



**The impact of financial Key Performance Indicators (KPIs) and Forward-Looking Disclosures (FLDs) on Market Value (MV)**

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## **Abstract**

Investors and companies require an efficient capital market where financial resources are allocated at a fair price. The challenge is not only to define measures able to calculate the fundamental value of a company but to compare it with actual market prices to test market efficiency. Based on this practical implication, the research has four objectives. Firstly, to examine the impact of changes in KPIs (key performance indicators) on changes in MV (market value). Secondly, to analyse the impact of changes in KPIs on changes in FLDs (forward-looking disclosures) as well as the impact of changes in FLDs on "one year ahead" changes in KPIs. Thirdly, to assess the impact of changes in FLDs on changes in MV. Fourthly, to evaluate the "combined" impact of changes in FLDs and KPIs on MV.

Based on the philosophical belief of a realist, a quantitative research approach has been chosen using correlation and regression analysis as a method. The regression formula consists of 19 KPIs covering profitability, liquidity, test of solvency, financial structure, efficiency, cash flow and growth ratios. Concerning the evaluation of FLDs, different FLD indices established by previous research are synthesised and afterwards extended to a list of 696 words through utilising grammatical terms. To score FLDs the current research counts the number of words in total and then calculating the change score in percentage. The framework is used to test the impact of FLDs and KPIs on the MV of companies listed on one of the German stock indices DAX, SDAX, MDAX and TecDAX during the years 2007 and 2017.

The analysis unveils that KPIs and FLDs, as well as KPIs and FLDs combined, are significantly related to the MV. The research implies the efficiency of the German stock market, which is beneficial for investors and companies. The thesis adds value to existing knowledge by providing a list of KPIs capable of determining the fundamental value of a company. Besides, the research implies to consider FLDs as a further essential fundamental variable that impacts MV. The thesis challenges regulatory bodies to set clear best practice guidance for not only narrative reporting but also to emphasise the requirements of distinct KPIs for evaluating the fundamental value of a company.

## **Author's Declaration**

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Signed: \_\_\_\_\_

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## Abbreviations

Amortisation = Amort.

Average = AVG

Deferred Income = Def. Inc.

Depletion = Depl.

Depreciation = Deprec.

Deutscher Aktienindex = DAX

Earnings before interest and tax = EBIT

Earnings before interest, tax, depreciation, amortisation = EBITDA

Financial Times Stock Exchange = FTSE

Financial Reporting Council = FRC

Forward Looking Disclosure(s) = FLD(s)

Gesellschaft mit beschränkter Haftung = GmbH

Key Performance Indicator = KPI

Market Value = MV

Mid-Cap-DAX = MDAX

Significance = Signif.

Small-Cap-DAX = SDAX

Statistics = Stat.

Technology DAX = TecDAX

Thousand = th.

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## **Chapter 1: Introduction**

### **1.1 Overview**

The purpose of this chapter is to introduce the rationale of the research project for the current thesis. Section 1.2 addresses the research area, which is capital market research in accounting. Further, section 1.3 outlines the importance and originality of the present research. Section 1.4 gives the aim and objectives while in section 1.5, the motivation for the research project is presented. Section 1.6 summarise the chapter, while in section 1.7, the structure of the thesis is provided.

### **1.2 Research Area**

For a corporation, the stock market is one of the most important financial markets where securities (traded financial assets such as shares of stock) are issued and traded (Brealey et al., 2007, p. 31). The capital market can be subdivided into a primary market where new emissions take place and a secondary market where financial titles already in circulation are traded (Brealey et al., 2007). "The primary role of the capital market is allocation of ownership of the economy capital stock" (Malkiel & Fama, 1970, p. 383). For companies, it provides access to financial resources (sell ownership in order to raise capital), while for investors, on the other hand, it is an uncertain investment decision (Schmidt, 2014) with the intention of capital growth (invest capital to gain ownership) (Malkiel & Fama, 1970). "...the ideal is a market in which prices [market value] provide accurate signals for resource [ownership] allocation" (Malkiel & Fama, 1970, p. 383). "A market in which prices always fully reflect available information is called efficient" (Malkiel & Fama, 1970, p. 383). As there are many different sources and hence, types of information that can determine the adequate value of a firm, it is important to discern information which is important and valuable. There are, for example, analysts' reports, industry experts discussions, press

releases or corporate reporting (Healy & Palepu, 2001; Samaha et al., 2015).

