis, is a machine learning or neural network approach. The core reasons behind this statistical modelling approach will be elaborated in the subsequent parts of this doctoral thesis.

4.3 Methodology Set-Up Secondary Approach – Comparison of the M-Score in Developing Countries vs Developed Countries complying with International Financial Reporting Standards Implementation

In addition to the primary approach, the author also incorporates a second approach which revolves around establishing the relationship between the M-Score occupational fraud risk proxy as an explained variable and country classification (Developed vs. Developing) as an explanatory variable. In this context it is relevant denoting that the Country Classification variable indicates the country profile (developed or developing jurisdiction) of the entities embedded in the sample size of the thesis that are adopters of International Financial Reporting Standards as well as International Standards on Auditing.

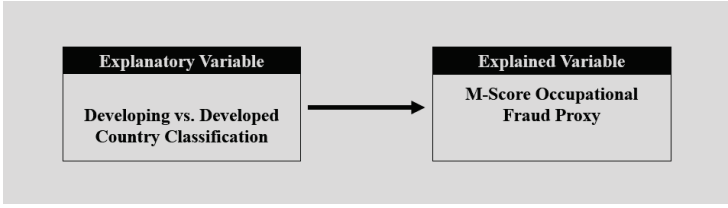


Figure 3. A high-granular view of the Explained and Explanatory Variable Setting

In other words, the author empirically investigates the main research questions embedded in this doctoral thesis via comparing the M-Score of 38 randomly selected entities operating in developing countries, against the M-Score of 38 additional randomly selected business entities operating in countries classified as developed. In this context it is relevant denoting that all 76 business entities which are embedded in the data sample of this doctoral thesis, are compliant with International Financial Reporting Standards as well as International Standards on Auditing.

The decision of the author to establish the denoted data sample structure stems from the intention of the author to complement to the annual surveys issued by the Association of Certified Fraud Examiners – as indicated in several parts in the above subsections of the doctoral thesis. Specifically, the annual reports generated by the Association of Certified Fraud Examiners throughout the 2010-2020 period (as indicated in the prior sections of this doctoral thesis) indicate that occupational fraud frequency rates are the lowest overall in developing countries compliant with International Financial Reporting Standards as well as International Standards on

Audit. Hence, lower relative to the occupational fraud frequency rates in developing countries not compliant with International Financial Reporting Standards, well as developed countries that are compliant with International Financial Reporting Standards. Consequently, the elaborated empirical study based on a machine learning approach capable of tackling both linear and non-linear dependencies between variables enhances the probability that this research methodology would generate an accurate quantitative output in the context of determining the statistical significance of International Financial Reporting Standards and International Standards on Auditing in shaping the occupational fraud phenomenon in entities operating in developing countries compared to the ones operating in developed countries. Hence, complementing to enriching the context of the statistical data generated by the Association of Certified Fraud Examiners – via providing insights on which policies and regulations could serve as explanatory variables behind their statistical observations. The second reason behind the decision of the author to select the elaborated data structure is that it provides the most optimal grounds to circumvent the data quality and data

completeness issues (elaborated in the research question section) accompanying the comparative empirical investigation of occupational fraud in developing countries versus countries that are developed. Specifically, International Financial Reporting Standards as well as International Standards on Auditing, due to their continuous emphasis on the harmonization of financial statements, have contributed towards compliant entities publish more complete and cross-border comparable financial statements – i.e. relative to their counterparts in developing countries that are not compliant with these standards. The prior elaborated, has further been confirmed by the analysis that the author conducted on the data provided by the GuruFocus repository – i.e. an ISO accredited repository providing automatically calculated M-Scores for a wide range of business entities operating across the globe. Specifically, the extensive analysis that the author conducted on the data provided by GuruFocus, Fin Box and Yahoo Finance demonstrated that the M-Score relevant financial information are relatively more complete and comprehensive in developing as well as developed countries that are compliant

with International Financial Reporting Standards as well as International Standards on Auditing[6].

Furthermore, it is relevant denoting that an additional benefit of establishing a data sample structure comparing the M-Score of International Financial Reporting Standards/International Standards on Auditing compliant entities in developing as well as developed countries, stems from the fact that developed countries are widely considered as benchmark jurisdictions when it comes to the adoption and compliance with these regulatory standards (as elaborated in the prior sections of this doctoral thesis). Consequently, additionally enriching the current state of art with an empirical analysis demonstrating the differences between developing countries and developed countries (serving as benchmark for International Financial Reporting Standards) in context of occupational fraud, as well as financial reporting standards.

[6] Prior to further elaborating it is important denoting that the main reason behind the author to have two different data sources for the M-Score (i.e. for the first approach leveraging Fin Box while for the second GuruFocus) is price driven. Specifically, when enriching the doctoral thesis with the first methodology approach the author explored options with a similar quality to GuruFocus, nevertheless, more competitive from a price perspective. Hence, the reason for embedding in the thesis a second data provider.

Furthermore, as indicated in the literature review section of the doctoral thesis, the majority of research elaborating on the motivation, opportunity, rationalization as well as capability dimension of the fraud commitment process overall, is primarily based on evidence gathered by developed countries. Even in the context of earnings management which is significantly more researched in comparison to occupational fraud, the majority of studies embedded in the current state of art are based either in developed counties or hybrid models of developing and developed jurisdictions. Consequently, indicating that a research setting which provides a comparison between developing as well as developed jurisdictions, provides the author with further grounds to complement as well as add value to the existing research already embedded in the current state of art – while effectively addressing the core data quality and data completeness challenges revolving around investigating occupational fraud in the context of developing jurisdictions overall.

In the context of the data sample it is also relevant denoting that the prior elaborated 71 randomly selected entities originate from the Eurasian, Eastern European, Western European, as well as the Latin American Region. The decision

of the author to select the data sample from the above mentioned regions, stems from the fact that as highlighted in the prior sections of the thesis, these regions have the relatively highest number of countries that are compliant with International Financial Reporting Standards as well as International Standards on Auditing for the longest period of time – i.e. the majority of them are early adopted according to the Official Website of International Financial Reporting Standards – Applications around the World (2021). Table 8 below provides an in detail overview of the entities embedded in this second empirical method embedded in the doctoral thesis clustered according to Region, Country as well as Country Classification i.e. Developed versus Developing.

Region	Country	Country Classification
Latin America	Chile	Developing
Latin America	Brazil	Developing
Latin America	Argentina	Developing
Eurasia	Turkey	Developing
Eastern Europe	Poland	Developing
Western Europe	Germany	Developed
Western Europe	Netherlands	Developed
Western Europe	Italy	Developed
Western Europe	France	Developed
Western Europe	Sweden	Developed
Western Europe	Belgium	Developed
Western Europe	Denmark	Developed
Western Europe	Spain	Developed
Western Europe	Norway	Developed

Table 6. Sample Size Details for the Second Methodology Approach – Entity Classification based on Country, Region as well as Country Classification

Consistent with the first methodology approach, the methodology selected by the author to determine the categorization of countries embedded in the data sample (between developing versus developed) is based on the methodology United Nations Department of Economic and Social Affairs Economic Analysis, the United Nations Conference on Trade and Development, and the five United Nations Regional Commissions in their yearly World Economic Situations

Prospects report. As per the denoted report Germany, Poland, Netherlands, Italy, France, Sweden, Belgium, Denmark, Spain, and Norway are considered as developed countries (United Nations, 2021, p. 123-127). In the context of this doctoral thesis it is important to denote that Poland is considered as an outlier when compared to the list of developed countries according to the World Economic Situations Prospects. The reason for the denoted stems from the fact that according to the World Economic Situations Prospects of 2016 (p. 159) Poland was considered as a New EU Member State – compared to the rest of developed countries embedded in this doctoral thesis which are European Union 15 states (p. 159). In addition to that as highlighted in Table 7., Table 6., as well as Table 5., embedded in the previous sub-section of this doctoral thesis, explicitly demonstrate that from all countries embedded in this doctoral sample Poland is the one whose classification is disputed. Reason for which being that even though according to the United Nations Methodology Poland is considered as a developed country, according to the S&P and MSCE Classification Poland is classified as an emerging country – hence, a non-developed country. Additionally, according to the FTSE

Classification up until 2017 Poland was also classified as advanced emerging i.e. non developed country (see Tables below) (FTSE Classification of Markets, 2017, p.7).

Developed	Advanced Emerging	Secondary Emerging	Frontier
Australia	Brazil	Chile	Argentina
Austria	Czech Republic	China	Bahrain
Belgium/Luxembourg	Greece	Colombia	Bangladesh
Canada	Hungary	Egypt	Botswana
Denmark	Malaysia	India	Bulgaria
Finland	Mexico	Indonesia	Côte d'Ivoire
France	Poland*	Pakistan	Croatia
Germany	South Africa	Peru	Cyprus
Hong Kong	Taiwan	Philippines	Estonia
Ireland	Thailand	Qatar	Ghana
Israel	Turkey	Russia	Jordan
Italy		UAE	Kazakhstan
Japan			Kenya
Netherlands		Kuwait**	Latvia
New Zealand			Lithuania
Norway			Macedonia
Portugal			Malta
Singapore			Mauritius
South Korea			Morocco
Spain			Nigeria
Sweden			Oman
Switzerland			Palestine
UK			Romania
USA			Serbia
			Slovakia
			Slovenia
			Sri Lanka
			Tunisia
			Vietnam

Table 7. FTSE Equity Country Classification September 2017 (FTSE 2021, p. 6)

Annual percentage change

	2007-2014[a]	2007	2008	2009	2010	2011	2012	2013	2014	2015[b]	2016[c]	2017[c]
Developed economies	0.8	2.5	0.1	-3.7	2.6	1.5	1.1	1.0	1.7	1.9	2.2	2.3
United States	1.1	1.8	-0.3	-2.8	2.5	1.6	2.2	1.5	2.4	2.4	2.6	2.8
Canada	1.6	2.0	1.2	-2.7	3.4	3.0	1.9	2.0	2.4	1.2	2.2	2.9
Japan	0.4	2.2	-1.0	-5.5	4.7	-0.5	1.7	1.6	-0.1	0.5	1.3	0.6
Australia	2.8	4.5	2.5	1.6	2.3	2.6	3.7	2.0	2.7	2.3	2.5	2.2
New Zealand	1.9	3.7	-0.8	0.5	2.0	1.4	2.9	2.5	3.3	2.5	2.4	2.5
European Union	0.5	3.1	0.5	-4.4	2.1	1.8	-0.5	0.2	1.4	1.9	2.1	2.2
EU-15	0.4	2.9	0.2	-4.4	2.1	1.7	-0.6	0.1	1.2	1.8	2.0	2.1
Austria	0.9	3.6	1.5	-3.8	1.9	2.8	0.8	0.3	0.4	0.7	1.7	1.8
Belgium	1.0	3.4	0.7	-2.3	2.7	1.8	0.2	0.0	1.3	1.3	1.7	1.9
Denmark	-0.2	0.8	-0.7	-5.1	1.6	1.2	-0.1	-0.2	1.3	1.7	2.2	2.3
Finland	0.0	5.2	0.7	-8.3	3.0	2.6	-1.4	-1.1	-0.4	0.1	1.2	1.4
France	0.6	2.4	0.2	-2.9	2.0	2.1	0.2	0.7	0.2	1.2	1.5	1.5
Germany	1.1	3.3	1.1	-5.6	4.1	3.7	0.4	0.3	1.6	1.8	2.1	2.3
Greece	-3.3	3.3	-0.3	-4.3	-5.5	-9.1	-7.3	-3.2	0.7	-2.4	-1.2	2.8
Ireland	0.9	5.5	-2.2	-5.6	0.4	2.6	0.2	1.4	5.2	6.0	4.5	3.8
Italy	-1.0	1.5	-1.1	-5.5	1.7	0.6	-2.8	-1.7	-0.4	0.7	1.3	1.5
Luxembourg	2.2	8.4	-0.8	-5.4	5.7	2.6	-0.8	4.3	4.1	3.1	3.6	2.5
Netherlands	0.5	3.7	1.7	-3.8	1.4	1.7	-1.1	-0.5	1.0	2.0	2.4	2.1
Portugal	-0.6	2.5	0.2	-3.0	1.9	-1.8	-4.0	-1.1	0.9	1.5	1.6	1.4
Spain	-0.4	3.8	1.1	-3.6	0.0	-1.0	-2.6	-1.7	1.4	3.1	2.5	2.6
Sweden	1.2	3.4	-0.6	-5.2	6.0	2.7	-0.3	1.2	2.3	2.7	2.6	2.1
United Kingdom	0.9	2.6	-0.5	-4.2	1.5	2.0	1.2	2.2	2.9	2.5	2.4	2.6
New EU member States	1.9	6.4	3.6	-3.7	2.0	3.1	0.5	1.2	2.7	3.2	3.0	3.2
Bulgaria	1.7	7.7	5.6	-4.2	0.1	1.6	0.2	1.3	1.5	1.9	2.4	3.6
Croatia	-0.8	5.2	2.1	-7.4	-1.7	-0.3	-2.2	-1.1	-0.4	0.8	1.1	2.0
Cyprus	-0.4	4.9	3.7	-2.0	1.4	0.4	-2.4	-5.9	-2.5	1.2	1.8	1.9
Czech Republic	1.0	5.5	2.7	-4.8	2.3	2.0	-0.9	-0.5	2.0	4.0	2.5	2.9
Estonia	0.7	7.7	-5.4	-14.7	2.5	7.6	5.2	1.6	2.9	1.9	2.5	3.0
Hungary	0.1	0.4	0.8	-6.6	0.7	1.8	-1.7	1.9	3.7	2.7	2.1	2.3
Latvia	0.2	10.0	-3.6	-14.3	-3.8	6.2	4.0	3.0	2.4	2.5	2.8	3.1
Lithuania	1.9	11.1	2.6	-14.8	1.6	6.0	3.8	3.5	3.0	1.6	2.6	3.2
Malta	2.4	4.0	3.3	-2.5	3.5	2.1	2.5	2.6	3.5	3.9	3.0	2.2
Poland	3.6	7.2	3.9	2.6	3.7	5.0	1.6	1.3	3.3	3.5	3.4	3.4
Romania	1.8	6.9	8.5	-7.1	-0.8	1.1	0.6	3.5	2.8	3.8	3.8	4.0
Slovakia	3.0	10.8	5.7	-5.5	5.1	2.8	1.5	1.4	2.5	3.3	3.2	3.5
Slovenia	0.4	6.9	3.3	-7.8	1.2	0.6	-2.7	-1.1	3.0	2.7	3.0	2.6
Other Europe	1.5	3.7	1.5	-2.0	1.9	1.5	1.8	1.5	2.0	1.2	1.4	2.0
Iceland	1.4	9.5	1.5	-4.7	-3.6	2.0	1.2	3.9	1.8	5.0	4.0	3.7
Norway	1.1	2.9	0.4	-1.6	0.6	1.0	2.7	1.0	2.2	1.4	1.2	2.2
Switzerland	1.7	4.1	2.3	-2.1	3.0	1.8	1.1	1.8	1.9	0.9	1.4	1.8

Table 8. Word Economic Situation Prospects 2016 – List of Developed Countries (p. 159)

Taking into account the prior, the fact that the research methodology embedded in this approach is based on empirical data up until the year 2016, as well as the cultural (according to Hofstede's dimensions) proximity of Poland with the rest of

countries classified as developing in the data sample, the author has decided to consider Poland as a developing instead of as a developed country – i.e. present Poland as the outlier of the overall data classification approach. Consequently, enabling an infrastructure to make a comparison as to whether the behavior of Poland in context of the M-Score and International Financial Reporting Standards is closer to the developing countries with whom its shares higher levels of cultural proximities - or it is alternatively closer to the other developed countries embedded in the data sample i.e. countries which represent its core Foreign Direct Investor partners as well as countries which alike it, according to United Nations World Economic Situation Prospects are identically categorized as developed.

Specifically, according to the Report of the National Bank of Poland (2016, p. 20) "Foreign direct investment in Poland and Polish direct investment abroad in 2016", Poland's core five Foreign Direct Investment Partners are Germany, Netherlands, Luxembourg, France, Italy, and Spain.

On the other hand, as seen by Figure 3. and 4. from the perspective of Hofstede's Cultural Dimensions, Poland is significantly closer to the profile of

other developing countries embedded in the sample such as Mexico, Turkey and Brazil – relatively to when compared to other developed WesternEuropean Countries such as Germany, France and Luxembourg. In this context it is relevant denoting the studies of Chung et al. (2021, p. 1), Sharma et al. (2019, p.17875), Indra and Nugroho (2018, p.143), Zahari and Harshad (2020, p.283), Mihret (2014, p.161) which provide multiple quantitive and qualitative evidence that culture as a phenomenon overall significantly impacts the fraud commitment process.

Hence, classifying Poland as a developing country (i.e. the odd one out) enables the author to obtain insights as to whether, in the context of occupational fraud and International Financial Reporting Standards associated patterns, a nation's Foreign Direct Investment cross-country partnership or Hofstede's cultural dimensions have a more significant role than cultural dimensions.

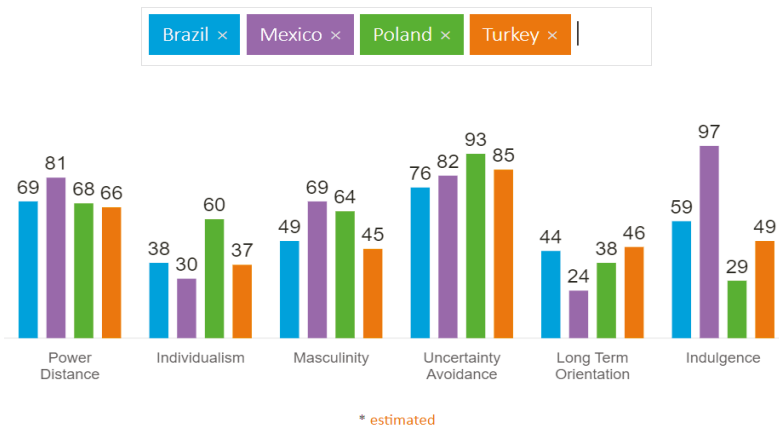


Figure 4. Hofstede 's Cultural Dimensions – Comparison between Poland, Turkey, Mexico and Brazil

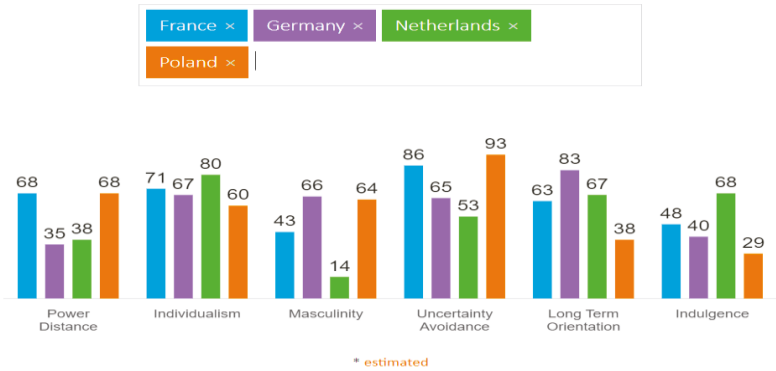


Figure 5. Hofstede 's Cultural Dimensions – Comparison between Poland, Germany, France and Netherlands

Last in the background section of the methodology it is also key to denote, the decision of the author to select a sample size composed of 76 business entities.

Specifically, as highlighted in the sub-section of the doctoral thesis focusing on elaborating on the first empirical methodology approach, neural networks in spite of being considered as relatively more statistically accurate when compared to standard regression-based methods utilized in white-collar crime research, they still are considerably more impacted by the amount of quantitative data they can process (particularly in context of the training time). On the other hand, the current state of art, provides no research dedicated towards establishing frameworks capable of guiding academics as well as practitioners on the manner in which they should determine the optimal sample size for their neural network-based models. Consequently, the author selected the size of their data sample by running their multilayer perceptron neural network hundreds different times through utilizing a wide spectrum of data sample variations ranging from 25 to 110 business entities (maximum sample size provided by GuruFocus).

4.4 M-Score as a Benchmark for Occupational Fraud

As denoted in the prior section of the thesis, the occupational fraud proxy that the author has decided to utilize in this doctoral thesis, is the M-Score. The M-Score is a mathematical model developed by Professor Messod Beneish that utilizes eight different types of financial ratios for the purpose of identifying whether business entities have manipulated their financial statements (Beneish, p.10-11). The calculation of the prior elaborated financial ratios is executed via the extraction of information from publicly available financial statements of business entities. These financial ratios are subsequently assigned a set of pre-determined weights (as per the framework adopted by Professor Beneish) and are utilized for the purpose of creating the actual score capable of indicating the degree to which the financial statements of entities have been manipulated (Beneish, p.10-11)

Taking the prior into account, bellow the author lists the eight financial ratios that are embedded in the M-Score :

- DSRI = Days' Sales in Receivables Index. This particular financial ratio aims to provide a comparison between the revenue in receivables in the current

fiscal year, against the revenue in receivables incurred in the previous fiscal year (i.e. the year before). Scenarios in which the revenue in receivables in the current fiscal year displays a material increase from the revenue in receivables in the previous fiscal year, potentially indicate revenue inflation – therefore, higher likelihood that the financial statement of the firm are manipulated.

- GMI = Gross Margin Index. This financial ratio provides a comparison between the gross margin in the current fiscal year versus the gross margin in the previous fiscal year. From a theoretical perspective a business entity displaying decreasing rates of gross margin is characterized with a higher tendency to manipulate financial information.

- AQI = Asset Quality Index. This particular financial ratio aims to provide a comparison of the non-current assets (other than plant, property and equipment) to total assets in the current fiscal year, against the non-current assets to total assets in the prior fiscal year. From a theoretical perspective, an increase of the non-current assets of corporations (i.e. assets which future benefits are not uncertain) from one fiscal year to another, could indicate attempts at cost deferrals in the form

of intangible assets on the balance sheet – therefore, higher likelihood for corporations to manipulate their financial statements.

- SGI = Sales Growth Index. This ratio measures the sales incurred in the current fiscal year versus the revenues incurred in the previous fiscal year. From a theoretical perspective, although sales growth or decline it is not on its own an explicit indication of financial statement manipulation per se, evidence suggests that business entities that are in a growth stage are more inclined to be exposed to the pressure to artificially boost their revenues in order to continue displaying growth rates in their financial statements.

DEPI = Depreciation Index. This financial ratio measures the depreciation in the current fiscal year against the depreciation in the previous fiscal year. From a theoretical perspective a slower rate of depreciation could be an indication that a particular business entity is revising useful asset life assumptions upwards – therefore, potentially manipulating their financial statements. Additionally, a lower depreciation rate could also signify that the corporation is adopting a depreciation

method that is more inclined to artificially boost the bottom-line reflected in the financial statements.

- SGAI = Sales, General and Administrative (SGA) expenses Index. This financial ratio measures the sales, general and administrative expenses in the current fiscal year, relative to the sales, general and administrative expenses incurred in the preceding fiscal year. Theoretically, a disproportionate increase in sales indicates that the future prospects of a particular business entity are negative – therefore, their overall tendency to engage in manipulating their financial statements is higher.

- LVGI = Leverage Index. This financial ratio measures the ratio of total debt to total assets in the current fiscal year versus the ratio of total debt to total assets in the prior year. Theoretically, an increase of the leverage index from one fiscal year to another signifies that the particular entity displays a tendency to capture an increased number of debt covenant-related incentives – which in turn is associated with a higher tendency for the firm to engage in manipulating its financial statements.

TATA - Total Accruals to Total Assets. This financial ratio assesses the total accruals to total assets in the current fiscal year against the total accruals to total assets in the preceding fiscal year. The core scope of this ratio is to actually quantify the extent to which corporations make discretionary accounting choices for manipulating their financial statements. Consequently, the higher the TATA ratio the higher the tendency of a particular firm to manipulate its financial statements.

The above financial ratios, as per the M-Score methodology are later inserted in the bellow presented formula for the purpose of calculating the M-Score of a particular business entity for a given fiscal year:

- M-Score = −4.84 + 0.92 × DSRI + 0.528 × GMI + 0.404 × AQI + 0.892 × SGI + 0.115 × DEPI −0.172 × SGAI + 4.679 × TATA − 0.327 × LVGI

As per the M-Score methodology, the higher the M-Score of a particular business entity, the higher the tendency of that entity to have engaged in crimes of the nature of occupational fraud.

Taking the above into account it is relevant denoting that the decision of the author to select M-Score as a proxy of occupational fraud, relative to other proxies

standardly used in the current state of art for identical purposes i.e. proxies of the nature of Altman Z score, is based on two particular reasons. The first reason stems from the fact that the Altman Z Score in spite of being utilized in the current state of art as a proxy of fraud, it still was historically developed by Professor Edward Altman in 1968 for the purpose of predicting bankruptcy within business entities. The M-Score of the other hand was developed with the primary purpose of assessing the likelihood of corporations to manipulate their financial statements. The second reason stems from the fact that the model has been successfully utilized for the purpose of predicting the fraud risk embedded in the financial statements of Enron i.e. the entity responsible for one of the most high profile accounting fraud scandals to have occurred in the past decades (Beneish, p.10-11; MacCarthy, 2017, 159-166).

4.5 Feedforward Neural Network – Overview

As denoted in the prior sections of this doctoral thesis, the author has selected a neural network modelling approach in order to investigate the main open questions embedded in this doctoral thesis. Specifically, the author in the doctoral thesis embeds two different types of neural networks in order to investigate the relationship between International Financial Reporting Standards as well as occupational fraud within entities operating in countries classified as developing.

The first neural network type implemented in this thesis is a feedforward neural network, while the second a multilayer perceptron neural network.

Feedforward neural networks are generally considered as the simplest form of neural networks where the connections between the units do not contribute towards creating a loop – hence, the information travels only forward. This is demonstrated in the below figure (Kriesel, 2007, p. 85); where *i1* and *i2* represent the input layers of the raw data which is imputed in the feedforward neural network. The *h1*, *h2*, and *h3* on the other hand represent the hidden layers, or in other words the nodes which together form the hidden layers (primarily via each node taking as an input

the nodes from the previous layers that are connected to it for the purpose of generating an output value). The Ω finally, represents the output layer or in other words the final models that accounts for the last hidden layer as an input. Consequently, indicating that in simple mathematical terms a feedforward network computes a function *f* on fixed size input *x* such that *f (x)* ≈ for training pairs (x,y).

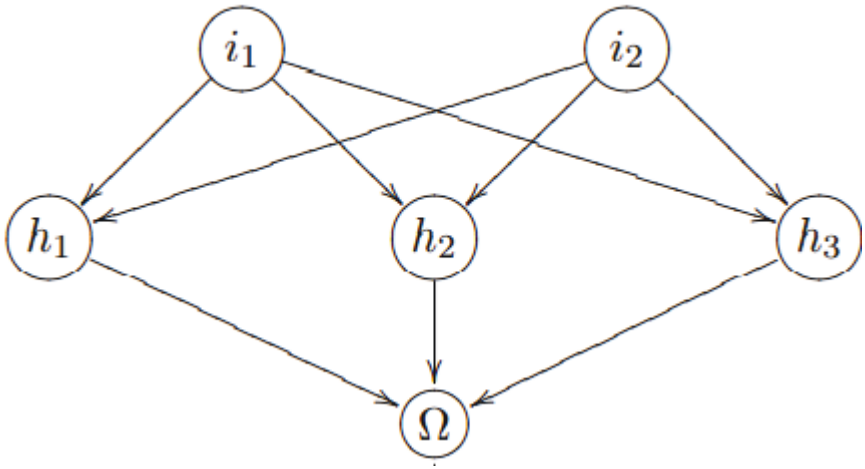


Figure 6. Generic representation of a basic feedforward neural network (Kriesel, 2007, p. 85)

Prior to proceeding forward, it is important denoting that the decision of the author to proceed with a feedforward neural network is primarily based on its simplicity, scalability as well as relatively higher computational performance – all

relevant factors when conducting long-term academic research in the field of fraud with sets imputing over 1000 data points. Additionally, Taniguchi et al. (1998, p. 1241- 42); Behera & Panigrahi (2015, p. 494); Khan et al. (2014, p. 115); Modi and Damya (2017, p. 1- 3); Ghosh & Reilly (1994, p. 621-62) have indicated that feedforward neural networks are effective in empirically investigating credit fraud primarily – while credit fraud being to a certain extent associated with multiple sub-categories of occupational fraud.

In this context it is relevant denoting that according to Kriesel (2007, p. 84) a multilayer perceptron is a sub-category of a feedforward neural network where every layer is a fully connected layer primarily. In other words, according to Kriesel (2007, p. 84) a classical feedforward neural network can be largely seen as a single layer perceptron which is capable of dividing the input space via a hyperplane (in a two dimension input space via the means of a straight line). On the other hand, a multiplayer perceptron neural network can classify convex polygons via further processing the straight lines referred to in the context of the single layer perceptron neural network (hence, in the below figure the multilayer perceptron neural

network is capable of recognizing patterns lying above straight line 1, below straight line 2, as well as below straight line 3) (Kriesel, 2007, p.84). This indicates that the multilayer perceptron neural network is capable of also capturing non-linear relationships amongst data - as well as, that this neural network can be seen as being composed of multiple single layer perceptrons or classic feedforward neural networks attached to each other. Hence, indicating that amongst the reasons behind the decision of the author to introduce a feedforward neural network was the fact that it serves as a base for constructing a multilayer perceptron neural network.

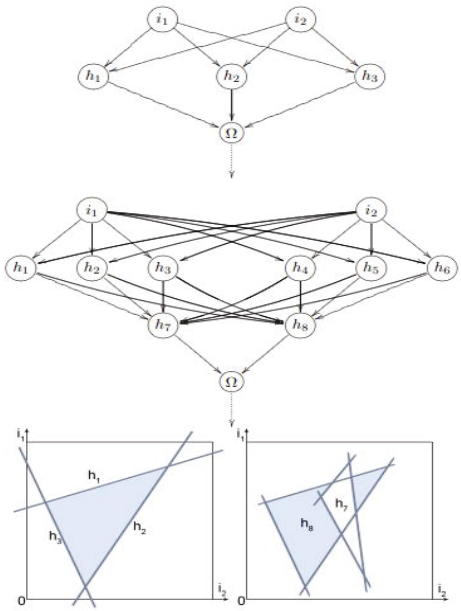


Figure 6. Generic representation of the relationship between a basic feedforward neural network and a multilayer perceptron neural network (Kriesel, 2007, p. 85)

4.6 Feedforward Neural Network Implementation – Primary and Secondary Methodology Approach

As indicated by the above sub-sections of the doctoral thesis, the feedforward neural network has been developed for the purpose of detecting the correlation between occupational fraud and International Financial Reporting Standards in developing countries (leveraging Colombia, Saudi Arabia as well as United Arab Emirates as developing country representatives). The data was divided into the period prior International Financial Reporting Standards was implemented in these jurisdictions (i.e. 2012-2014), as well as the period after International Financial Reporting Standards was implemented in these respective countries (i.e. 2018-2020). In other words, the feedforward neural network predicts M-Score associated patterns leveraging the pre-implementation period of International Financial Reporting Standards as a basis for predicative analysis data classification. Specifically, it can be stated that the feedforward neural network predicts M-Score associated patterns via imputing as an input layer the M-Score data for the period before International Financial Reporting Standards were implemented in Colombia, Saudi Arabia and United Arab Emirates (i.e. the M-Score data obtained

for 2012, 2013 and 2014). This input is then connected to hidden layers and stipulates the M-Score data obtained after International Financial Reporting Standards were implemented in these countries as an output (i.e. the M-Score Data obtained for the period 2018, 2019 as well as 2020). Consequently, indicating that the trained model of the feedforward neural network is configured in a manner in which it is tested to predict the M-score for the year 2018-2020 (post International Financial Reporting Standards implementation period), when the input is the M-score for the year 2012-2014 (pre International Financial Reporting Standards implementation period). In this context it is relevant denoting there are three specific reasons as to why the author has made the decision to exclude the data for the period 2015, 2016 as well as 2017 from the model – i.e. the M-Score data obtained for 123 randomly selected entities from Saudi Arabia, United Arab Emirates as well as Colombia. The first reason derives from the intent of the author to introduce a consistent data set in context of the input layer as well as the output layer – by considering only the last three fiscal years before International Financial Reporting Standards implementation, against the data available for the most recent

last three years after International Financial Reporting Standards were adopted in these jurisdictions (for all 123 entities embedded in the data set). The second reason was the author's decision to take mitigating actions from distorting the accuracy structure and final outcome of the model, via introducing an uneven set of input versus output M-Score data from a fiscal year perspective. In other words, configuring a model where only three years of data are used as an input (i.e. the M-Score for 2012 to 2014 as the only available data before International Financial Reporting Standards were adopted in Colombia, Saudi Arabia and United Arab Emirates) to predict six years' worth of data as an output (i.e. the total set of available M-Score data 2015, 2016, 2017, 2018, 2019 and 2020 after International Financial Reporting Standards were adopted in the jurisdictions considered in the data sample) could have significantly distorted the neural network accuracy and structure. This assumption was validated by the fact when the author attempted to construct such a model the statistical outputs associated with both types of neural network models were less than satisfactory. The last reason behind the decision of the author to adopt such a structure (i.e. eliminate the 2015, 2016 and 2017 M-

Score data from the model) was the intent to avoid that the statistical observations regarding the M-Score patterns observed after International Financial Reporting Standards were adopted in Saudi Arabia United Arab Emirates as well as Colombia are impacted by the fact that these jurisdictions have had a relatively more limited learning curve associated with this framework in the first years when it was introduced in their jurisdictions – hence, the opportunity and rationalization dimension of the fraud commitment process would be relatively lower simply as a result of lack of experience.

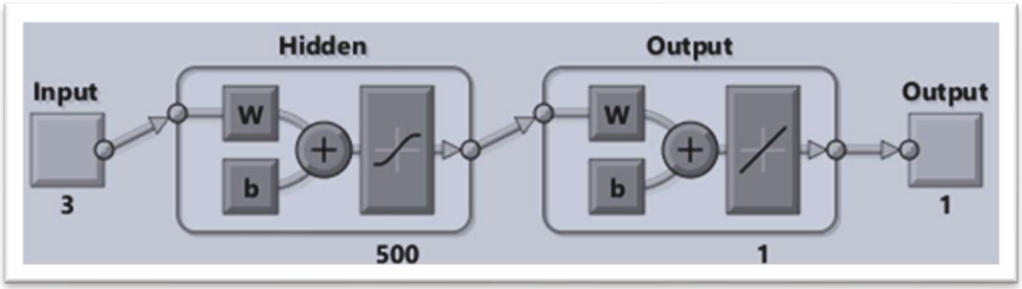


Figure 7. Blueprint of a Feedforward Neural Network for Approach 1

As indicated in multiple sub-sections of this doctoral thesis, the current state of art does not provide explicit guidance on the optimal data sample selection training function and hidden layer selection, in the process of engineering a neural network

infrastructure. Consequently, the final architecture and structure was selected after an extensive trial and error simulation process (over thousand simulations) to come up with the most performant neural network architecture.

Consequently, as indicated above the neural network was constructed leveraging as Input Variables the M-Scores obtained prior the implementation of International Financial Reporting Standards, namely the period 2012, 2013 and 2014. The output on the other hand, represented the M-Scores obtained post the implementation of International Financial Reporting Standards namely the period 2018, 2019 and 2020.

The hidden layers computed amounted to 500 and their generation (as highlighted above) was based on a trial and error basis – indicating that hidden layers of 500 were selected due to providing the most optimal neural network structure. Additionally, the author assigs as well as bias neuron solely for the technical purposes of enabling the consideration of threshold values as connection weights. In this context it is relevant denoting that for this feedforward neural network 70% of the data sample composed of 123 business entities operating in

Colombia United Arab Emirates as well as Saudi Arabia was used for the training of the neural network. The remaining 30% was used for the testing purpose of the neural network, on the other hand. In this context as well the decision of the author to divide the sample between a training versus a testing population was exclusively driven by a trial and error process comprised of over thousand simulations.

The training function utilized for the training of this network is based on Levenberg-Marquardt (LM) backpropagation model which primary application is solving for the least-squares curve fitting problem. In other words, for a given set of *m* empirical pairs (*Xi, Yi*) of both dependent as well as independent variables it finds the parameter *B* of the model curve *f (x,B),* in a manner which the sum of the squares of the deviations *S(B)* is minimized. This training function was selected as per the trial and error process implemented – i.e. it provided for the most optimal performance of the neural network (e.g. ahead of other training functions such as the Bayesian regularization backpropagation method, or the method based on scaled conjugate gradient backpropagation). The activation function selected for this neural network is a sigmoid function which is defined as a monotonic function

(a function between ordered sets that preserves or reverses the given order), and which first derivative is bell shaped (Han and Claudio, 1995; p. 93). The activation function selection was also based exclusively on a trial and error basis.

As indicated in the prior subsections of this doctoral thesis, the author as well implements the feedforward neural network in context of the second empirical approach. This approach revolved around comparing the M-Score of entities operating in developing countries as well as entities operating in developed countries that are both adopters of International Financial Reporting Standards.

In other words, the feedforward neural network predicts M-Score associated patterns across both developing and developed countries that have adopted International Financial Reporting Standards. The prior is achieved by comparing the M-Score of a range of entities (71) operating in Latin America, Eastern European, Western European as well as Eurasian countries for the period 2012-2016. In other words, it can be stated that in this context the feedforward neural network evaluates the correlation between International Financial Reporting Standards, via a model which imputes as an input the 4 years' worth of M-Score

data obtained for the entities in the embedded data sample, while also injecting a 10 hidden layer structure and accounting for the "Developing vs Developed" (i.e. 1 or 0) data point as an output.

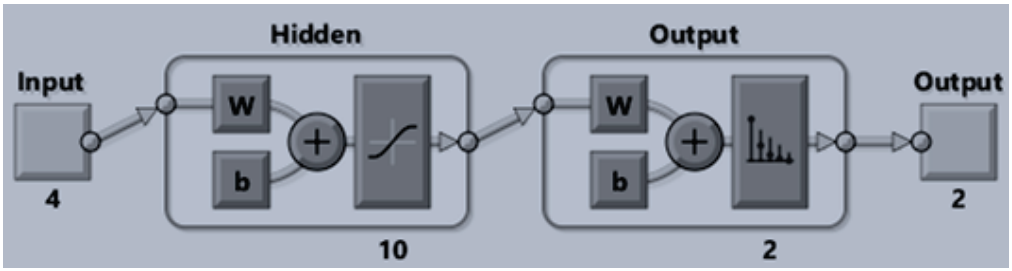


Figure 8. Feedforward Neural Network Blueprint for Second Methodology Approach

The hidden layers computed amounted to 10 and their generation was based on a trial and error basis – indicating that hidden layers of 10 were selected due to providing the most optimal neural network structure. The training function utilized for the training of this network is based on the scaled conjugate gradient backpropagation model, which primary application is revolving towards adjusting the weights in the steepest descent direction (negative of the gradient) – as it uses a scaled conjugate gradient to update the weights and biases of the feedforward network.

This training function was selected ahead of Bayesian regularization backpropagation method, as well as the method based on Levenberg-Marquardt backpropagation - as it provided the most optimal structure during the trial and error process revolving over thousand structure simulations.

In this context it is relevant denoting that for this feedforward neural network as well 70% of the data sample composed of the 71 business entities was used for the training of the neural network. The remaining 30% was used for the testing purpose of the neural network, on the other hand.

Lastly, in this context it is also relevant denoting that alike the first methodology approach embedded in this doctoral thesis, here as well the author selected a sigmoid function as an activation function. The sigmoid function was selected to ensure consistency with the primary methodology approach, as well as the fact that it provided for the most optimal neural network structure based on the trial and error analysis of over thousand simulations selected by the author.

4.7 Multilayer Perceptron Neural Network – Overview

As indicated in the prior sub-sections of this doctoral thesis the author as part of the thesis also incorporates a multilayer perceptron neural network. In line with prior elaborated indications it is important denoting the core reasons as to why the multilayer perceptron was selected for the purpose of this doctoral study:

- A multilayer perceptron neural network is a feedforward neural network where the mapping between the input and output layer is conducted in a non-linear fashion. In other words, a multilayer perceptron neural network is primarily defined as a class of a feedforward artificial neural network (with a backpropagation supervised learning technique) where each node is a neuron which uses a nonlinear activation function. Consequently, different to the standard feedforward neural network elaborated above, the multilayer perceptron neural network can also be applied against non-linear functions – or against exploring linear as well as non-linear relationships amongst data. As highlighted in the above sections of the doctoral thesis, to the best knowledge of the author there

is no evidence in the current state of art which investigates the relationship between occupational fraud as well as International Financial Reporting Standards in the current state of art. Hence, there are minimal indications as to whether the relationship between International Financial Reporting Standards and occupational fraud is linear or non-linear. Consequently, a multilayer perceptron neural network or better said a neural network structure capable of tackling both linear and non-linear data relationships was deemed as optimal.