Capital market research in accounting is particularly interested in testing market efficiency with respect to corporate reporting and MV (Kothari, 2001). Corporate reporting can either occur through voluntary communication, such as management forecasts, presentations and conference calls or through annual reports consisting of regulated financial statements, footnotes, management discussion and analysis as well as other regulatory filings (Healy & Palepu, 2001). Regulated financial figures represent one of the most important means in order to determine company performance (Beretta & Bozzolan, 2008; Chang et al., 1983). The performance of a company can be determined by using specific KPIs that can handle a large quantity of financial data (Brealey et al., 2007). The evaluation process can be determined by fundamental analysis, which is the most traditional performance analysis tool (Delen et al., 2013) aiming to determine the intrinsic (Nada & Igor, 2016) or fundamental value (Mankiw & Taylor, 2006) of a company.

To assess the future value development of a company is often not possible by analysing financial figures only, as they consist of backward-looking information (Beretta & Bozzolan, 2008). Therefore, companies include within annual reports additionally so-called voluntary disclosures (Elshandidy et al., 2015). This is due to an increasing demand for voluntary disclosures with which analyst are able to evaluate more accurately future developments (Beretta & Bozzolan, 2008). Voluntary disclosures are needed to fully understand the business context, a company's strategy and its operations, as the business world is becoming more and more complex (Beretta & Bozzolan, 2008). Of particular interest are forward-looking disclosures (FLDs) as previous research indicates their value relevance for future development. However, they are not part of any regulation (Beretta & Bozzolan, 2008), despite the fact that corporate disclosure is critical for the functioning of an efficient capital market (Healy & Palepu, 2001). FLDs concern the company's future developments, including information about its

strategic and competitive advantage (Samaha et al., 2015), but also uncertainties and risks (Hussainey, 2004).

### **1.3 Importance and Originality of the Research**

To test market efficiency, the market value must equal the fundamental, or internal value, of a company (theoretical ideal) (Mankiw & Taylor, 2006). In theory, a change in any relevant value indicator should lead to a change in market value (Lev & Thiagarajan, 1993). On the one hand, there are studies that analyse the impact of KPIs on MV. Ball and Brown (1968) are one of the first researchers analysing and proving the usefulness of the accounting position earnings concerning their value relevance. On the other hand, there are studies that examine the value relevance of FLDs thereby mixing traditional KPIs with the variable FLD which should enable investors to determine the fundamental value of the firm and analyse the impact on MV. Hussainey (2004) is one of the first researchers in this particular knowledge area that combines part of the traditional value analysis and the inclusion of FLDs for determining future value.

However, previous research in this particular area is limited with regard to the number of KPIs used within the regression formula and, these KPIs are mostly defined as mere control variables (see chapter 2.5). As just one short example Hassanein & Hussainey (2015) used KPIs like leverage expressed by debt to equity ratio, liquidity ratio expressed by the current ratio, firm growth proxied sales growth, profitability expressed by return on equity, risk exposure expressed by change in return volatility, capital expenditure expressed by capital expenditure to asset ratio and firm performance expressed by return on equity. Out of these KPIs, only the last ratio return on equity is not defined by Hassanein & Hussainey (2015) as a control variable.

In addition to the limitation of KPIs used within the regression formula, the impact of FLDs in general on MV is continues to require further research. There is currently no conclusive evidence that FLDs, in general, are

essential to understand the relationship between Fundamental value and MV of the firm. There is only evidence that FLDs matter in a specific context. For example, Hussainey (2004) proved the significance of the impact of profit relevant FLDs on MV and Wang & Hussainey (2013) proved the significant relationship of FLDs of well-governed firms on MV.

Current research is still rare in this particular knowledge area. A combination of mandatory backward-looking information such as KPIs and FLDs into one formula that is able to determine the MV of a company is not yet part of intensive research. The conclusion of this research should be helpful for investors making investment decisions, regulation bodies setting accounting standards, as well as for companies deciding on the level of forward-looking disclosures.