- The selection of the multilayer perceptron neural network provided more optimal results than other types of neural networks which the author tested for the purpose of this doctoral thesis. Amongst these were other types of feedforward neural networks such as the autoencoder – as well as other categories of neural networks such as the radial basis function neural network as well as different forms of recurrent neural networks. Hence, why the author opted for this neural network structure

as well as a feedforward neural network (serving as a base for constructing the multilayer perceptron neural network in question).

4.8 Multilayer Perceptron Neural Network – Implementation Primary and Secondary Methodology Approach

The implementation of the multilayer perceptron for the primary approach was based on the same input layer structure as the feedforward neural network. Specifically, it can be stated that the multilayer perceptron neural network predicts M-Score associated patterns via imputing as an input layer the M-Score data for the period before International Financial Reporting Standards were implemented in Colombia, Saudi Arabia and United Arab Emirates (i.e. the M-Score data obtained for 2012, 2013 and 2014). This input is then connected to hidden layers and stipulates the M-Score data obtained after International Financial Reporting Standards were implemented in these countries as an output (i.e. the M-Score Data obtained for the period 2018, 2019 as well as 2020). Consequently, indicating that the trained model of the multilayer perceptron neural network is configured in a manner in which it is tested to predict the M-score for the year 2018-2020 (post International Financial Reporting Standards implementation period), when the input is the M-score for the year 2012-2014 (pre International Financial Reporting Standards implementation period).

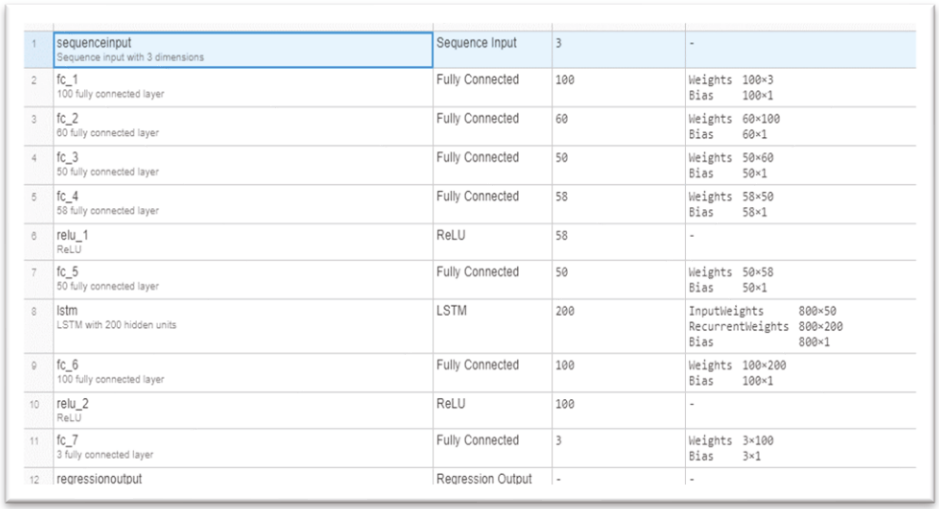
Additionally, similarly to the context of the feedforward neural network for the multilayer perceptron neural network 70% of the data was used for trainings – while the remaining 30% for testing purposes. In this context it is relevant denoting that the structure of the neural network was selected after

After testing different topologies, the network with the below specifications was finalized to find the correlation between the Pre and Post IFRS M-Scores.

- **Input Layer**: M-Score Data 2012-2014
- **Layer 2**: Fully Connected Layer with 100 Neurons
- **Layer 3**: Fully Connected Layer with 60 Neurons
- **Layer 4**: Fully Connected Layer with 50 Neurons
- **Layer 5**: Fully Connected Layer with 58 Neurons
- **Layer 6**: Rectified Linear Unit Layer
- **Layer 7**: Fully Connected Layer with 50 Neurons
- **Layer 8**: Long Short Term Memory layer
- **Layer 9**: Fully Connected Layer with 100 Neurons
- **Layer 10**: Rectified Linear Unit Layer

- **Layer 11**: Fully Connected Layer with Output Neurons (M-Score data for 2018-2020)
- **Layer 12**: Regression Layer

In this context it is relevant denoting that Rectified Linear Unit is an activation function used in neural networks where $f(x) = x^+ = max\ (0, x)$ and x is the input on the neuron. The activation function overall is a linear function that will output the input directly if it is positive, otherwise, it will output zero. On the other hand, a long short-term memory recurrent neural network layer is a layer capable of triggering feedback connections to process not only single data points but also entire sequences of data.



1	sequenceinput Sequence input with 3 dimensions	Sequence Input	3	-
2	fc_1 100 fully connected layer	Fully Connected	100	Weights 100×3 Bias 100×1
3	fc_2 60 fully connected layer	Fully Connected	60	Weights 60×100 Bias 60×1
4	fc_3 50 fully connected layer	Fully Connected	50	Weights 50×60 Bias 50×1
5	fc_4 58 fully connected layer	Fully Connected	58	Weights 58×50 Bias 58×1
6	relu_1 ReLU	ReLU	58	-
7	fc_5 50 fully connected layer	Fully Connected	50	Weights 50×58 Bias 50×1
8	lstm LSTM with 200 hidden units	LSTM	200	InputWeights 800×50 RecurrentWeights 800×200 Bias 800×1
9	fc_6 100 fully connected layer	Fully Connected	100	Weights 100×200 Bias 100×1
10	relu_2 ReLU	ReLU	100	-
11	fc_7 3 fully connected layer	Fully Connected	3	Weights 3×100 Bias 3×1
12	regressionoutput	Regression Output	-	-

Figure 9. Blueprint of a Multilayer Perceptron Neural Network for Approach 1

As indicated in the prior sections of this doctoral thesis the multilayer perceptron neural network is also implemented in context of the second research proposal.

In other words, the neural network predicts M-Score associated patterns across both developing and developed countries that have adopted International Financial Reporting Standards. The prior is achieved by comparing the M-Score of a range of entities (71) operating in Latin America, Eastern European, Western European as well as Eurasian entities for the period 2012-2016. In other words, it can be

stated that in this context the neural network evaluates the correlation between International Financial Reporting Standards, via the below presented model:

- **Input Layer:** M-Score Data for 2013, 2014, 2015 and 2016 for entities operating in Developing and Developed Countries in the data sample
- **Layer 2:** Fully Connected Layer with 20 Neurons
- **Layer 3:** Fully Connected Layer with 30 Neurons
- **Layer 4**: Fully Connected Layer with 50 Neurons
- **Layer 5**: LSTM layer
- **Layer 6**: Fully Connected Layer with 2 Neurons
- **Layer 7**: SoftMax Layer with 2 Neurons
- **Output Layer**: Classification Layer of Developing versus Developed Countries with two classes (0 and 1)

In this context it is relevant denoting that a SoftMax Layer is defined as a neural network activation function, otherwise referred to as a normalized exponential function. In other words, a SoftMax is frequently used as the last

activation function of a neural network for the purpose of normalizing the output of a network to a probability distribution over predicted output classes.

For this second multilayer perceptron neural network approach, the same trainings versus testing population sample was implemented as for the feedforward neural network.

ANALYSIS RESULT

	Name	Type	Activations	Learnables
1	sequenceinput Sequence input with 4 dimensions	Sequence Input	4	-
2	fc_1 20 fully connected layer	Fully Connected	20	Weights 20×4 Bias 20×1
3	fc_2 30 fully connected layer	Fully Connected	30	Weights 30×20 Bias 30×1
4	fc_3 50 fully connected layer	Fully Connected	50	Weights 50×30 Bias 50×1
5	lstm LSTM with 100 hidden units	LSTM	100	InputWeights 400×… RecurrentWe… 400×… Bias 400×1
6	fc_4 2 fully connected layer	Fully Connected	2	Weights 2×100 Bias 2×1
7	softmax softmax	Softmax	2	-
8	classoutput crossentropyex with classes '0' and '1'	Classification Output	-	-

Figure 10. Blueprint of a Multilayer Perceptron Neural Network for Approach 2

Last, in this context of the doctoral thesis it is important denoting that the full architecture of the neural network was determined on the basis of a trial and error process involving over thousand simulations. This refers to the input data

layer construction the construction of each hidden layer - as well as activation function and epochs selection.

5. RESULTS

5.1 First Methodology Approach

5.1.1 Descriptive Statistics

As per the standard M-Score interpretation presented in the paper of Beneish & Vorst (2020, p. 24-25) and Beneish et al. (2013, p. 75- 80) if the M-Score is less than (-1.78) than the corporation in question is less likely to correspond to the profile of a manipulator (e.g. in the context of this doctoral thesis an M-Score of (-2.80) indicates a lower probability of occupational fraud risks within a corporation). On the other hand, if the M-Score is greater than (-1.78) then the likelihood that the corporation is corresponding to the profile of a manipulator is higher - e.g. in context of the thesis an M-Score of (-1.25) indicates higher likelihood that the corporation is subjected to fraud (Beneish & Vorst, 2020, p. 24-25; Beneish et al., 2013, p. 75- 80).

The prior denoted interpretation indicates that relatively more negative the M-Score values in a mathematical sense, the lower the occupational fraud risks within entities. In other words, a mathematical increase of the negative value

associated with the M-Score, the more improved the M-Score is – i.e. it reflects lower occupational risk within entities.

Taking the prior into account as well as the descriptive statistical data presented in the below tables it can be determined that the implementation of International Financial Reporting Standards in Colombia has contributed towards improving the M-Score of entities operating in this jurisdiction. Consequently, reducing the occupational fraud risks incurred within entities operating in Colombia. Specifically, the average M-Score for the period 2012-2014 in Colombia is (-1.756) – this period corresponds to the timeline before International Financial Reporting Standards were adopted in Colombia. On the other hand, the average M-Score for the period 2015-2017 is (-2.275), while for the period 2018 – 2020 is (-2.373) – these periods both corresponding to the timeline before International Financial Reporting Standards were implemented in Colombia. The above statistics indicate that overall, the M-Score has improved (i.e. occupational risk has been reduced) with the implementation of International Financial Reporting Standards in Colombia. The reason for the denoted stems from the fact

that after the implementation of International Financial Reporting Standards (in a mathematical sense) the M-Score values are more negative – i.e. when compared to the M-Scores obtained prior the implementation of International Financial Reporting Standards in Colombia. In this context it is also relevant denoting that the average M-Score for the fiscal year 2014 (i.e. a fiscal year before International Financial Reporting Standards were adopted in Colombia) is an outlier. Specifically, the average M-Score obtained for the fiscal year 2014 is an outlier when compared to the overall average M-Score patterns for all fiscal years before and after International Financial Reporting Standards were adopted in Colombia. The reason for the prior stems from the fact that the average M-Score for Colombian entities for the fiscal year of 2014 is (-0.339) - the only case for the entire sample of Colombian data where the M-Score goes below (-1.5). The associated M-Scores with this outlier year contributes the most towards the average M-Score result obtained for the overall period prior International Financial Reporting Standards were adopted in Colombia. Specifically, if the average M-Score for the fiscal year of 2014 is removed from the sample then the average M-

Score for Colombia for the entire period prior International Financial Reporting Standards were implemented in this jurisdiction will amount to (-2.464) – hence, it would significantly increase.

Nevertheless, in this context it is relevant denoting that there are also outlier fiscal years amongst the range of M-Score data obtained for the period after International Financial Reporting Standards were adopted in Colombia. Namely, the average M-Score for the fiscal year 2018 for Colombia is (-1.787) – the only fiscal year post the implementation of International Financial Reporting Standards in Colombia where the average M-Score drops below (-2.0). Consequently, if removing this outlier year than the average M-Score for the fiscal years after International Financial Reporting Standards were adopted in Colombia is (-2.494). Therefore, indicating that even in a scenario in which one is removing the outlier fiscal years the average M-Score for the fiscal years after International Financial Reporting Standards was adopted in Colombia indicates a decrease in occupational fraud risk tendencies when compared to the period before these financial reporting standards were adopted within the jurisdiction.

It is also relevant denoting that in context of Colombia there is an improvement in the average M-Score obtained for the most recent three years during which Colombia had adopted International Financial Reporting Standards (2018-2020) - relative to the first three years after this country had adopted International Financial Reporting Standards for the first time (2015-2017). Consequently, indicating that the more experience the jurisdiction gains with International Financial Reporting Standards the more the M-Scores of the entities within it improve. In this context it is relevant denoting that for fiscal year 2012, 2013, 2016, 2017, 2019, and 2020 the standard deviation is below 1 – i.e. ranging between 0.387 to 0.870. Consequently, indicating that a considered portion of the entities embedded in the sample of this doctoral thesis are positioned near the mean. An exception to this standard deviation pattern are the two prior elaborated outlier fiscal years in the entire data sample (namely 2014 as well as 2018) as well as the fiscal year 2015 (i.e. the fiscal year when the implementation of International Financial Reporting Standards initiated in Colombia) – i.e. fiscal years which due

to their specific outlier driven nature create the expectation that larger standard deviations are to be expected.

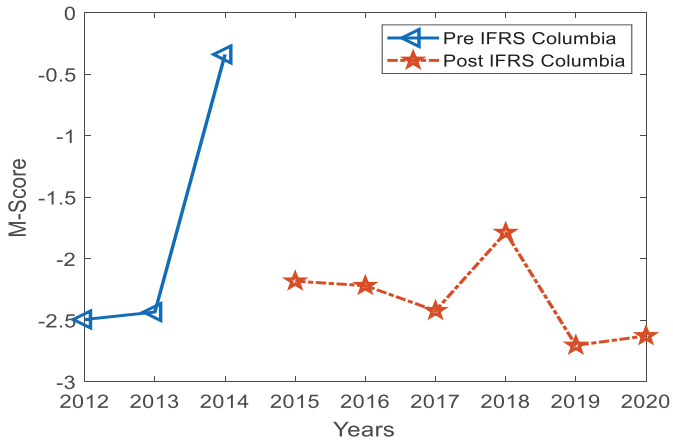


Figure 11. Average M-Score for Colombia before and after implementation of International Financial Reporting Standards

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mean	-2.494	-2.434	-0.339	-2.183	-2.219	-2.423	-1.787	-2.705	-2.627
Standard Error	0.117	0.237	1.451	0.599	0.262	0.132	0.566	0.094	0.138
Median	-2.464	-2.55	-2.06	-2.7	-2.4	-2.52	-2.35	-2.69	-2.65
Standard Deviation	0.387	0.784	4.812	1.987	0.87	0.439	1.878	0.312	0.459
Sample Variance	0.15	0.615	23.153	3.948	0.758	0.192	3.526	0.098	0.211
Kurtosis	2.576	7.133	7.3	8.154	5.73	4.972	8.348	2.086	2.976
Skewness	0.207	2.098	2.362	2.565	1.813	1.464	2.631	-0.217	0.617
Range	1.344	3.19	16.62	7.11	3.17	1.69	6.51	0.99	1.61
Minimum	-3.109	-3.42	-3.25	-3.47	-3.07	-3	-2.76	-3.19	-3.26
Maximum	-1.765	-0.23	13.37	3.64	0.1	-1.31	3.75	-2.2	-1.65
Sum	-27.435	-26.77	-3.73	-24.01	-24.41	-26.65	-19.66	-29.75	-28.9
Count	11	11	11	11	11	11	11	11	11

Average M-Score 2012-2014	**-1.756**
Average M-Score 2015-2017	**-2.275**
Average M-Score 2018-2020	**-2.373**

Table 9. Descriptive M-Score Statistics for Colombia before and after implementation of International Finan1cial Reporting Standards

In this context it is also relatively important to denoting that the statistical data obtained for Saudi Arabia demonstrated different patterns to the ones from Colombia. Specifically, as demonstrated by the figures displayed in the below pages the average M-Score for the period before International Financial Reporting Standards (namely from 2012 to 2014) were implemented in Saudi Arabia corresponds to (-2.392). On the other hand, the average M-Score for the period post International Financial Reporting Standards implementation is (-2.119) for the period 2015 to 2017, as well as (-2.518) for the period 2018 to 2020. Consequently, imputing an overall average of (-2.319) for the period after International Financial Reporting Standards were implemented in Saudi Arabia. Hence, indicating that different to Colombia in Saudi Arabia the average M-Scores of entities operating in this jurisdiction worsened (as they are less negative in a mathematical sense) after the implementation of International Financial Reporting Standards. Nevertheless, in this context it is important to bear in mind two facts.

The first fact is that similar to Colombia, the average M-Score for entities operating in Saudi Arabia was significantly improved during the last three most recent years of International Financial Reporting Standards implementation – when compared against the average M-Score of the first three years after International Financial Reporting Standards implementation in this jurisdiction for the first time. Consequently, indicating that the more experience the jurisdiction gains with International Financial Reporting Standards the more improvements are observed in relation to its M-Score overall trajectory. Moreover, comparing the average M-Score of the most recent three years post International Financial Reporting Standards implementation against the only three years of observation before International Financial Reporting Standards were adopted in Saudi Arabia explicitly indicates an improvement of the overall M-Score. In other words, the average M-Score for the period 2018-2020 is significantly better (i.e. reflected via higher negative numbers) when compared against the average M-Score for the period 2012-2014 (the period corresponding to the timeline before International Financial Reporting Standards were adopted in Saudi Arabia). Consequently, in

addition indicating that the sole reason behind the overall worst M-Score results post the implementation of International Financial Reporting Standards were the Saudi Arabian M-Score results obtained for the first three initial years after these financial reporting standards were adopted in this jurisdiction.

The above also is consistent with the second relevant fact that in the context of Saudi Arabia there are outlier fiscal years observed in light of the computed M-Score values computed for the period before and after the implementation of International Financial Reporting Standards in Saudi Arabia. Specifically, in spite of having less outlier years when compared to Colombia still in context of Saudi Arabia the fiscal year for 2015 is an outlier for both the period before and after International Financial Reporting Standards implementation. Specifically, the fiscal year 2015 is the sole fiscal year in the entire data sample with an average M-Score value of – 2.0 (the worst M-Score value when compared to the rest of the fiscal years). Consequently, as a result of it being the main contributor why the overall M-Score for the entire period post International Financial Reporting Standards is worse when compared to the average M-Score of fiscal years before

International Financial Reporting Standards was implemented in Saudi Arabia. This is further proven by the fact that when removing 2015 from the sample, the average M-Score for the period post International Financial Reporting Standards is -2.398 (i.e. better than the M-Score obtained for the fiscal years before these financial reporting standards were adopted in these jurisdictions). In this context it is relevant also denoting that the standard deviations for all fiscal years is less than 1 – i.e. indicating that a considerable portion of the entities embedded in the sample of this doctoral thesis are centered near the mean. The fiscal year with the highest standard deviation is the fiscal year 2015 – which serves as well as the outlier fiscal year in the Saudi Arabian data sample.

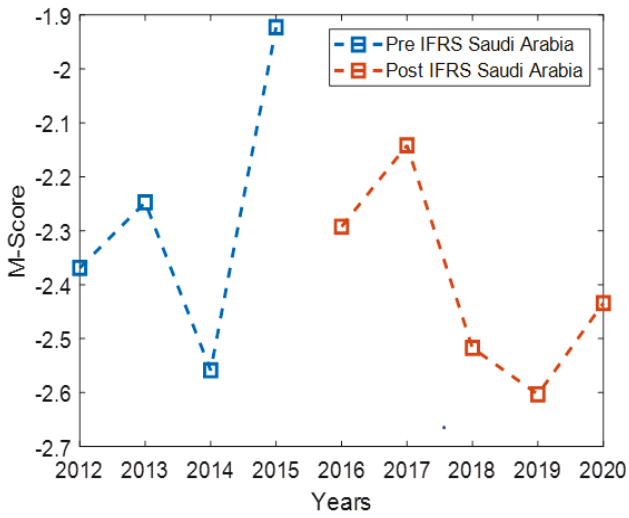


Figure 12. Average M-Score for Saudi Arabia before and after implementation of International Financial Reporting Standards

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mean	-2.369	-2.248	-2.559	-1.923	-2.293	-2.142	-2.517	-2.603	-2.434
Standard Error	0.146	0.117	0.074	0.341	0.141	0.238	0.1	0.094	0.203
Median	-2.495	-2.545	-2.6	-2.555	-2.52	-2.525	-2.55	-2.615	-2.64
Standard Deviation	1.146	0.923	0.582	2.687	1.11	1.878	0.79	0.741	1.597
Sample Variance	1.314	0.853	0.338	7.222	1.233	3.527	0.623	0.549	2.55
Kurtosis	14.66	9.671	3.177	28.281	19.09	22.038	13.148	16.91	39.724
Skewness	2.301	2.346	0.236	4.713	3.702	4.277	-1.02	-2.626	5.754
Range	8.8	5.44	2.67	20.37	7.35	11.54	6.59	5.35	12.94
Minimum	-5.14	-3.92	-3.86	-5.32	-3.45	-4.17	-6.42	-6.74	-4.26
Maximum	3.66	1.52	-1.19	15.05	3.9	7.37	0.17	-1.39	8.68
Sum	-146.87	-139.35	-158.64	-119.22	-142.14	-132.8	-156.07	-161.4	-150.92
Count	62	62	62	62	62	62	62	62	62

Average M-Score 2012-2014	**-2.392**
Average M-Score 2015-2017	**-2.119**
Average M-Score 2018-2020	**-2.518**

Table 11. Descriptive M-Score Statistics for Saudi Arabia before and after implementation of International Finan1cial Reporting Standards

The last country embedded in the data sample is United Arab Emirates. Specifically, for the United Arab Emirates the average M-Score for the fiscal years 2012 to 2014 was (-2.000) – this corresponds to the period before International Financial Reporting Standards were adopted in United Arab Emirates. On the other hand, the United Arab Emirates average M-Score for the fiscal years 2015-2017 is (-2.441), while for the fiscal years 2018-2020 being (-2.517). Consequently, indicating that the M-Score improved after the implementation of International Financial Reporting Standards in United Arab Emirates. Furthermore, similar to Saudi Arabia as well as Colombia in the context of United Arab Emirates as well the M-Score average data obtained for the three most recent years of International Financial Reporting Standards implementation demonstrate that the more experience the jurisdiction acquires with these reporting standards the more improvements in the M-Score area are apparent. The reason for the denoted is that the M-Score is (-2.441) for the period of 2015 to 2017 – while (-2.517) for the period of 2018-2020. In this context it is relevant to denote that in context of United Arab Emirates the fiscal year 2013 is an outlier – as it is the only year where the

M-Score is below -2.0. Consequently, the fiscal year contributing the most for the difference of M-Score average data for the period before versus the period after International Financial Reporting Standards were implemented in this jurisdiction. In this context it is important to denote that for every fiscal year besides 2018 to 2020 the standard deviation is above one – hence, relatively higher than for the rest of the data sample. Therefore, indicating that most of M-Score data for the United Arab Emirates are not centered around the mean.

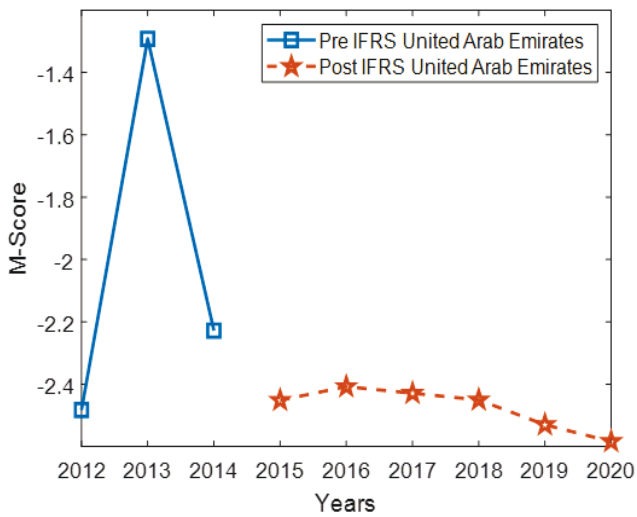


Figure 13. Average M-Score for United Arab Emirates before and after implementation of International Financial Reporting Standards

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mean	-2.488	-1.295	-2.217	-2.458	-2.418	-2.447	-2.437	-2.534	-2.58
Standard Error	0.081	0.426	0.144	0.156	0.191	0.148	0.071	0.1	0.108
Median	-2.41	-2.27	-2.37	-2.54	-2.65	-2.45	-2.46	-2.52	-2.51
Standard Deviation	0.576	3.043	1.025	1.113	1.366	1.055	0.511	0.712	0.769
Sample Variance	0.331	9.258	1.05	1.239	1.867	1.113	0.261	0.507	0.591
Kurtosis	10.852	15.322	7.828	15.947	15.87	11.149	3.141	21.085	16.149
Skewness	-1.7	3.337	1.16	2.932	2.521	1.905	-0.015	-3.166	-2.724
Range	4.12	17.75	7.04	7.74	10.83	7.29	2.44	5.59	5.49
Minimum	-5.08	-3.53	-5.23	-4.56	-6.59	-5.29	-3.73	-6.53	-6.57
Maximum	-0.96	14.22	1.81	3.18	4.24	2	-1.29	-0.94	-1.08
Sum	-126.9	-66.05	-113.06	-125.37	-123.31	-124.81	-124.31	-129.23	-131.59
Count	51	51	51	51	51	51	51	51	51

Average M-Score 2012-2014	**-2**
Average M-Score 2015-2017	**-2.441**
Average M-Score 2018-2020	**-2.517**

Table 12. Descriptive M-Score Statistics for United Arab Emirates before and after implementation of International Finan1cial Reporting Standards

5.1.2 Multilayer Perceptron Neural Network and Feedforward Neural Network Results

The below diagram provides an overview of the actual versus the predicted M-Score values which were generated as part of the output of the feedforward neural network described in the above sub-section of this doctoral thesis. As demonstrated by the figure below the predicted and actual values are very close to each other, with exception of less than 15 data points which serve as an outlier. Consequently, indicating that the feedforward neural network leveraging the M-Score obtained for the period prior the implementation of International Financial Reporting Standards as an input was relatively sucessful in predicting the M-Score post the implementation of International Financial Reporting Standards as an output. In addition, for the evaluation of the feedforward neural network the author

as well leverages the error histogram metric – which is a histogram representation of the errors between the target values and predicted values after training a feedforward neural network. As per standard metrics, an accurate feedforward neural network or better said a successfully trained neural network should have the values in the x-axis of the error histogram close to zero. As demonstrated by the below figure (i.e. by the below error histogram), bins are the number of vertical bars one is observing on the graph. The total error range is divided into 20 smaller bins in the below case. The Y-axis represents the number of samples from the dataset, which lies in a particular bin. At the mid of the below plot, the bins are corresponding to the error of -5.5e-05 to 4.85e-05.

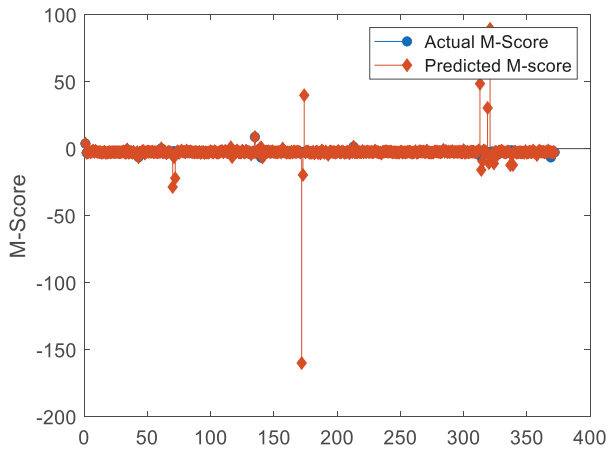


Figure 14. Feedforward Neural Network - Testing result for the data embedded in the primary methodology approach with Pre-International Financial Reporting Standards (2012-2014) and post-International Financial Reporting Standards (2018-2020)

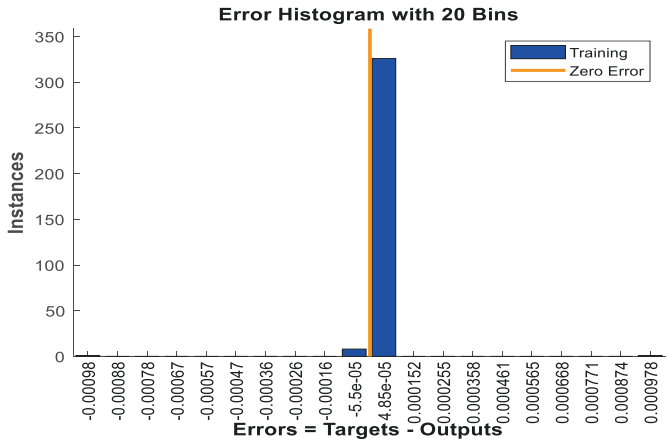


Figure 15. Error histogram for Feedforward Neural Network

In addition to the above, the figures below demonstrate that the data fitting result for the training and the regression value for this fitting is 1, which means the model achieved the perfect fit between the input and output. Further the below figure as well shows that mean square error also reflects high level of accuracy, for a model trained with 1000 epochs.

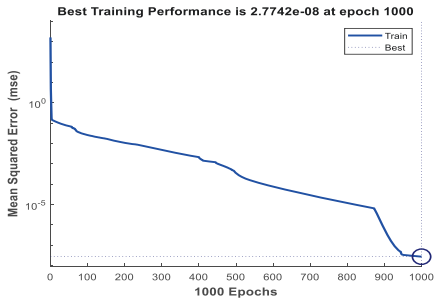


Figure 16. Training Time for Feedforward Neural Network for Primary Approach

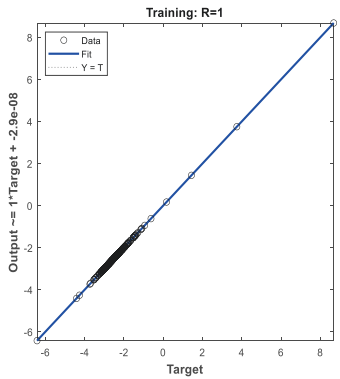


Figure 17. Training Data Fit for Feedforward Neural Network for Primary Approach

In this context it is relevant denoting that similarly favorable neural network results were also obtained for the multilayer perceptron neural network. Specifically, in the below diagram the author provides a representation of the Loss Function as well as Root Mean Squared Error, which demonstrates the error

between the actual and estimated output. For the Root Mean Squared Error the lower the value the more accurate the neural network. The same applies for the loss function. As the data is from different countries with different output in terms of fiscal years the convergence of the network is slow and the result for the first 1500 Epochs imputing a Root Mean Square Error of 0.19 is presented in the figure (hence, indicating a 81% fit to the data). The Loss Function as well indicates that it imputes a value relatively close to 0.

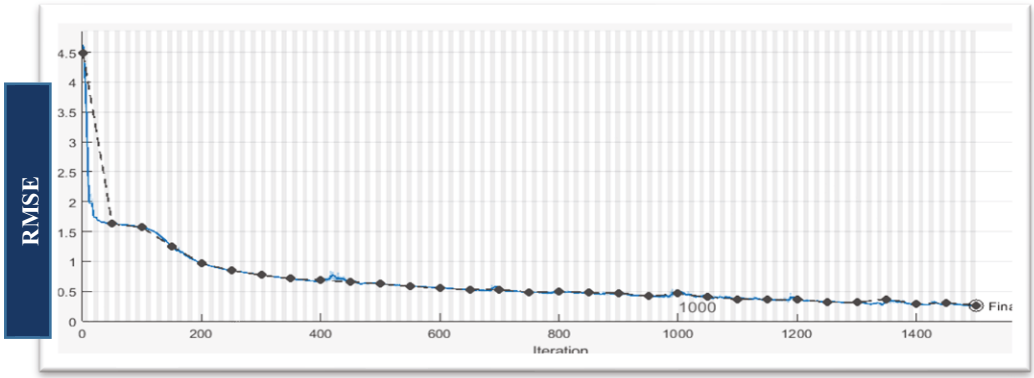


Figure 18. Root Mean Squared Error for the Multilayer Perceptron Neural Network

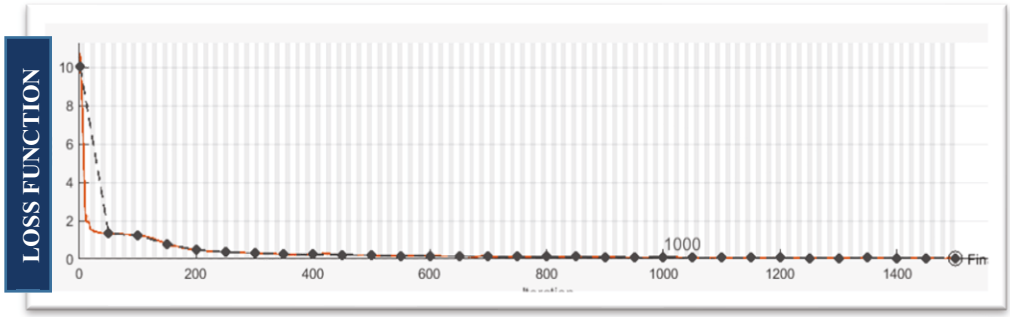


Figure 19. Loss Function for the Multilayer Perceptron Neural Network

5.2 Second Methodology Approach

5.2.1 Descriptive Statistics

The Descriptive Statistics for the M-Score data obtained for the period 2013-2016 for developed and developing regions compliant with International Financial Reporting Standards demonstrates that entities complying with International Financial Reporting Standards that operate in developing countries have on average lower M-score means (in the mathematical sense) - when compared to their counterparts operating in developed jurisdictions. Hence, indicating that entities compliant with International Financial Reporting Standards as well as International Standards on Auditing that operate in developed countries reflect lower occupational fraud-related tendencies when compared to entities operating in developing jurisdictions. Specifically, the lowest M-Score average mean for 2013-2016, is recorded for entities operating in the Eurasian region (namely - 2.31) as well as Latin American region (i.e. namely - 2.52) – i.e. entities in developing countries operating in International Financial Reporting Standards as well as International Standards on Auditing. On the other hand, entities operating

in Western Europe (i.e. entities operating in developed regions and compliant with International Financial Reporting Standards as well as International Standards on Auditing) have an average M-score mean of (-2.688). In this context, it is relevant denoting that the sole developing region, which demonstrates an M-score that is relatively more in line with the ones observed in developed regions (rather than the M-score observed in other similar developing countries), is the average M-score obtained during 2013-16 for Eastern Europe. Specifically, the M-score obtained for Eastern European companies that are compliant with International Financial Reporting Standards and International Standards on Auditing for 2013-2016 is (-2.72). In this context it is relevant denoting that the M-Score of (-2.72) besides of being closer to the M-score obtained for entities operating in developed countries, it is also the highest average M-score in a mathematical sense that is obtained for the full scope of the data sample. Hence, indicating that Eastern European countries do demonstrate the lowest occupational fraud tendencies observed in the doctoral thesis. The prior phenomenon can to a certain extent be explained by the fact that entities operating in Eastern Europe from a geo-political as well as economic-

relationship proximity are significantly closer to their counterparts embedded in this thesis that operate in developed regions (i.e. Western Europe), rather than the other peer entities operating in developing regions that are embedded in this doctoral thesis (i.e. Latin America, as well as Eurasia). Specifically, in this context it is relevant denoting that the Eastern European sub-sample obtained for the purposes of this doctoral thesis is fully composed of entities operating in Poland. Poland since 1994 has integrated itself as a member of the European Union (i.e. a Union part of which are as well the full scope of entities embedded in the sub-sample of Western Europe). Furthermore, as indicated in the previous sections of this doctoral thesis, Poland according to the methodology of the United Nations Department of Economic and Social Affairs, & United Nations Conference on Trade and Development for country classification is considered as a developed country as well as its core foreign direct partners are in fact entities operating in Western Europe (exclusively countries classified as developed). Taking this into account as well as the main reasons as to why the author embedded Poland in the category of developing countries, it is important denoting that the descriptive

statistics results are indicating that the country classification methodology developed by United Nations Department of Economic and Social Affairs, & United Nations Conference on Trade and Development is more adequate than the one of MSCI S&P as well as FTSE in classifying countries in light of occupational fraud and International Financial Reporting Standards implementation behavioral patterns. In other words, the above data demonstrates that in context of occupational fraud the methodology for country classification provided by the United Nations Department of Economic and Social Affairs, & United Nations Conference on Trade and Development provides a relatively more accurate infrastructure in grouping countries in relation of their fraud behavioral patterns.

In the context of the statistical description embedded in the below tables , it is also relevant denoting that the standard deviation for the average M-score computed across the 2013-2016 period is relatively low for all regions embedded in the thesis (i.e. ranging between 0.28 to 0.76). Specifically, for all sub-samples embedded in the thesis, the coefficient of variation computed (i.e. standard deviation vs. mean) is less than 1 – hence, indicating that a considered portion of

the entities embedded in the sample of this doctoral thesis are centered near the mean. However, the highest standard deviations are experienced for entities operating in Western Europe as well as Eastern Europe.

Company M-Score 2013		*Company M-Score 2014*		*Company M-Score 2015*		*Company M-Score 2016*		*M-Score Averege 2013-16*	
Mean	-2.8625	**Mean**	-2.05666667	**Mean**	-3.1175	**Mean**	-2.84833333	**Mean**	-2.720833333
Standard Error	0.310117585	**Standard Error**	0.37037314	**Standard Error**	0.247071101	**Standard Error**	0.189999335	**Standard Error**	0.219612118
Median	-2.425	**Median**	-2.425	**Median**	-2.8	**Median**	-2.775	**Median**	-2.55
Standard Deviation	1.074278828	**Standard Deviation**	1.283010192	**Standard Deviation**	0.855879399	**Standard Deviation**	0.658177005	**Standard Deviation**	0.760758692
Sample Variance	1.154075	**Sample Variance**	1.646115152	**Sample Variance**	0.732529545	**Sample Variance**	0.43319697	**Sample Variance**	0.578753788
Kurtosis	3.781315978	**Kurtosis**	0.687770154	**Kurtosis**	8.729841197	**Kurtosis**	0.209739626	**Kurtosis**	3.60385963
Skewness	-1.93678715	**Skewness**	1.245152503	**Skewness**	-2.8104174	**Skewness**	0.080416246	**Skewness**	-1.289686983
Range	3.63	**Range**	4.19	**Range**	3.16	**Range**	2.32	**Range**	3.14
Minimum	-5.68	**Minimum**	-3.62	**Minimum**	-5.68	**Minimum**	-4.03	**Minimum**	-4.65
Maximum	-2.05	**Maximum**	0.57	**Maximum**	-2.52	**Maximum**	-1.71	**Maximum**	-1.51
Sum	-34.35	**Sum**	-24.68	**Sum**	-37.41	**Sum**	-34.18	**Sum**	-32.65
Count	12	**Count**	12	**Count**	12	**Count**	12	**Count**	12

Table 13. M-Score Descriptive Statistics for Eastern Europe (Developing Region)

Company M- Score 2013		*Company M - Score 2014*		*Company M-Score 2015*		*Company M-Score 2016*		*M-Score Averege 2013-16*	
Mean	-1.6854545	Mean	-2.8681818	Mean	-2.0236364	Mean	-2.667272727	Mean	-2.3118182
Standard Error	0.4078555	Standard Error	0.1875673	Standard Error	0.552767	Standard Error	0.132645055	Standard Error	0.1520754
Median	-2.15	Median	-2.81	Median	-2.55	Median	-2.67	Median	-2.43
Standard Deviation	1.3527037	Standard Deviation	0.6220903	Standard Deviation	1.8333209	Standard Deviation	0.439933879	Standard Deviation	0.5043772
Sample Variance	1.8298073	Sample Variance	0.3869964	Sample Variance	3.3610655	Sample Variance	0.193541818	Sample Variance	0.2543964
Kurtosis	5.6976989	Kurtosis	-0.2265833	Kurtosis	9.4457059	Kurtosis	-0.221929834	Kurtosis	1.5203127
Skewness	2.1523811	Skewness	0.0565053	Skewness	2.9867061	Skewness	0.025022093	Skewness	0.9831448
Range	4.92	Range	2.17	Range	6.72	Range	1.51	Range	1.87
Minimum	-2.97	Minimum	-3.95	Minimum	-3.37	Minimum	-3.42	Minimum	-3.09
Maximum	1.95	Maximum	-1.78	Maximum	3.35	Maximum	-1.91	Maximum	-1.22
Sum	-18.54	Sum	-31.55	Sum	-22.26	Sum	-29.34	Sum	-25.43
Count	11	Count	11	Count	11	Count	11	Count	11

Table 14. M-Score Descriptive Statistics for Eurasia (Developing Region)