#### **1.4 Aim and Objectives of the Research**

The focus of this current research is in the area that combines traditional value analysis and the value relevance of voluntary disclosures to determine MV development. The aim is to evaluate the impact of KPIs and FLDs on MV. At present, current research that combines both areas of knowledge - traditional value analysis and value relevance of voluntary disclosures - is limited regarding the number of KPIs and besides, most ratios are defined as mere control variables within developed regression formula. Moreover, previous research often uses KPIs and FLDs as variables in a specific context, for example, in the context of corporate governance. Hence, there is currently no conclusive evidence that FLDs, in general, are essential to enhance the understanding of the relationship between fundamental and MV of the firm as required by market efficiency theory. This research will contribute to the existing knowledge by extending the number of KPIs associated with the fundamental value and comparing them holistically with regard to their impact on MV. Finally, an in-depth analysis of the impact of KPIs and FLDs on MV is required to prove whether market efficiency exists or not. The challenge is not only to define measures



able to calculate the fundamental value of a company but to compare it with actual market prices to test market efficiency. In order to test market efficiency and to analyse the required relationship between KPIs, FLDs and MV, the following four research objectives have been determined:

- 1) To examine the impact of changes in KPIs on changes in MV.
- 2) To analyse the relationship between KPIs and FLDs
  - a) To analyse the impact of changes in KPIs on changes in FLDs.
  - b) To determine the impact of changes in FLDs on "one year ahead" changes in KPIs.
- 3) To assess the impact of changes in FLDs on changes in MV.
- 4) To evaluate the combined impact of changes in KPIs and FLDs on MV.

## **1.5 Research Motivation**

Investors and companies require an efficient capital market where financial resources are allocated at a fair price (Malkiel & Fama, 1970). "...the primary objective of financial reporting as the provision of information that is useful to capital providers in making decisions about allocating resources to the firm" (Penman & Zhang, 2002, p. 1145). The challenge is not only to define measures able to calculate the fair price or fundamental value of a company, but to compare them with actual market prices in order to test market efficiency. Based on this challenge, the aim of this research paper is to select two distinct variables, namely KPIs and FLDs, and to test their impact on MV. At present, there are studies that analyse the impact of KPIs on MV and studies that examine the value relevance of FLDs. These disclosure studies have tried enhance traditional evaluation methods by mixing traditional KPIs with the variable FLD, which should enable investors to determine the fundamental value of the firm and analyse the impact on MV. Previous research is limited concerning the number of KPIs within the developed regression formula as unveiled later in chapter 2.5. Further, there is currently no conclusive evidence that FLDs, in general, are essential to

enhance the understanding of the relationship between fundamental and market value of the firm.

A further closely related motivation is to challenge regulatory bodies to set clear best practice guidance for not only narrative reporting, but also to emphasise the requirements of distinct KPIs for evaluating the fundamental value of a company. Full transparency and clarity are required by capital market participants such as companies, investors or analysts (Li & Yang, 2016). Moreover, regulatory bodies need to continuously enhance, as Li & Yang (2016) mentioned, the interplay between mandatory financial reporting and voluntary disclosures. Li & Yang (2016) also indicated that the adoption of IFRS standards leads to a better likelihood of predicting future earnings and in turn attracts more (foreign) investors. This unveils the requirement and the motivation to enhance not only valuation methods but also to challenge regulatory bodies to provide clear guidance on how to improve forward-looking disclosures and KPI reporting. Further, regulatory bodies are challenged to offer incentives to follow their guidance. The current research is a step forward to unveil the problematic relationship between KPIs, FLDs and MV and provide thereby, not only a list of significant KPIs that impact MV but also the proof of the inclusion of FLDs as a variable to determine the fundamental value of a firm.

The motivation to study the impact of KPIs and FLDs in annual reports on MV of companies listed on one of the four German stock indices (DAX, SDAX, MDAX, TecDAX) is due to the limitation of previous research, which mostly focused on the UK (for example Hassanein & Hussainey, 2015), the US (for example Elshandidy et al., 2015) or the Middle East (for example Moumen et al., 2016). Only Elshandidy et al. (2015) as just one example focusses not only on the UK and the US, but also on the German stock market, but still, research is rare using Germany as a geographical area. The motivation is, however, not only limited to the fact that previous research is rare, but it is also since the German economy represents the largest within the EU and the German stock market represents, the largest exchange in Europe in terms of market capitalisation (Brida & Risso, 2010).

Analysing the efficiency of the German stock market is an essential issue for all capital market participants.