Company M-Score 2013		*Company M-Score 2014*		*Company M-Score 2015*		*Company M-Score 2016*		*M-Score Averege 2013-16*	
Mean	-2.671142857	Mean	-2.636571429	Mean	-2.784285714	Mean	-2.652857143	Mean	-2.688
Standard Error	0.063970544	Standard Error	0.049640629	Standard Error	0.087299625	Standard Error	0.055666431	Standard Error	0.047886069
Median	-2.61	Median	-2.62	Median	-2.7	Median	-2.61	Median	-2.64
Mode	-2.42	Mode	-2.58	Mode	-2.96	Mode	-2.7	Mode	-2.62
Standard Deviation	0.378454842	Standard Deviation	0.293677923	Standard Deviation	0.516471545	Standard Deviation	0.329327045	Standard Deviation	0.283297806
Sample Variance	0.143228067	Sample Variance	0.086246723	Sample Variance	0.266742857	Sample Variance	0.108456303	Sample Variance	0.080257647
Kurtosis	6.085495693	Kurtosis	1.784035843	Kurtosis	8.007356862	Kurtosis	2.128973009	Kurtosis	8.057111738
Skewness	-2.186726027	Skewness	0.240466334	Skewness	-2.528425505	Skewness	-0.90982557	Skewness	-2.530645068
Range	1.89	Range	1.49	Range	2.77	Range	1.66	Range	1.47
Minimum	-4.13	Minimum	-3.36	Minimum	. -4.83	Minimum	-3.63	Minimum	-3.78
Maximum	-2.24	Maximum	-1.87	Maximum	-2.06	Maximum	-1.97	Maximum	-2.31
Sum	-93.49	Sum	-92.28	Sum	-97.45	Sum	-92.85	Sum	-94.08
Count	35	Count	35	Count	35	Count	35	Count	35

Table 15. M-Score Descriptive Statistics for Western Europe (Developed Region)

Company M- Score 2013		*Company M - Score 2014*		*Company M-Score 2015*		*Company M-Score 2016*		*M-Score Averege 2013-16*	
Mean	-2.643846154	Mean	-2.348461538	Mean	-2.99	Mean	-2.116153846	Mean	-2.525384615
Standard Error	0.143863978	Standard Error	0.443934689	Standard Error	0.442904169	Standard Error	0.284739058	Standard Error	0.185401904
Median	-2.57	Median	-2.59	Median	-2.54	Median	-2.53	Median	-2.63
Standard Deviation	0.51870895	Standard Deviation	1.600629283	Standard Deviation	1.59691369	Standard Deviation	1.026641275	Standard Deviation	0.66847607
Sample Variance	0.269058974	Sample Variance	2.562014103	Sample Variance	2.550133333	Sample Variance	1.053992308	Sample Variance	0.446860256
Kurtosis	4.571597898	Kurtosis	9.448237247	Kurtosis	10.21823411	Kurtosis	4.442500927	Kurtosis	2.48933861
Skewness	-1.923180972	Skewness	2.760494386	Skewness	-3.026222242	Skewness	2.015559343	Skewness	0.348266676
Range	1.98	Range	7.02	Range	6.57	Range	3.69	Range	2.88
Minimum	-4.08	Minimum	-4.38	Minimum	-8.06	Minimum	-2.97	Minimum	-3.93
Maximum	-2.1	Maximum	2.64	Maximum	-1.49	Maximum	0.72	Maximum	-1.05
Sum	-34.37	Sum	-30.53	Sum	-38.87	Sum	-27.51	Sum	-32.83
Count	13	Count	13	Count	13	Count	13	Count	13

Table 16. M-Score Descriptive Statistics for Latin America (Developing Region)

5.1.2 Multilayer Perceptron Neural Network and Feedforward Neural Network Results

For the evaluation of the feedforward neural network of the second methodology approach the author primarily is leveraging the confusion matrix as a metric for evaluating the accuracy of the neural network. A confusion matrix is defined overall a summary-based representation of all of the prediction results associated with the data classification in a neural network. The number of correct and incorrect predictions are summarized with count values and broken down by each class. In context of this doctoral thesis, the classifications of the data are

divided in context of entities operating in developing countries as well as entities operating in developed countries. Consequently, in the process of testing the neural network, if an entity is classified in the raw data as an entity belonging to a developing country and also the neural network predicative analysis classifier also groups it to belonging to a developing country, then the output of the classifier is correct. In terms of the confusion matrix the value of all those business entities which belonged to the developing countries and the network correctly classified them as such, are place in position A of the neural network (see graphs below). Similarly, all the business entities belonging to developed countries and correctly classified by the classifier are placed at B category. Consequently, in light of the below diagram A and B represent the correct responses. On the other hand, C and D provide the misclassification (incorrect results) for Class I (Developed classified as Developing) and Class II (Developing classified as Developed), respectively. From the results it is concluded that the feedforward neural network provides 100% accuracy for the developed countries sub-sample embedded in this second approach. However, there are 3 data point misclassifications for the companies

belonging to the developing countries sub-sample– in line with the initial assumption of the author given the lower data quality as well as higher statistical volatility of the M-Score data associated with developing countries.

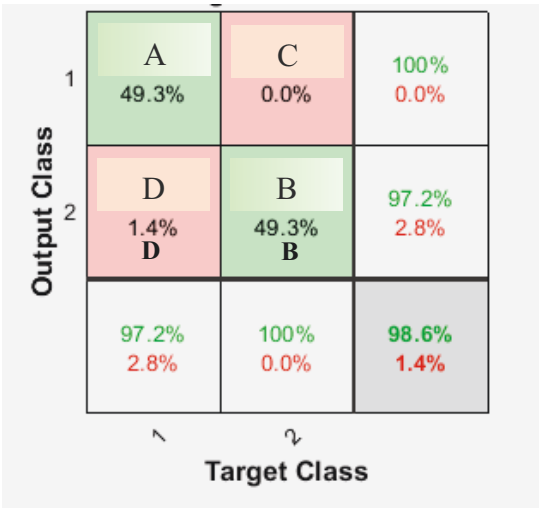


Figure 20. Confusion Matrix Feedforward Neural Network for Secondary Approach

In this context it is relevant denoting that similarly favorable neural network results were also obtained for the multilayer perceptron neural network. Specifically, in context of the confusion matrix of the multilayer perceptron neural network there are no data points which are classified wrongly – hence, there is a 100% predicative analysis accuracy.

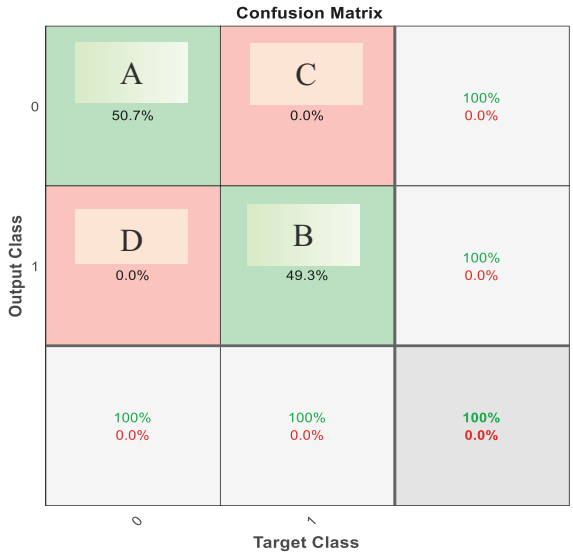


Figure 21. Confusion Matrix Multilayer Perceptron Neural Network for Secondary Approach

6. CONCULSION

The findings embedded in this doctoral thesis stipulate that on average International Financial Reporting Standards as well as International Standards on Audit contribute towards reducing occupational fraud risks within entities in countries classified as developing. Specifically, the findings embedded in this doctoral thesis did demonstrate that occupational fraud associated risks within entities operating in developing countries are reduced with the implementation of International Financial Reporting Standards. Additionally, the findings as well stipulate that the more experience developing jurisdictions gain with International Financial Reporting Standards, the more occupational fraud related risks associated with entities operating within these jurisdictions are reduced.

Given that to the best knowledge of the author this the first empirical analysis exploring the relationship between International Financial Reporting Standards, International Standards on Audit and occupational fraud it is key to denote what these findings stipulate for the overall stakeholder value chain of entities operating in developing countries.

As indicated in the prior sections of this doctoral thesis the implementation of complex regulatory and compliance frameworks of the nature of International Financial Reporting Standards as well as International Standards on Auditing is associated with high costs as well as lengthy timelines. Consequently, their implementation in countries classified as developing (i.e. countries which compared to their developed counterparts have lower economic growth and less advanced legislation implementation infrastructure) must be associated with relatively tangible benefits. Therefore, the fact that the implementation of International Financial Reporting Standards and International Standards on Auditing is associated with diminished occupational fraud risks (in context of developing countries) indicates for both policymakers as well as the management of corporations operating in these developing jurisdictions that investing in complying with these financial reporting and audit standards could be associated with relatively high returns of investment. Especially, since as denoted in the prior sections of this doctoral thesis occupational fraud is associated with substantial financial losses – i.e. financial losses which not only that distort the core

competences of victim organizations but also threaten their overall existence in the long run. The prior being in addition to the fact that the economic losses associated with occupational fraud could also contribute towards creating an infrastructure for corporations to reduce their overall tax obligations towards their respective governments – hence, hindering both the economic growth and development of countries overall. The prior is relatively crucial for developing countries which as per the findings of the Association of Certified Fraud Examiners are characterized with higher economic consequences triggered as a result of occupational fraud. Given the prior denoted facts it can stipulated that in light of the findings embedded in this doctoral thesis, policymakers (and other law enforcement institutions) as well as the management of corporations operating in developing countries should consider investing in the implementation of International Financial Reporting Standards for the purpose of introducing a mechanism capable to effectively diminishing occupational fraud risks. Additionally, the fact that the findings embedded in this doctoral thesis demonstrate that occupational fraud risks are increasingly getting reduced by the years of experience that jurisdictions in

developing regions gain with International Financial Reporting Standards indicates that the investment of policymakers and the management of corporations in implementing International Financial Reporting Standards has long-term benefits overall. Hence, it would not serve as a short-term tactical patch effective only up until the point the entities develop a learning curve on how to engage in occupational fraud while operating under an International Standards on Audit and International Financial Reporting Standards-based legislation.

The prior sections of this doctoral thesis amongst others also indicate that the economic losses associated with occupational fraud also could pose significant risks for the investors of the victim organizations. Particularly, the economic consequences associated with occupational fraud not only that distort the economic benefits acquired by investors – but also their overall welfare. The prior is particularly relevant for developing countries where as previously emphasized the economic losses associated with occupational fraud are higher when compared to their developed counterparts – while also there is generally a higher information asymmetry perceived by investors (particularly for the investors coming from

developed countries). In the context of information asymmetry it is relevant denoting that according to Mengitsu & Adams (2007, p.225-236) the process of investing in developing countries is generally associated with relatively higher levels of perceived skepticism overall – primarily due to information asymmetry triggered by the less advanced legislation (amongst others). Hence, the occurrence of occupational fraud in entities operating in developing countries could distort the welfare of investors (in addition to their economic outlook), not solely because "economic losses feel twice as painful as gains feel good" but also because of triggering higher levels of perceived information asymmetry. Consequently, the findings of this doctoral thesis indicate that investors investing in developing countries would optimize their economic outlook as well as welfare if investing in developing jurisdictions which in general have implemented International Financial Reporting Standards and International Standards on Audit. Especially, since the positive relationship between occupational fraud International Financial Reporting Standards and International Standards on Audit is further enforced with further experience in complying with these standards according to the findings

embedded in the thesis – as well as the fact that the economic and political incentives elaborated in the literature review also are further cemented with increased compliance experience in this area (which in turn reduced the motivation, and rationalization dimension of fraud commitment). Prior to further elaboration, in this context of the doctoral thesis it is relevant denoting that developing countries due to being largely foreign direct investment oriented (foreign direct investment being a core determinant of the economic growth and development) would be significantly more impacted than their developed counterparts by the distorted investor welfare and economic outlook as a consequence of occupational fraud. Hence, this should be seen as an additional indication that in light of the findings of this doctoral thesis, policymakers and the management of the corporations in developing countries could perceive the implementation of International Financial Reporting Standards and International Standards on Audit as crucial for their foreign direct investment prospects.

In the doctoral thesis it has been indicated that the economic losses associated with occupational fraud also impact the supply chain management of the

victim corporations – while also potentially subjecting them to unfair treatment compared to other suppliers which could be colluding with employees within the firm (primarily in the context of multiple corruption sub-categories). Consequently, indicating that suppliers selecting partners which implement International Financial Reporting Standards (in light of the findings of this doctoral thesis) could enable them mitigating some of the occupational fraud associated consequences.

In light of the current state of art from an academia perspective, the findings embedded in this doctoral thesis conducting the first empirical study of this nature do stipulate that economic and political incentives associated with International Financial Reporting Standards positively impact occupational fraud risks within developing countries. The reason for which being that the fact that this doctoral thesis demonstrates empirically that in general International Financial Reporting Standards reduce occupational fraud tendencies validates the theoretical assumption that the economic and regulation-based incentives associated with this reporting framework do statistically contribute to reducing the motivation and rationalization dimension of fraud commitment in developing countries.

Furthermore, the empirical study embedded in this doctoral thesis to the best knowledge of the author is the first one in the current state of art to be based on a machine learning approach – which besides of having a relatively higher predicative analysis power overall, is also optimally equipped to handle both linear and non-linear relationships across the data. As indicated in the prior sections of this doctoral thesis the current state of art provides minimal indications on the design of neural network models overall – particularly in context of investigating complex data relationships in the area of fraud and legislation overall. Hence, the neural network structure embedded in this doctoral thesis provides a foundation on the methods and types of neural network architectures to be chosen for empirical research similar to the one pursued as part of this doctoral thesis.

In this context it is relevant denoting the secondary findings which are as well embedded in this doctoral thesis. The first of this secondary findings is that occupational fraud risks overall are lower for entities in developed countries complying with International Financial Reporting Standards and International Standards on Audit – when compared to entities in developing countries which are

equally complying with International Financial Reporting Standards and International Standards on Audit. Consequently, indicating that the theoretical assumptions embedded in the statistical findings published by the Association of Certified Fraud Examiners indicating that occupational fraud occurrences are the lowest amongst developing countries are not validated by the empirical findings embedded in this doctoral thesis – which also accounts for International Financial Reporting Standards as an explanatory variable of the fraud phenomenon. The prior however is consistent with the theoretical assumptions presented in this doctoral thesis indicating that developed countries serve as benchmarks in context of legislative implementation in business practice. Therefore, in the context of this doctoral thesis indicating that the more developing countries interact with developed countries which alike implement International Financial Reporting Standards (in context of foreign direct investment primarily), the more International Financial Reporting Standards benefits will be experienced in context of an overall reduction of occupational fraud within entities operating in countries classified as developing. Additionally, in this context it is relevant denoting that

Poland in spite of being classified as a developing country (outlier in the secondary methodology approach) showed that from an occupational fraud and International Financial Reporting Standards perspective has higher level of similarity with developed countries which across all country classification methodologies presented in this thesis were classified as developed – contrary to Poland which besides in the United Nations Department of Economic and Social Affairs, & United Nations Conference on Trade and Development classification, is largely disputed as to whether it belongs in the developed country group alike its main Foreign Direct Investment partners such as France, Germany, etc. Therefore, the findings embedded in this doctoral thesis could indicate that the country classification methodology developed by United Nations Department of Economic and Social Affairs, & United Nations Conference on Trade and Development is more adequate than the one of MSCI, S&P as well as FTSE in classifying countries in light of occupational fraud and International Financial Reporting Standards implementation behavioral patterns. In this context it is relevant denoting that to the best knowledge of the author this is the first empirical research investigation

which explores which country classification methodology would provide more accurate results in the context of fraud, International Standards on Audit as well as International Financial Reporting Standards – in spite of country classification is a fundamental aspect on the accuracy of empirical analysis of this nature.

In spite of the fact that this doctoral thesis successfully provides the first empirical evidence concerning the statistical relevance of International Financial Reporting Standards and International Standards on Auditing in the context of occupational fraud and developing countries; it still has some limitations embedded in it. The first limitation stems from the fact that the data population embedded in the thesis is limited and does not incorporate all developing regions worldwide. Nevertheless, as indicated in the above sections of the thesis, the decision to incorporate a relatively more limited data sample size stems from the fact the neural networks provide a restricted infrastructure when it comes to processing large data sample sizes. Additionally, another limitation embedded in this doctoral thesis, is that it does not incorporate neither in its theoretical nor its empirical part, any mentioning of interaction variables such as Hofstede's cultural dimensions – i.e.

interaction variables which the current state of art indicates as relevant in the context of International Financial Reporting Standards and International Standards on Auditing. The decision of the author to not incorporate in this thesis interaction variables, which the current state of art deems relevant was made for the purpose of maintaining a relatively concise research scope – i.e. a concise scope which revolved exclusively around provide the first empirical evidence in the current state of art, that highlight the direct relationship between International Financial Reporting Standards and International Standards on Auditing, while holding other factors constant.

7. BIBLIOGRAPHY

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8. APPENDIX

APPENDIX 1: *M Score Raw Data for Secondary Research Methodology*

Company Name	Company Country	Company Region	Company M- Score 2013	Company M-Score 2014
GERDAU_SA	BRAZIL	LATIN_AMERICA	-2.67	-2.57
BRF_SA	BRAZIL	LATIN_AMERICA	-2.98	-2.97
KLABIN_SA	BRAZIL	LATIN_AMERICA	-2.34	-2.79
MRV_SA	BRAZIL	LATIN_AMERICA	-2.57	-2.02
DURATEX_SA	BRAZIL	LATIN_AMERICA	-2.71	-2.51
CRESUD_SACIF_SA	ARGENTINA	LATIN_AMERICA	-2.1	-2.92
PAMPA_ENERGIA_SA	ARGENTINA	LATIN_AMERICA	-4.08	-4.38
PETROBAS_SA	ARGENTINA	LATIN_AMERICA	-3.08	2.64
JBS_SA	BRAZIL	LATIN_AMERICA	-2.26	-2.93
CYRELA_BRAZIL_REALTY_SA_EMPREEND_E_PART	BRAZIL	LATIN_AMERICA	-2.3	-2.82
KOC_HOLDING_AS	TURKEY	EURASIA	-2.15	-3.4
TURK_HAVA_YOLLARI_AO	TURKEY	EURASIA	-2.33	-2.66
TURKCELL ILETISIM HIZMETLERI	TURKEY	EURASIA	-2.37	-2.17
TURK_TELEKOMUNIKASYON_AS	TURKEY	EURASIA	-2.97	-3.09
ANADOLU_EFES_BIRACILIK_VE_MALT_SANAYI_AS	TURKEY	EURASIA	-1.3	-2.81
BIM_BIRLESIK _MAGAZALAR _AS	TURKEY	EURASIA	-1.16	-2.45
ARCELIK	TURKEY	EURASIA	-2.23	-2.61
OTOKAR_OTOBUS_KAROSERI_SANAYI_AS	TURKEY	EURASIA	-1.3	-3.95
TOFAS_TURK_OTOMOBIL_FABRIKASI_AS	TURKEY	EURASIA	-2.89	-1.78
ZORLU_ENERJI_ELEKTRIK_URETIM_AS	TURKEY	EURASIA	1.95	-3.25
ASSECO_POLAN_SA	POLAND	EASTERN_EUROPE	-2.32	-2.43
QUMAK_SA	POLAND	EASTERN_EUROPE	-2.19	0.18
BETACOM_SA	POLAND	EASTERN_EUROPE	-2.07	-2.42
LLP_SA	POLAND	EASTERN_EUROPE	-2.48	-2.4
CCC_SA	POLAND	EASTERN_EUROPE	-2.37	0.57
TAURON_POLSKA_ENERGIA_SA	POLAND	EASTERN_EUROPE	-5.68	-3.62
GRUPA_LOTOS_SA	POLAND	EASTERN_EUROPE	-2.57	-2.91
Cyfrowy Polsat SA	POLAND	EASTERN_EUROPE	-2.17	-1.12

Grupa Zywiec SA	POLAND	EASTERN_EUROPE	-2.85	-3.03
ARCUS_SA	POLAND	EASTERN_EUROPE	-3.87	-2.11
AGORA_SA	POLAND	EASTERN_EUROPE	-3.73	-2.72
MUZA_SA	POLAND	EASTERN_EUROPE	-2.05	-2.67
IS_YATIRIM_MENKUL_DEGERLER_AS	TURKEY	EURASIA	-1.79	-3.38
EMBRAER_SA	BRAZIL	LATIN_AMERICA	-2.47	-2.23
BR_MALLS_PARTICIPACOES	BRAZIL	LATIN_AMERICA	-2.57	-2.59
LPS_BRASIL	BRAZIL	LATIN_AMERICA	-2.24	-2.44
VOLKSWAGEN_AG	GERMANY	WESTERN_EUROPE	-2.42	-2.58
DAIMLER_AG	GERMANY	WESTERN_EUROPE	-2.29	-2.32
SIEMENS_AG	GERMANY	WESTERN_EUROPE	-2.6	-2.62
BASF_SE	GERMANY	WESTERN_EUROPE	-2.64	-2.58
BMW_AG	GERMANY	WESTERN_EUROPE	-2.46	-2.48
DEUTSCHE_TELEKOM_AG	GERMANY	WESTERN_EUROPE	-2.85	-2.77
FRESENIUS_SE_&_CO_KGAA	GERMANY	WESTERN_EUROPE	-2.62	-2.54
AUDI_AG	GERMANY	WESTERN_EUROPE	-2.42	-2.7
ROYAL_DUTCH_SHELL	NETHERLANDS	WESTERN_EUROPE	-2.24	-2.92
AEGON	NETHERLANDS	WESTERN_EUROPE	-2.36	-3.36
ROYAL_PHILIPS_NV	NETHERLANDS	WESTERN_EUROPE	-2.42	-2.55
AIRBUS_NV	NETHERLANDS	WESTERN_EUROPE	-2.39	-2.58
PARMALAT_SpA	ITALY	WESTERN_EUROPE	-2.42	-3.17
SANOFI_SA	FRANCE	WESTERN_EUROPE	-2.7	-2.68
RENAULT_SA	FRANCE	WESTERN_EUROPE	-3.57	-2.69
L'OREAL_SA	FRANCE	WESTERN_EUROPE	-2.58	-2.45
ULRIC_DE_VARENS	FRANCE	WESTERN_EUROPE	-2.64	-2.6
SCHNEIDER_ELECTRIC_SE	FRANCE	WESTERN_EUROPE	-2.61	-2.5
CARREFOUR_SE	FRANCE	WESTERN_EUROPE	-2.45	-2.67
DANONE_SA	FRANCE	WESTERN_EUROPE	-2.71	-2.66
FORMAGERIES_BEL	FRANCE	WESTERN_EUROPE	-2.63	-2.53
ELECTROLUX_AB	SWEDEN	WESTERN_EUROPE	-2.7	-2.91
VOLVO_AB	SWEDEN	WESTERN_EUROPE	-2.52	-2.6
ALFA_LAVAL_AB	SWEDEN	WESTERN_EUROPE	-2.64	-2.54
KESKO_OYJ	SWEDEN	WESTERN_EUROPE	-2.84	-2.86
SOLVAY_SA	BELGIUM	WESTERN_EUROPE	-3.02	-2.98
COLRUYT	BELGIUM	WESTERN_EUROPE	-2.8	-2.78
UCB_SA	BELGIUM	WESTERN_EUROPE	-2.66	-2.63
ANDERSEN & MARTINI A/S CLASS B	DENMARK	WESTERN_EUROPE	-3.2	-1.92

TELEFONICA_SA	SPAIN	WESTERN_EUROPE	-2.29	-2.26
ESSILOR_INTERNATIONAL_SA	FRANCE	WESTERN_EUROPE	-2.61	-2.43
PETROLEUM_GEO_SERVICES_ASA	NORWAY	WESTERN_EUROPE	-3.19	-2.79
SEADRILL_LTD	NORWAY	WESTERN_EUROPE	-2.33	-1.87
ARCHER_LTD NORWAY	NORWAY	WESTERN_EUROPE	-4.13	-3.1
ELECTRICITE_DE_FRANCE_SA	FRANCE	WESTERN_EUROPE	-2.54	-2.66

Table 17. M-Score Raw Data at Company Level (2013-2014) for Secondary Approach

Company Name	Company Country	Company Region	Company M-Score 2015	Company M-Score 2016
GERDAU_SA	BRAZIL	LATIN_AMERICA	-2.96	-2.92
BRF_SA	BRAZIL	LATIN_AMERICA	-2.53	-2.34
KLABIN_SA	BRAZIL	LATIN_AMERICA	-3.23	-1.94
MRV_SA	BRAZIL	LATIN_AMERICA	-1.49	-2.81
DURATEX_SA	BRAZIL	LATIN_AMERICA	-3	-2.55
CRESUD_SACIF_SA	ARGENTINA	LATIN_AMERICA	-2.26	0.72
PAMPA_ENERGIA_SA	ARGENTINA	LATIN_AMERICA	-2.12	-1.23
PETROBAS_SA	ARGENTINA	LATIN_AMERICA	-2.54	-1.23
JBS_SA	BRAZIL	LATIN_AMERICA	-2.2	-2.73
CYRELA_BRAZIL_REALTY_SA_EMPREEND_E_PART	BRAZIL	LATIN_AMERICA	-3.13	-2.29
KOC_HOLDING_AS	TURKEY	EURASIA	3.35	-2.69
TURK_HAVA_YOLLARI_AO	TURKEY	EURASIA	-2.66	-2.15
TURKCELL ILETISIM HIZMETLERI	TURKEY	EURASIA	-1.87	-2.59
TURK_TELEKOMUNIKASYON_AS	TURKEY	EURASIA	-2.87	-3.42
ANADOLU_EFES_BIRACILIK_VE_MALT_SANAYI_AS	TURKEY	EURASIA	-2.92	-2.67
BIM_BIRLESIK _MAGAZALAR _AS	TURKEY	EURASIA	-2.55	-2.85
ARCELIK	TURKEY	EURASIA	-2.71	-2.54
OTOKAR_OTOBUS_KAROSERI_SANAYI_AS	TURKEY	EURASIA	-2.07	-3.15
TOFAS_TURK_OTOMOBIL_FABRIKASI_AS	TURKEY	EURASIA	-2.1	-2.34
ZORLU_ENERJI_ELEKTRIK_URETIM_AS	TURKEY	EURASIA	-3.37	-1.91
ASSECO_POLAN_SA	POLAND	EASTERN_EUROPE	-2.79	-2.63
QUMAK_SA	POLAND	EASTERN_EUROPE	-2.81	-4.03
BETACOM_SA	POLAND	EASTERN_EUROPE	-3.21	-1.85
LLP_SA	POLAND	EASTERN_EUROPE	-2.63	-2.74
CCC_SA	POLAND	EASTERN_EUROPE	-2.52	-1.71
TAURON_POLSKA_ENERGIA_SA	POLAND	EASTERN_EUROPE	-5.68	-3.62

GRUPA_LOTOS_SA	POLAND	EASTERN_EUROPE	-3.2	-2.69
Cyfrowy Polsat SA	POLAND	EASTERN_EUROPE	-2.61	-2.79
Grupa Zywiec SA	POLAND	EASTERN_EUROPE	-3.3	-3.3
ARCUS_SA	POLAND	EASTERN_EUROPE	-3.27	-3.27
AGORA_SA	POLAND	EASTERN_EUROPE	-2.76	-2.76
MUZA_SA	POLAND	EASTERN_EUROPE	-2.63	-2.79
IS_YATIRIM_MENKUL_DEGERLER_AS	TURKEY	EURASIA	-2.49	-3.03
EMBRAER_SA	BRAZIL	LATIN_AMERICA	-2.53	-2.69
BR_MALLS_PARTICIPACOES	BRAZIL	LATIN_AMERICA	-2.82	-2.53
LPS_BRASIL	BRAZIL	LATIN_AMERICA	-8.06	-2.97
VOLKSWAGEN_AG	GERMANY	WESTERN_EUROPE	-2.76	-2.56
DAIMLER_AG	GERMANY	WESTERN_EUROPE	-2.35	-2.26
SIEMENS_AG	GERMANY	WESTERN_EUROPE	-3.49	-2.55
BASF_SE	GERMANY	WESTERN_EUROPE	-2.96	-2.57
BMW_AG	GERMANY	WESTERN_EUROPE	-2.06	-2.36
DEUTSCHE_TELEKOM_AG	GERMANY	WESTERN_EUROPE	-2.67	-2.81
FRESENIUS_SE_&_CO_KGAA	GERMANY	WESTERN_EUROPE	-2.74	-2.64
AUDI_AG	GERMANY	WESTERN_EUROPE	-2.8	-2.63
ROYAL_DUTCH_SHELL	NETHERLANDS	WESTERN_EUROPE	-3	-3.06
AEGON	NETHERLANDS	WESTERN_EUROPE	-2.86	-1.97
ROYAL_PHILIPS_NV	NETHERLANDS	WESTERN_EUROPE	-2.52	-2.51
AIRBUS_NV	NETHERLANDS	WESTERN_EUROPE	-2.37	-2.25
PARMALAT_SpA	ITALY	WESTERN_EUROPE	-2.36	-2.41
SANOFI_SA	FRANCE	WESTERN_EUROPE	-2.83	-2.67
RENAULT_SA	FRANCE	WESTERN_EUROPE	-2.7	-2.49
L'OREAL_SA	FRANCE	WESTERN_EUROPE	-2.58	-2.7
ULRIC_DE_VARENS	FRANCE	WESTERN_EUROPE	-2.62	-2.92
SCHNEIDER_ELECTRIC_SE	FRANCE	WESTERN_EUROPE	-2.67	-2.71
CARREFOUR_SE	FRANCE	WESTERN_EUROPE	-2.78	-2.59
DANONE_SA	FRANCE	WESTERN_EUROPE	-2.53	-2.71
FORMAGERIES_BEL	FRANCE	WESTERN_EUROPE	-2.7	-2.47
ELECTROLUX_AB	SWEDEN	WESTERN_EUROPE	-3.09	-2.88
VOLVO_AB	SWEDEN	WESTERN_EUROPE	-2.75	-2.61
ALFA_LAVAL_AB	SWEDEN	WESTERN_EUROPE	-2.84	-2.78
KESKO_OYJ	SWEDEN	WESTERN_EUROPE	-2.66	-2.13
SOLVAY_SA	BELGIUM	WESTERN_EUROPE	-2.43	-2.79

COLRUYT	BELGIUM	WESTERN_EUROPE	-2.75	-2.78
UCB_SA	BELGIUM	WESTERN_EUROPE	-2.32	-2.35
ANDERSEN & MARTINI A/S CLASS B	DENMARK	WESTERN_EUROPE	-2.33	-2.7
TELEFONICA_SA	SPAIN	WESTERN_EUROPE	-2.6	-2.59
ESSILOR_INTERNATIONAL_SA	FRANCE	WESTERN_EUROPE	-2.45	-2.53
PETROLEUM_GEO_SERVICES_ASA	NORWAY	WESTERN_EUROPE	-4.83	-3.46
SEADRILL_LTD	NORWAY	WESTERN_EUROPE	-2.96	-3.18
ARCHER_LTD NORWAY	NORWAY	WESTERN_EUROPE	-4.25	-3.63
ELECTRICITE_DE_FRANCE_SA	FRANCE	WESTERN_EUROPE	-2.84	-2.6

Table 18. M-Score Raw Data at Company Level (2015-2016) for Secondary Approach

Company Name	Company Country	Company Region	Company M-Score Average 2013-16
GERDAU_SA	BRAZIL	LATIN_AMERICA	-2.78
BRF_SA	BRAZIL	LATIN_AMERICA	-2.71
KLABIN_SA	BRAZIL	LATIN_AMERICA	-2.58
MRV_SA	BRAZIL	LATIN_AMERICA	-2.22
DURATEX_SA	BRAZIL	LATIN_AMERICA	-2.69
CRESUD_SACIF_SA	ARGENTINA	LATIN_AMERICA	-1.64
PAMPA_ENERGIA_SA	ARGENTINA	LATIN_AMERICA	-2.95
PETROBAS_SA	ARGENTINA	LATIN_AMERICA	-1.05
JBS_SA	BRAZIL	LATIN_AMERICA	-2.53
CYRELA_BRAZIL_REALTY_SA_EMPREEND_E_PART	BRAZIL	LATIN_AMERICA	-2.64
KOC_HOLDING_AS	TURKEY	EURASIA	-1.22
TURK_HAVA_YOLLARI_AO	TURKEY	EURASIA	-2.45
TURKCELL ILETISIM HIZMETLERI	TURKEY	EURASIA	-2.25
TURK_TELEKOMUNIKASYON_AS	TURKEY	EURASIA	-3.09
ANADOLU_EFES_BIRACILIK_VE_MALT_SANAYI_AS	TURKEY	EURASIA	-2.43
BIM_BIRLESIK _MAGAZALAR _AS	TURKEY	EURASIA	-2.25
ARCELIK	TURKEY	EURASIA	-2.52
OTOKAR_OTOBUS_KAROSERI_SANAYI_AS	TURKEY	EURASIA	-2.62
TOFAS_TURK_OTOMOBIL_FABRIKASI_AS	TURKEY	EURASIA	-2.28
ZORLU_ENERJI_ELEKTRIK_URETIM_AS	TURKEY	EURASIA	-1.65
ASSECO_POLAN_SA	POLAND	EASTERN_EUROPE	-2.54
QUMAK_SA	POLAND	EASTERN_EUROPE	-2.21

BETACOM_SA	POLAND	EASTERN_EUROPE	-2.39
LLP_SA	POLAND	EASTERN_EUROPE	-2.56
CCC_SA	POLAND	EASTERN_EUROPE	-1.51
TAURON_POLSKA_ENERGIA_SA	POLAND	EASTERN_EUROPE	-4.65
GRUPA_LOTOS_SA	POLAND	EASTERN_EUROPE	-2.84
Cyfrowy Polsat SA	POLAND	EASTERN_EUROPE	-2.17
Grupa Zywiec SA	POLAND	EASTERN_EUROPE	-3.12
ARCUS_SA	POLAND	EASTERN_EUROPE	-3.13
AGORA_SA	POLAND	EASTERN_EUROPE	-2.99
MUZA_SA	POLAND	EASTERN_EUROPE	-2.54
IS_YATIRIM_MENKUL_DEGERLER_AS	TURKEY	EURASIA	-2.67
EMBRAER_SA	BRAZIL	LATIN_AMERICA	-2.48
BR_MALLS_PARTICIPACOES	BRAZIL	LATIN_AMERICA	-2.63
LPS_BRASIL	BRAZIL	LATIN_AMERICA	-3.93
VOLKSWAGEN_AG	GERMANY	WESTERN_EUROPE	-2.58
DAIMLER_AG	GERMANY	WESTERN_EUROPE	-2.31
SIEMENS_AG	GERMANY	WESTERN_EUROPE	-2.82
BASF_SE	GERMANY	WESTERN_EUROPE	-2.69
BMW_AG	GERMANY	WESTERN_EUROPE	-2.34
DEUTSCHE_TELEKOM_AG	GERMANY	WESTERN_EUROPE	-2.78
FRESENIUS_SE_&_CO_KGAA	GERMANY	WESTERN_EUROPE	-2.64
AUDI_AG	GERMANY	WESTERN_EUROPE	-2.64
ROYAL_DUTCH_SHELL	NETHERLANDS	WESTERN_EUROPE	-2.81
AEGON	NETHERLANDS	WESTERN_EUROPE	-2.64
ROYAL_PHILIPS_NV	NETHERLANDS	WESTERN_EUROPE	-2.5
AIRBUS_NV	NETHERLANDS	WESTERN_EUROPE	-2.4
PARMALAT_SpA	ITALY	WESTERN_EUROPE	-2.59
SANOFI_SA	FRANCE	WESTERN_EUROPE	-2.72
RENAULT_SA	FRANCE	WESTERN_EUROPE	-2.86
L'OREAL_SA	FRANCE	WESTERN_EUROPE	-2.58
ULRIC_DE_VARENS	FRANCE	WESTERN_EUROPE	-2.7
SCHNEIDER_ELECTRIC_SE	FRANCE	WESTERN_EUROPE	-2.62
CARREFOUR_SE	FRANCE	WESTERN_EUROPE	-2.62
DANONE_SA	FRANCE	WESTERN_EUROPE	-2.65

FORMAGERIES_BEL	FRANCE	WESTERN_EUROPE	-2.58
ELECTROLUX_AB	SWEDEN	WESTERN_EUROPE	-2.9
VOLVO_AB	SWEDEN	WESTERN_EUROPE	-2.62
ALFA_LAVAL_AB	SWEDEN	WESTERN_EUROPE	-2.7
KESKO_OYJ	SWEDEN	WESTERN_EUROPE	-2.62
SOLVAY_SA	BELGIUM	WESTERN_EUROPE	-2.81
COLRUYT	BELGIUM	WESTERN_EUROPE	-2.78
UCB_SA	BELGIUM	WESTERN_EUROPE	-2.49
ANDERSEN & MARTINI A/S CLASS B	DENMARK	WESTERN_EUROPE	-2.54
TELEFONICA_SA	SPAIN	WESTERN_EUROPE	-2.44
ESSILOR_INTERNATIONAL_SA	FRANCE	WESTERN_EUROPE	-2.51
PETROLEUM_GEO_SERVICES_ASA	NORWAY	WESTERN_EUROPE	-3.57
SEADRILL_LTD	NORWAY	WESTERN_EUROPE	-2.59
ARCHER_LTD NORWAY	NORWAY	WESTERN_EUROPE	-3.78
ELECTRICITE_DE_FRANCE_SA	FRANCE	WESTERN_EUROPE	-2.66

Table 19. M-Score Raw Data at Company Level (Average M-Score 2013-2016) for Secondary Approach

APPENDIX 2: *M Score Raw Data for Primary Research Methodology*

	Company Name	M_SCORE_2012	M_SCORE_2013
1	Saudi Telecom Company	-3.01	-3.12
2	Saudi Arabian Mining Company (Ma'aden)	-0.89	-1.77
3	SABIC Agri-Nutrients Company	-2.57	-2.7
4	Almarai Company	-2.67	-2.63
5	Sahara International Petrochemical Company	-2.21	-1.84
6	Saudi Kayan Petrochemical Company	-0.12	-2.88
7	Jarir Marketing Company	-2.48	-1.52
8	Etihad Etisalat Company	-2.5	-2.37
9	Savola Group Company	-2.73	-2.62
10	Saudi Industrial Investment Group	3.66	-1.49
11	Mouwasat Medical Services Company	-2.37	-2.79
12	Bupa Arabia for Cooperative Insurance Company	-3.31	-2.61
13	Advanced Petrochemical Company	-2.68	-3.01
14	National Industrialization Company	-2.6	-2.64
15	The National Shipping Company of Saudi Arabia	-2.53	-1.52
16	Makkah Construction & Development Company	-2.9	-2.03
17	Saudi Research and Media Group	-2.17	-2.49
18	Mobile Telecommunications Company Saudi Arabia	-2.23	-2.79
19	Dar Al Arkan Real Estate Development Company	-2.16	-2.69
20	Abdullah Al-Othaim Markets Company	-3.36	-1.91
21	Saudi Cement Company	-2.49	-2.54
22	Saudi Airlines Catering Company	-3.66	1000
23	Qassim Cement Company	-2.85	-2.9
24	Dallah Healthcare Company	-2.36	1.52
25	Yanbu Cement Company	-2.91	NM
26	Taiba Investments Co.	-2.4	-2.25

27	Seera Holding Group	-2.75	-3.92
28	Saudi Pharmaceutical Industries and Medical Appliances Corporation	-2.37	-2.12
29	Saudia Dairy & Foodstuff Company	-1.98	-2.27
30	Arriyadh Development Co.	-1.82	-2.16
31	National Gas & Industerialization Co.	-1.95	-2.79
32	Saudi Ceramic Company	-2.42	-2.76
33	Eastern Province Cement Co.	-2.84	-2.55
34	Arabian Cement Company	-2.47	-2.76
35	The National Agricultural Development Company	-2.98	-2.38
36	Dur Hospitality Company	-2.19	-2.38
37	Astra Industrial Group Company	-1.75	-2.03
38	Saudi Chemical Holding Company	-2.32	-1.98
39	Najran Cement Company	-3.25	-3.15
40	Northern Region Cement Company	-1.94	0.29
41	Methanol Chemicals Company	-2.8	-3.13
42	Saudi Advanced Industries Company	-7.95	-4.43
43	Zamil Industrial Investment Company	-2.45	-2.25
44	Ayyan Investment Company	-2.9	-1.52
45	Al Jouf Cement Company	-0.83	-2.27
46	Saudi Re for Cooperative Reinsurance Company	-0.7	-3.8
47	The Mediterranean and Gulf Cooperative Insurance and Reinsurance Company	-1.58	-7.23
48	Al Hassan Ghazi Ibrahim Shaker Company	-2.11	-1.46
49	Saudi Printing and Packaging Co.	0.01	-2.35
50	National Gypsum Company	-3.11	-2.55
51	Allianz Saudi Fransi Cooperative Insurance Company	-0.96	-1.91
52	Saudi Paper Manufacturing Company	-2.34	-2.67
53	Al Alamiya for Cooperative Insurance Company	-2.98	0.85
54	Chubb Arabia Cooperative Insurance Company	-2.68	-2.53
55	SABB Takaful Company	-1.89	-3.02
56	Nama Chemicals Co.	-3.17	-2.35

57	Al-Etihad Cooperative Insurance Company	-2.58	-1.3
58	Tihama Advertising and Public Relations Co.	-1.42	-2.34
59	Etihad Atheeb Telecommunication Company	-5.14	-2.89
60	Saudi Arabian Cooperative Insurance Company	-2.7	-2.75
61	Al Sagr Cooperative Insurance Company	-2.69	-1.72
62	Salama Cooperative Insurance Company	-2.12	-35.66

Table 20. M-Score Raw Data at Company Level Saudi Arabia (Average M-Score 2012-2013)

	Company Name	M_SCORE_2014	M_SCORE_2015
1	Saudi Telecom Company	-2.57	-2.81
2	Saudi Arabian Mining Company (Ma'aden)	-2.6	-2.44
3	SABIC Agri-Nutrients Company	NM	-2.78
4	Almarai Company	-2.53	-3.14
5	Sahara International Petrochemical Company	-2.88	-2.87
6	Saudi Kayan Petrochemical Company	-2.83	-5.32
7	Jarir Marketing Company	-3.86	-2.48
8	Etihad Etisalat Company	-2.53	-3.27
9	Savola Group Company	-2.38	-2.69
10	Saudi Industrial Investment Group	-2.37	-2.93
11	Mouwasat Medical Services Company	-3.46	-2.23
12	Bupa Arabia for Cooperative Insurance Company	-1.8	-2.74
13	Advanced Petrochemical Company	NM	-1.79
14	National Industrialization Company	-2.41	-2.98
15	The National Shipping Company of Saudi Arabia	-3.44	-2.27
16	Makkah Construction & Development Company	-2.78	NM
17	Saudi Research and Media Group	-2.69	-3.14
18	Mobile Telecommunications Company Saudi Arabia	NM	-3.22
19	Dar Al Arkan Real Estate Development Company	-3.31	-2.25
20	Abdullah Al-Othaim Markets Company	-2.67	6.45
21	Saudi Cement Company	-2.34	-2.7
22	Saudi Airlines Catering Company	-2.17	-2.01

23	Qassim Cement Company	-2.19	-2.12
24	Dallah Healthcare Company	-2.89	-2.32
25	Yanbu Cement Company	-1.81	NM
26	Taiba Investments Co.	-2.11	-0.82
27	Seera Holding Group	-2.08	-2.68
28	Saudi Pharmaceutical Industries and Medical Appliances Corporation	-2.69	-2.32
29	Saudia Dairy & Foodstuff Company	-0.87	-2.89
30	Arriyadh Development Co.	-3.09	-2.43
31	National Gas & Industerialization Co.	-2.26	-2.83
32	Saudi Ceramic Company	-2.7	-2.77
33	Eastern Province Cement Co.	-2.63	-2.24
34	Arabian Cement Company	-2.92	-2.79
35	The National Agricultural Development Company	-2.67	-3.05
36	Dur Hospitality Company	NM	-2.63
37	Astra Industrial Group Company	-1.25	-2.91
38	Saudi Chemical Holding Company	-1.79	-1.63
39	Najran Cement Company	NM	-2.78
40	Northern Region Cement Company	NM	-2.12
41	Methanol Chemicals Company	-3.56	1.36
42	Saudi Advanced Industries Company	NM	NM
43	Zamil Industrial Investment Company	-2.06	-2.61
44	Ayyan Investment Company	-1.19	15.05
45	Al Jouf Cement Company	-3.4	-1.16
46	Saudi Re for Cooperative Reinsurance Company	NM	-1.6
47	The Mediterranean and Gulf Cooperative Insurance and Reinsurance Company	NM	5.32
48	Al Hassan Ghazi Ibrahim Shaker Company	-2.88	-1.9
49	Saudi Printing and Packaging Co.	-2.21	-3.03
50	National Gypsum Company	-2.24	-2.11
51	Allianz Saudi Fransi Cooperative Insurance Company	-2.18	-2.35
52	Saudi Paper Manufacturing Company	-2.39	-2.55

53	Al Alamiya for Cooperative Insurance Company	-3.16	-2.48
54	Chubb Arabia Cooperative Insurance Company	-1.25	-2.5
55	SABB Takaful Company	-1.29	-0.03
56	Nama Chemicals Co.	NM	-3.25
57	Al-Etihad Cooperative Insurance Company	-2.69	-3.04
58	Tihama Advertising and Public Relations Co.	NM	-4.73
59	Etihad Atheeb Telecommunication Company	-2.6	-2.68
60	Saudi Arabian Cooperative Insurance Company	-2.97	-2.14
61	Al Sagr Cooperative Insurance Company	-3.42	-3.01
62	Salama Cooperative Insurance Company	NM	-2.35

Table 21. M-Score Raw Data at Company Level Saudi Arabia (Average M-Score 2014-2015)

	Company Name	M_SCORE_2016	M_SCORE_2017
1	Saudi Telecom Company	-2.31	-2.44
2	Saudi Arabian Mining Company (Ma'aden)	-2.54	-2.06
3	SABIC Agri-Nutrients Company	-3.83	-2.91
4	Almarai Company	-2.72	-2.75
5	Sahara International Petrochemical Company	-2.87	0.08
6	Saudi Kayan Petrochemical Company	-3.13	-2.81
7	Jarir Marketing Company	-1.96	-2.26
8	Etihad Etisalat Company	-2.91	-2.9
9	Savola Group Company	-2.49	-2.69
10	Saudi Industrial Investment Group	-3.12	-1.7
11	Mouwasat Medical Services Company	-1.99	-2.72
12	Bupa Arabia for Cooperative Insurance Company	-2.13	7.37
13	Advanced Petrochemical Company	-2.49	-2.6
14	National Industrialization Company	-1.76	-2.39
15	The National Shipping Company of Saudi Arabia	-2.53	-2.1
16	Makkah Construction & Development Company	-2.53	-0.31
17	Saudi Research and Media Group	-2.92	-2.14
18	Mobile Telecommunications Company Saudi Arabia	-2.93	-2.8

19	Dar Al Arkan Real Estate Development Company	-2.48	-1.16
20	Abdullah Al-Othaim Markets Company	-3.45	-2.79
21	Saudi Cement Company	-2.53	-2.64
22	Saudi Airlines Catering Company	-1.6	-2.17
23	Qassim Cement Company	-2.29	-1.05
24	Dallah Healthcare Company	-2.85	-2.73
25	Yanbu Cement Company	-3.58	NM
26	Taiba Investments Co.	-2.57	-0.45
27	Seera Holding Group	3.9	-2.09
28	Saudi Pharmaceutical Industries and Medical Appliances Corporation	-2.16	-2.52
29	Saudia Dairy & Foodstuff Company	-2.93	-3.23
30	Arriyadh Development Co.	-0.44	NM
31	National Gas & Industerialization Co.	-2.64	-3
32	Saudi Ceramic Company	-2.73	-2.16
33	Eastern Province Cement Co.	-2.36	-2.45
34	Arabian Cement Company	-2.51	-3.02
35	The National Agricultural Development Company	-2.72	-2.53
36	Dur Hospitality Company	-3	-2.42
37	Astra Industrial Group Company	1.54	-2.89
38	Saudi Chemical Holding Company	-2.35	-2.36
39	Najran Cement Company	-2.62	-1.84
40	Northern Region Cement Company	-2.99	-2.96
41	Methanol Chemicals Company	-3.29	-3.01
42	Saudi Advanced Industries Company	-1.36	-2.35
43	Zamil Industrial Investment Company	-2.41	-2.38
44	Ayyan Investment Company	-2.72	-2.53
45	Al Jouf Cement Company	-2.38	-2.28
46	Saudi Re for Cooperative Reinsurance Company	-1.72	-1.48
47	The Mediterranean and Gulf Cooperative Insurance and Reinsurance Company	-2.96	-3.28
48	Al Hassan Ghazi Ibrahim Shaker Company	-1.67	-2.96

49	Saudi Printing and Packaging Co.	-2.83	-2.79
50	National Gypsum Company	-2.62	-4.17
51	Allianz Saudi Fransi Cooperative Insurance Company	-2.04	-2.63
52	Saudi Paper Manufacturing Company	-3.38	-2.74
53	Al Alamiya for Cooperative Insurance Company	-1.96	-2.55
54	Chubb Arabia Cooperative Insurance Company	-2.45	-2.14
55	SABB Takaful Company	-2.63	-2.52
56	Nama Chemicals Co.	-5.1	-3.19
57	Al-Etihad Cooperative Insurance Company	-2.71	-2.4
58	Tihama Advertising and Public Relations Co.	-4.51	-3.75
59	Etihad Atheeb Telecommunication Company	-2.13	-2.7
60	Saudi Arabian Cooperative Insurance Company	-2.42	-2.48
61	Al Sagr Cooperative Insurance Company	-0.38	-3.68
62	Salama Cooperative Insurance Company	-2.83	-2.71

Table 22. M-Score Raw Data at Company Level Saudi Arabia (Average M-Score 2016-2017)

	Company Name	M_SCORE_2018	M_SCORE_2019
1	Saudi Telecom Company	-3.08	-2.11
2	Saudi Arabian Mining Company (Ma'aden)	-2.37	-1.97
3	SABIC Agri-Nutrients Company	-2.31	-2.41
4	Almarai Company	-2.72	-2.53
5	Sahara International Petrochemical Company	-3.01	-1.46
6	Saudi Kayan Petrochemical Company	-2.65	-2.14
7	Jarir Marketing Company	-1.94	-2.36
8	Etihad Etisalat Company	-2.86	-3.07
9	Savola Group Company	-2.56	-2.58
10	Saudi Industrial Investment Group	-2.9	-2.73
11	Mouwasat Medical Services Company	-1.75	-2.76
12	Bupa Arabia for Cooperative Insurance Company	-2.71	-1.95
13	Advanced Petrochemical Company	-2.96	-2.19
14	National Industrialization Company	-1.34	-2.65

15	The National Shipping Company of Saudi Arabia	-2.28	-2.94
16	Makkah Construction & Development Company	-2.32	-3.07
17	Saudi Research and Media Group	-3.52	-1.39
18	Mobile Telecommunications Company Saudi Arabia	-2.95	-2.63
19	Dar Al Arkan Real Estate Development Company	-2.35	-2.32
20	Abdullah Al-Othaim Markets Company	-0.62	-3.06
21	Saudi Cement Company	-2.35	-2.52
22	Saudi Airlines Catering Company	-2.55	-3.32
23	Qassim Cement Company	-2.99	-1.53
24	Dallah Healthcare Company	-2.35	-2.79
25	Yanbu Cement Company	-2.15	-2.98
26	Taiba Investments Co.	-2.66	-2.92
27	Seera Holding Group	-3.08	-2.42
28	Saudi Pharmaceutical Industries and Medical Appliances Corporation	-2.34	-3.51
29	Saudia Dairy & Foodstuff Company	-2.78	48.31
30	Arriyadh Development Co.	-2.25	-3.1
31	National Gas & Industerialization Co.	-2.91	-1.84
32	Saudi Ceramic Company	-3.01	-2.66
33	Eastern Province Cement Co.	-2.44	-2.68
34	Arabian Cement Company	0.17	-2.66
35	The National Agricultural Development Company	-2.53	-3.15
36	Dur Hospitality Company	-2.53	-2.31
37	Astra Industrial Group Company	-2.61	-3.43
38	Saudi Chemical Holding Company	-2.04	-2.61
39	Najran Cement Company	-4.85	-3.15
40	Northern Region Cement Company	-2.79	-2.16
41	Methanol Chemicals Company	-2.99	-2.61
42	Saudi Advanced Industries Company	NM	-3.25
43	Zamil Industrial Investment Company	-2.27	-2.62
44	Ayyan Investment Company	-2.32	-2.73

45	Al Jouf Cement Company	-6.42	-3.03
46	Saudi Re for Cooperative Reinsurance Company	-2.38	-2.25
47	The Mediterranean and Gulf Cooperative Insurance and Reinsurance Company	-2.12	-2.3
48	Al Hassan Ghazi Ibrahim Shaker Company	-3.45	-3.53
49	Saudi Printing and Packaging Co.	-2.17	-3.41
50	National Gypsum Company	-2.58	-2.19
51	Allianz Saudi Fransi Cooperative Insurance Company	-2.36	-2.52
52	Saudi Paper Manufacturing Company	-3.11	-2.96
53	Al Alamiya for Cooperative Insurance Company	-2.39	-3.15
54	Chubb Arabia Cooperative Insurance Company	-2.22	-1.42
55	SABB Takaful Company	-2.79	-2.77
56	Nama Chemicals Co.	-2.88	-2.66
57	Al-Etihad Cooperative Insurance Company	-2.57	-2.09
58	Tihama Advertising and Public Relations Co.	-3.69	-1.19
59	Etihad Atheeb Telecommunication Company	-2.42	-3.24
60	Saudi Arabian Cooperative Insurance Company	-2.83	-2.24
61	Al Sagr Cooperative Insurance Company	-1.86	-1.79
62	Salama Cooperative Insurance Company	-0.96	-2.75

Table 23. M-Score Raw Data at Company Level Saudi Arabia (Average M-Score 2018-2019)

	Company Name	M_SCORE_2020
1	Saudi Telecom Company	-3.32
2	Saudi Arabian Mining Company (Ma'aden)	-2.62
3	SABIC Agri-Nutrients Company	-3.02
4	Almarai Company	-2.6
5	Sahara International Petrochemical Company	-2.41
6	Saudi Kayan Petrochemical Company	-2.15
7	Jarir Marketing Company	-3.04
8	Etihad Etisalat Company	-2.61
9	Savola Group Company	-2.59
10	Saudi Industrial Investment Group	-2.35

11	Mouwasat Medical Services Company	-2.02
12	Bupa Arabia for Cooperative Insurance Company	-3.14
13	Advanced Petrochemical Company	-2.6
14	National Industrialization Company	-2.76
15	The National Shipping Company of Saudi Arabia	-3.33
16	Makkah Construction & Development Company	-33.61
17	Saudi Research and Media Group	-2.5
18	Mobile Telecommunications Company Saudi Arabia	-2.95
19	Dar Al Arkan Real Estate Development Company	-2.1
20	Abdullah Al-Othaim Markets Company	-2.88
21	Saudi Cement Company	-2.91
22	Saudi Airlines Catering Company	0.84
23	Qassim Cement Company	-2.46
24	Dallah Healthcare Company	-1.41
25	Yanbu Cement Company	-2.74
26	Taiba Investments Co.	-2.08
27	Seera Holding Group	-1.78
28	Saudi Pharmaceutical Industries and Medical Appliances Corporation	-2.74
29	Saudia Dairy & Foodstuff Company	-2.64
30	Arriyadh Development Co.	-2.19
31	National Gas & Industerialization Co.	-2.38
32	Saudi Ceramic Company	-2.93
33	Eastern Province Cement Co.	-2.79
34	Arabian Cement Company	-2.63
35	The National Agricultural Development Company	-2.87
36	Dur Hospitality Company	-3.04
37	Astra Industrial Group Company	-2.77
38	Saudi Chemical Holding Company	-2.48
39	Najran Cement Company	-2.68
40	Northern Region Cement Company	-2.81

41	Methanol Chemicals Company	-1.98
42	Saudi Advanced Industries Company	NM
43	Zamil Industrial Investment Company	-2.88
44	Ayyan Investment Company	-3.23
45	Al Jouf Cement Company	-2.96
46	Saudi Re for Cooperative Reinsurance Company	-2.14
47	The Mediterranean and Gulf Cooperative Insurance and Reinsurance Company	-1.92
48	Al Hassan Ghazi Ibrahim Shaker Company	-2.51
49	Saudi Printing and Packaging Co.	-2.94
50	National Gypsum Company	-2.65
51	Allianz Saudi Fransi Cooperative Insurance Company	-2.24
52	Saudi Paper Manufacturing Company	-3.15
53	Al Alamiya for Cooperative Insurance Company	-2.4
54	Chubb Arabia Cooperative Insurance Company	-2.28
55	SABB Takaful Company	8.68
56	Nama Chemicals Co.	-1.76
57	Al-Etihad Cooperative Insurance Company	-2.42
58	Tihama Advertising and Public Relations Co.	-3.98
59	Etihad Atheeb Telecommunication Company	-2.78
60	Saudi Arabian Cooperative Insurance Company	-2.09
61	Al Sagr Cooperative Insurance Company	-3.69
62	Salama Cooperative Insurance Company	-3.25

Table 24. M-Score Raw Data at Company Level Saudi Arabia (Average M-Score 2020)

	Company Name	M_SCORE_2012	M_SCORE_2013
1	Abu Dhabi National Takaful Company PSC	-2.76	-1.46
2	Al Ain Ahlia Insurance Company P.S.C.	-2.39	5.58
3	Al Buhaira National Insurance Company P.S.C.	-2.23	-2.02
4	Al Dhafra Insurance Company P.S.C.	-2.05	-2.02
5	Al Fujairah National Insurance Company P.J.S.C	-2.41	-2.38
6	Al Khazna Insurance Company P.S.C.	-2.72	-2.29
7	Aldar Properties PJSC	-2.43	4.7
8	Arabian Scandinavian Insurance Company (PLC) - Takaful - ASCANA Insurance	-2.1	-2
9	Arkan Building Materials Company (ARKAN) PJSC	-2.17	-1.62
10	Dana Gas PJSC	-2.18	-1.91
11	Dubai Financial Market (DFM) P.J.S.C	-2.41	-1.63
12	Dubai Insurance Company (P.S.C.)	-2.98	-2.47
13	Dubai Investments PJSC	-2.69	-2.22
14	Dubai Islamic Insurance & Reinsurance Co. (Aman) (P.J.S.C)	-2.65	14.22
15	Dubai Refreshment (P.J.S.C.)	-2.28	-2.35
16	Emaar Properties PJSC	-2.4	-2.8
17	Emirates Insurance Company P.J.S.C.	-2.35	-2.6
18	Emirates Integrated Telecommunications Company PJSC	-2.72	-2.93
19	Emirates Telecommunications Group Company PJSC	-2.06	-3.14
20	Finance House P.J.S.C.	-2.14	-2.61
21	Gulf Medical Projects Company (PJSC)	-2.31	-1.81
22	Insurance House P.S.C.	-0.96	3.24
23	Islamic Arab Insurance Co. (Salama) PJSC	-5.08	-3.53
24	Methaq Takaful Insurance Company PSC	-2.68	-3.03
25	National Central Cooling Company PJSC	-2.77	-2.8
26	National Corporation for Tourism and Hotels	-2.71	-1.86
27	National General Insurance Co. (P.J.S.C.)	-2.8	-2.26
28	Oman Insurance Company P.S.C.	-2.31	-1.35
29	Ras Al Khaimah Co. for White Cement & Construction Materials P.S.C.	-2.12	-2.32

30	Ras Al Khaimah National Insurance Company P.S.C.	-1.98	-2.48
31	Ras Al Khaimah Poultry & Feeding Co. P.S.C.	-4.03	-2.7
32	Union Properties Public Joint Stock Company	-1.39	-1.04
33	United Fidelity Insurance Company (PSC)	-2.5	-2.27
34	United Foods Company (PSC)	-2.69	0.47
35	Abu Dhabi Aviation	-3.08	-2.17
36	Abu Dhabi National Hotels Company	-1.94	-2.35
37	Abu Dhabi Ship Building	-2.42	-2.97
38	Agthia Group	-2.65	-2.58
39	Al Ain Ahlia Insurance Company	-2.39	5.58
40	Al Sagr National Insurance Company	-2.72	-1.83
41	Aramex	-2.6	-2.84
42	Arkan Building Materials Company (ARKAN)	-2.17	-1.62
43	Dana Gas	-2.18	-1.91
44	Dubai Refreshment	-2.28	-2.35
45	Emirates Insurance Company	-2.35	-2.6
46	Emirates Integrated Telecomunications Company	-2.72	-2.93
47	National Central Cooling Company Tabreed	-2.77	-2.8
48	Orient Insurance	-2.33	-2.22
49	Ras Al Khaimah Co. for White Cement and Construction Materials	-2.12	-2.32
50	Sharjah Cement and Industrial Development Co	-2.67	-2.45
51	Union Insurance Company	-3.06	2

Table 25. M-Score Raw Data at Company Level United Arab Emirates (Average M-Score 2012-2013)

	Company Name	M_SCORE_2014	M_SCORE_2015
1	Abu Dhabi National Takaful Company PSC	-1.65	-2.79
2	Al Ain Ahlia Insurance Company P.S.C.	-2.03	-2.43
3	Al Buhaira National Insurance Company P.S.C.	-2.42	-2.53
4	Al Dhafra Insurance Company P.S.C.	-1.64	-4.56
5	Al Fujairah National Insurance Company P.J.S.C	-0.63	-1.61
6	Al Khazna Insurance Company P.S.C.	0.46	1.03

7	Aldar Properties PJSC	-3.24	-3.32
8	Arabian Scandinavian Insurance Company (PLC) - Takaful - ASCANA Insurance	-2.87	-2.5
9	Arkan Building Materials Company (ARKAN) PJSC	-2.41	-2.56
10	Dana Gas PJSC	-2.35	-2.47
11	Dubai Financial Market (DFM) P.J.S.C	-1.81	-1.71
12	Dubai Insurance Company (P.S.C.)	-2.03	-2.32
13	Dubai Investments PJSC	-2.21	-2.6
14	Dubai Islamic Insurance & Reinsurance Co. (Aman) (P.J.S.C)	-3.44	-2.73
15	Dubai Refreshment (P.J.S.C.)	-1.05	-2.56
16	Emaar Properties PJSC	-2.28	-2.34
17	Emirates Insurance Company P.J.S.C.	-5.23	-2.17
18	Emirates Integrated Telecommunications Company PJSC	-3.01	-3.1
19	Emirates Telecommunications Group Company PJSC	-1.79	-2.35
20	Finance House P.J.S.C.	-2.21	-2.16
21	Gulf Medical Projects Company (PJSC)	-3.39	-2.05
22	Insurance House P.S.C.	-2.21	-2.9
23	Islamic Arab Insurance Co. (Salama) PJSC	-2.67	-1.88
24	Methaq Takaful Insurance Company PSC	-2.04	-3.32
25	National Central Cooling Company PJSC	-2.46	-2.83
26	National Corporation for Tourism and Hotels	-2.86	-3.1
27	National General Insurance Co. (P.J.S.C.)	-2.69	-1.78
28	Oman Insurance Company P.S.C.	-3.09	3.18
29	Ras Al Khaimah Co. for White Cement & Construction Materials P.S.C.	-2.38	-2.66
30	Ras Al Khaimah National Insurance Company P.S.C.	-0.91	-2.64
31	Ras Al Khaimah Poultry & Feeding Co. P.S.C.	-3.26	-2.43
32	Union Properties Public Joint Stock Company	-2.73	-2.46
33	United Fidelity Insurance Company (PSC)	-2.69	-3.38
34	United Foods Company (PSC)	-0.65	-3.1
35	Abu Dhabi Aviation	-2.65	-2.32
36	Abu Dhabi National Hotels Company	-2.36	-2.54

37	Abu Dhabi Ship Building	-1.69	-3.88
38	Agthia Group	-2.63	-2.14
39	Al Ain Ahlia Insurance Company	-2.21	-2.43
40	Al Sagr National Insurance Company	-2.62	-4.42
41	Aramex	-2.6	-2.74
42	Arkan Building Materials Company (ARKAN)	-1.92	-2.56
43	Dana Gas	-2.21	-2.47
44	Dubai Refreshment	-2.44	-2.56
45	Emirates Insurance Company	-1.29	-2.17
46	Emirates Integrated Telecomunications Company	-2.88	-3.1
47	National Central Cooling Company Tabreed	-2.19	-2.83
48	Orient Insurance	-2.4	-2.17
49	Ras Al Khaimah Co. for White Cement and Construction Materials	-2.54	-2.66
50	Sharjah Cement and Industrial Development Co	-2.37	-2.72
51	Union Insurance Company	1.81	-2.53

Table 26. M-Score Raw Data at Company Level United Arab Emirates (Average M-Score 2014-2015)

	Company Name	M_SCORE_2016	M_SORE_2017
1	Abu Dhabi National Takaful Company PSC	-2.92	-3.36
2	Al Ain Ahlia Insurance Company P.S.C.	-3.12	-2.48
3	Al Buhaira National Insurance Company P.S.C.	-2.4	-2.63
4	Al Dhafra Insurance Company P.S.C.	-3.39	-2.77
5	Al Fujairah National Insurance Company P.J.S.C	-2.8	-2.6
6	Al Khazna Insurance Company P.S.C.	-0.96	-4.09
7	Aldar Properties PJSC	-2.29	-1.91
8	Arabian Scandinavian Insurance Company (PLC) - Takaful - ASCANA Insurance	-1.71	-2.23
9	Arkan Building Materials Company (ARKAN) PJSC	-2.86	-2.54
10	Dana Gas PJSC	-2.79	-3.72
11	Dubai Financial Market (DFM) P.J.S.C	-1.6	-2.43
12	Dubai Insurance Company (P.S.C.)	-2.8	-2.34
13	Dubai Investments PJSC	-2.3	-2.31

14	Dubai Islamic Insurance & Reinsurance Co. (Aman) (P.J.S.C)	-2.56	-1.41
15	Dubai Refreshment (P.J.S.C.)	-2.67	-2.44
16	Emaar Properties PJSC	-2.02	-2.2
17	Emirates Insurance Company P.J.S.C.	-2.2	-2.36
18	Emirates Integrated Telecommunications Company PJSC	-2.43	-2.95
19	Emirates Telecommunications Group Company PJSC	-3.03	-2.9
20	Finance House P.J.S.C.	-2.01	-2.39
21	Gulf Medical Projects Company (PJSC)	-2.34	1.33
22	Insurance House P.S.C.	-2.86	-2.98
23	Islamic Arab Insurance Co. (Salama) PJSC	-6.59	-3.3
24	Methaq Takaful Insurance Company PSC	-3.11	-2.08
25	National Central Cooling Company PJSC	-2.58	-2.33
26	National Corporation for Tourism and Hotels	-2.96	2
27	National General Insurance Co. (P.J.S.C.)	-2.59	-3.17
28	Oman Insurance Company P.S.C.	-3.02	-2.44
29	Ras Al Khaimah Co. for White Cement & Construction Materials P.S.C.	-2.71	-2.94
30	Ras Al Khaimah National Insurance Company P.S.C.	-1.77	-2.92
31	Ras Al Khaimah Poultry & Feeding Co. P.S.C.	-2.29	-2.55
32	Union Properties Public Joint Stock Company	4.24	-5.29
33	United Fidelity Insurance Company (PSC)	-2.98	-2.43
34	United Foods Company (PSC)	2.15	-2.51
35	Abu Dhabi Aviation	-2.79	-2.06
36	Abu Dhabi National Hotels Company	-2.52	-2.45
37	Abu Dhabi Ship Building	-3.08	-1.3
38	Agthia Group	-2.23	-2.52
39	Al Ain Ahlia Insurance Company	-3.12	-2.48
40	Al Sagr National Insurance Company	-2.83	-2.48
41	Aramex	-2.7	-2.33
42	Arkan Building Materials Company (ARKAN)	-2.86	-2.54
43	Dana Gas	-2.79	-3.72

44	Dubai Refreshment	-2.67	-2.44
45	Emirates Insurance Company	-2.2	-2.36
46	Emirates Integrated Telecomunications Company	-2.43	-2.95
47	National Central Cooling Company Tabreed	-2.58	-2.33
48	Orient Insurance	-2.65	-1.95
49	Ras Al Khaimah Co. for White Cement and Construction Materials	-2.71	-2.94
50	Sharjah Cement and Industrial Development Co	-2.62	-2.26
51	Union Insurance Company	-2.26	-2.03

Table 27. M-Score Raw Data at Company Level United Arab Emirates (Average M-Score 2016-2017)

	Company Name	M_SCORE_2018	M_SCORE_2019
1	Abu Dhabi National Takaful Company PSC	-1.79	-2.72
2	Al Ain Ahlia Insurance Company P.S.C.	-2.7	-2.05
3	Al Buhaira National Insurance Company P.S.C.	-2.61	-2.37
4	Al Dhafra Insurance Company P.S.C.	-2.59	-1.52
5	Al Fujairah National Insurance Company P.J.S.C	-2.46	-2.8
6	Al Khazna Insurance Company P.S.C.	-3.73	-2.46
7	Aldar Properties PJSC	-2.04	-1.98
8	Arabian Scandinavian Insurance Company (PLC) - Takaful - ASCANA Insurance	-2.37	-2.22
9	Arkan Building Materials Company (ARKAN) PJSC	-2.91	-2.61
10	Dana Gas PJSC	-2.86	-2.78
11	Dubai Financial Market (DFM) P.J.S.C	-2.29	-2.33
12	Dubai Insurance Company (P.S.C.)	-2.55	-2.87
13	Dubai Investments PJSC	-2.32	-2.28
14	Dubai Islamic Insurance & Reinsurance Co. (Aman) (P.J.S.C)	-3.01	-2.97
15	Dubai Refreshment (P.J.S.C.)	-1.88	-3.09
16	Emaar Properties PJSC	-1.94	-2.14
17	Emirates Insurance Company P.J.S.C.	-2.1	-2.52
18	Emirates Integrated Telecommunications Company PJSC	-1.45	-2.84
19	Emirates Telecommunications Group Company PJSC	-3.02	-2.94
20	Finance House P.J.S.C.	-2.2	-2.11

21	Gulf Medical Projects Company (PJSC)	-2.46	-2.5
22	Insurance House P.S.C.	-2.28	-0.94
23	Islamic Arab Insurance Co. (Salama) PJSC	-1.71	-2.68
24	Methaq Takaful Insurance Company PSC	-2.64	-2.29
25	National Central Cooling Company PJSC	-2.59	-2.5
26	National Corporation for Tourism and Hotels	-2.55	-2.47
27	National General Insurance Co. (P.J.S.C.)	-2.86	-2.95
28	Oman Insurance Company P.S.C.	-3.16	-2.76
29	Ras Al Khaimah Co. for White Cement & Construction Materials P.S.C.	-2.72	-2.64
30	Ras Al Khaimah National Insurance Company P.S.C.	-2.31	-2.25
31	Ras Al Khaimah Poultry & Feeding Co. P.S.C.	-2.8	-2.34
32	Union Properties Public Joint Stock Company	-3.61	-6.53
33	United Fidelity Insurance Company (PSC)	-1.29	-1.82
34	United Foods Company (PSC)	-3.02	-2.93
35	Abu Dhabi Aviation	-2.21	-2.5
36	Abu Dhabi National Hotels Company	-2.38	-2.59
37	Abu Dhabi Ship Building	-2.09	-2.01
38	Agthia Group	-2.04	-2.72
39	Al Ain Ahlia Insurance Company	-2.7	-2.05
40	Al Sagr National Insurance Company	-1.63	-1.32
41	Aramex	-2.41	-2.39
42	Arkan Building Materials Company (ARKAN)	-2.91	-2.61
43	Dana Gas	-2.86	-2.78
44	Dubai Refreshment	-1.88	-3.09
45	Emirates Insurance Company	-2.21	-2.52
46	Emirates Integrated Telecomunications Company	-1.45	-2.84
47	National Central Cooling Company Tabreed	-2.59	-2.5
48	Orient Insurance	-2.22	-2.38
49	Ras Al Khaimah Co. for White Cement and Construction Materials	-2.72	-2.64
50	Sharjah Cement and Industrial Development Co	-2.24	-2.57

51	Union Insurance Company	-2.95	-2.52

Table 28. M-Score Raw Data at Company Level United Arab Emirates (Average M-Score 2018-2019)

	Company Name	M_SCORE_2020
1	Abu Dhabi National Takaful Company PSC	-2.4
2	Al Ain Ahlia Insurance Company P.S.C.	-2.5
3	Al Buhaira National Insurance Company P.S.C.	-2.7
4	Al Dhafra Insurance Company P.S.C.	-2.39
5	Al Fujairah National Insurance Company P.J.S.C	-2.92
6	Al Khazna Insurance Company P.S.C.	-2.29
7	Aldar Properties PJSC	-2.35
8	Arabian Scandinavian Insurance Company (PLC) - Takaful - ASCANA Insurance	-2.34
9	Arkan Building Materials Company (ARKAN) PJSC	-2.68
10	Dana Gas PJSC	-3.07
11	Dubai Financial Market (DFM) P.J.S.C	-3
12	Dubai Insurance Company (P.S.C.)	-2.68
13	Dubai Investments PJSC	-2.51
14	Dubai Islamic Insurance & Reinsurance Co. (Aman) (P.J.S.C)	-2.63
15	Dubai Refreshment (P.J.S.C.)	-2.83
16	Emaar Properties PJSC	-2.35
17	Emirates Insurance Company P.J.S.C.	-2.75
18	Emirates Integrated Telecommunications Company PJSC	-2.81
19	Emirates Telecommunications Group Company PJSC	-2.92
20	Finance House P.J.S.C.	-2.23
21	Gulf Medical Projects Company (PJSC)	-2.84
22	Insurance House P.S.C.	-2.41
23	Islamic Arab Insurance Co. (Salama) PJSC	-2.21
24	Methaq Takaful Insurance Company PSC	-1.81
25	National Central Cooling Company PJSC	-2.35
26	National Corporation for Tourism and Hotels	-2.11
27	National General Insurance Co. (P.J.S.C.)	-1.08

28	Oman Insurance Company P.S.C.	-2.4
29	Ras Al Khaimah Co. for White Cement & Construction Materials P.S.C.	-2.16
30	Ras Al Khaimah National Insurance Company P.S.C.	-2.76
31	Ras Al Khaimah Poultry & Feeding Co. P.S.C.	-1.14
32	Union Properties Public Joint Stock Company	-1.69
33	United Fidelity Insurance Company (PSC)	-2.58
34	United Foods Company (PSC)	-2.58
35	Abu Dhabi Aviation	-2.24
36	Abu Dhabi National Hotels Company	-4.41
37	Abu Dhabi Ship Building	-1.66
38	Agthia Group	-2.95
39	Al Ain Ahlia Insurance Company	-2.5
40	Al Sagr National Insurance Company	-1.93
41	Aramex	-3.13
42	Arkan Building Materials Company (ARKAN)	-2.68
43	Dana Gas	-3.07
44	Dubai Refreshment	-2.83
45	Emirates Insurance Company	-2.75
46	Emirates Integrated Telecomunications Company	-2.81
47	National Central Cooling Company Tabreed	-2.35
48	Orient Insurance	-2.34
49	Ras Al Khaimah Co. for White Cement and Construction Materials	-2.16
50	Sharjah Cement and Industrial Development Co	-6.57
51	Union Insurance Company	-2.74

Table 29. M-Score Raw Data at Company Level United Arab Emirates (Average M-Score 2020)

	Company Name	M_SCORE_2012	M_SCORE_2013	M_SCORE_2014
1	Grupo Energía Bogotá S.A. E.S.P.	-2.40	-2.59	-1.86
2	Alimentos Derivados de la Caña S. A	-2.99	-0.23	0.01
3	Almacenes Éxito S.A.	-2.24	-2.72	-2.38
4	BMC Bolsa Mercantil de Colombia S.A.	-2.69	-2.38	2.26
5	Constructora Conconcreto S.A.	-1.77	-2.38	-2.06
6	Ecopetrol S.A.	-2.68	-2.77	-3.25
7	Enka de Colombia S.A.	-3.11	-2.54	13.37
8	Grupo Argos S.A.	-2.46	-2.49	-2.57
9	Grupo Nutresa S. A.	-2.59	-2.7	-2.37
10	Grupo Nutresa S.A.	-2.59	-2.7	-2.37
11	Interconexión Eléctrica S.A. E.S.P.	-2.06	-3.42	-1.78

Table 30. M-Score Raw Data at Company Level Colombia (Average M-Score 2012-2014)

	Company Name	M_SCORE_2015	M_SCORE_2016	M_SCORE_2017
1	Grupo Energía Bogotá S.A. E.S.P.	-2.6	-2.4	-2.65
2	Alimentos Derivados de la Caña S. A.	-3.47	0.1	-1.31
3	Almacenes Éxito S.A.	3.64	-2.33	-2.5
4	BMC Bolsa Mercantil de Colombia S.A.	-1.86	-3.07	-3
5	Constructora Conconcreto S.A.	-2.7	-1.84	-2.31
6	Ecopetrol S.A.	-3.3	-2.75	-2.4
7	Enka de Colombia S.A.	-3.19	-2.26	-2.55
8	Grupo Argos S.A.	-2.32	-2.6	-2.74
9	Grupo Nutresa S. A.	-2.44	-2.58	-2.6
10	Grupo Nutresa S.A.	-2.44	-2.58	-2.6
11	Interconexión Eléctrica S.A. E.S.P.	-2.74	-1.75	-2.07

Table 31. M-Score Raw Data at Company Level Colombia (Average M-Score 2015-2017)

	Company Name	M_SCORE_2018	M_SCORE_2019	M_SCORE_2020
1	Grupo Energía Bogotá S.A. E.S.P.	-2.67	-2.2	-2.29
2	Alimentos Derivados de la Caña S. A.	3.75	-3.16	-2.9
3	Almacenes Éxito S.A.	-1.82	-2.82	-2.27
4	BMC Bolsa Mercantil de Colombia S.A.	-1.52	-2.43	-1.65
5	Constructora Conconcreto S.A.	-2.35	-2.57	-2.64
6	Ecopetrol S.A.	-2.58	-3.19	-2.75
7	Enka de Colombia S.A.	-2.35	-2.99	-3.17
8	Grupo Argos S.A.	-2.76	-2.47	-2.91
9	Grupo Nutresa S. A.	-2.58	-2.52	-2.65
10	Grupo Nutresa S.A.	-2.58	-2.52	-2.65
11	Interconexión Eléctrica S.A. E.S.P.	-2.69	-2.69	-2.41

Table 32. M-Score Raw Data at Company Level Colombia (Average M-Score 2018-2020)

Resume

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General Profile: Adelina is a Director at Credit Suisse, with rich academic background in Management of Technology, Machine Learning, Finance, Accounting, Law and Literature. She has 10 years of work experience in the financial services industry in Middle East, Europe, Central Asia, Americas, and Africa. Throughout her career she has continuously supported FSI Clients in various topics ranging from Compliance, Risk Management and Regulatory Delivery to Hybrid Advisory Models, M&A and Hedging Strategies:

- Adelina has supported Tier 1 as well as Tier 2 Financial Institutions in building proprietary sales and trading platforms for Structured Products, Funds, Cryptocurrency and FX OTC derivatives. Furthermore, she has also supported multiple Tier 1 Investment Banks and Hedge Funds in developing Next Gen Hybrid Advisory Models, Algorithmic Trading Solutions, M&A forecasting models as well as Hedging Strategies.

- Adelina has led strategic initiatives enabling Tier 1 Financial Institutions to introduce fully harmonized credit & market risk as well as finance reporting systems to achieve compliance with multiple BCBS 239 regulatory delivery streams – while also building Multiple Proprietary Credit Risk Calculators primarily utilized for Risk Cost Contribution Calculations, US Mortgage Risk Assessments as well as Real Estate Liquidation Risk and Probability of Default Assessments. While a PhD researcher in the University of St. Gallen, she developed a proprietary machine learning approach aimed at minimizing the financial crime-related risks in entities operating in developing countries.

- She has as well, led multiple strategic regulatory initiatives enabling Tier 1 Wealth Managers, Insurance Companies and Investment Banks establish an end-to- end Automated Infrastructure, Contingency Management Blueprints as well as Target Operating Models to achieving and/or remediating compliance with multiple regulatory aspects pertaining to PRIIPs, Suitability and Appropriateness, Dodd Frank, Volker, Anti-Money Laundering, Sanctions, US Person Buying Restrictions, Ex-Ante MiFID Cost & Charges as well as Market Abuse.

- She also supports the development of proprietary Front to Back Client Onboarding Workflows as well as Anti-Money and Client Risk Scoring Risk Systems which leverage on proprietary machine learning and Big Data analytics.