## **1.6 Summary**

Capital market research in accounting is particularly interested in testing market efficiency concerning corporate reporting and MV (Kothari, 2001). In theory, a change in any relevant value indicator should lead to a change in market value (Lev & Thiagarajan, 1993). On the one hand, there are studies that analyse the impact of KPIs on MV, for example, Ball and Brown (1968) who proved the usefulness of the accounting position earnings concerning their value relevance. On the other hand, there are studies such as from Hussainey (2004) that examine the value relevance of FLDs mixing thereby traditional KPIs with the variable FLD which should enable investors to determine the fundamental value of the firm and analyse the impact on MV.

However, previous research in that particular area is limited concerning the amount of KPIs used within the regression formula, and besides, those KPIs are mostly defined as mere control variables. In addition, the limitation of KPIs used within the regression formula, the impact of FLDs in general on MV requires further research. There is currently no conclusive evidence that FLDs, in general, are essential to understand the relationship between fundamental value and MV of the firm.

This research study will contribute to existing knowledge by extending the number of KPIs associated with the fundamental value and comparing them holistically with regard to their impact on MV. In addition the relationship between KPIs and FLDs will be assessed. Finally, an in-depth analysis of the impact of KPIs and FLDs on MV is required to prove whether market efficiency exists or not. The motivation is not only to define measures able to calculate the fundamental value of a company, but also to compare it with actual market prices to test market efficiency of the German stock market (DAX, MDAX, SDAX, TecDAX). The goal is to challenge regulatory bodies to set clear best practice guidance for not only narrative reporting,

but also to emphasise the requirements of distinct KPIs for evaluating the fundamental value of a company.

## **1.7 Structure of the thesis**

The thesis consists of five chapters, including the introduction and conclusion. Chapter 2 reviews and discusses the current literature, which addresses efficient market theory, signalling theory, the approach to test an efficient market, the role, evaluation and information sources of KPIs and FLDs, the research gap as well as the research hypotheses. Chapter 3 presents the research methodology of the study. It includes the methodology choice, the research approach, the research design, the evaluation framework, as well as a chapter on the research validity and reliability. Chapter 4 provides empirical analysis, including a critical discussion. Chapter 5 embodies the conclusion, which also deals with the relevance of the research as well as the research results. Moreover, it unveils the limitation of the present study and provides recommendations for future research. A self-reflection follows the conclusion. Finally, several Appendices serve as background information. The reference list is at the end of this research paper.

## **Chapter 2: Literature Review**

### **2.1 Overview**

The purpose of section 2 is to review existing literature with the purpose of defining the research gap and to formulate the hypotheses for the present study. This research starts in section 2.2 with a brief description of the stock market and its relevance as a finance centre. In section 2.3, the market efficiency theory is explained, which explains the emergence of prices for goods in an economy and the basic role of information. In section 2.4 the signalling theory is presented, which is needed to understand the role of information on investors behaviour. In section 2.5 evaluation approaches required to test market efficiency are discussed. In addition, the role of KPIs and FLDs in the context of market efficiency are reviewed. Furthermore, the information sources for evaluation purposes are described in section 2.6. In section 2.7 the evaluation process of KPIs are thoroughly discussed, including how to calculate certain KPIs, for example return on equity, and which KPIs are used for the research. The complex analysis procedure of FLDs is explained in section 2.8. This section concludes with a summary due to its complexity. In section 2.9 the research gap is unveiled, based on the literature review mentioned throughout this chapter, but in particular in section 2.5. Based on market efficiency and signalling theory as well as the research gap, the hypotheses for the present study mentioned are formulated in section 2.10. In section 2.11 there is a summary of the literature review.

## 2.2 The Stock Market

The stock market is one of the most important capital markets where securities (traded financial assets such as shares of stock) are issued and traded (Brealey et al., 2007, p. 31). The capital market can be subdivided into a primary market where new issues of shares take place and a secondary market where financial titles already in circulation are traded (Brealey et al., 2007). "The primary role of the capital market is allocation of ownership of the economy capital stock" (Malkiel & Fama, 1970, p. 383). For companies, it provides access to financial resources (sell ownership in order to raise capital), while for investors, on the other hand, it is an investment decision under uncertainty with the intention of capital growth (invest capital to gain ownership) (Malkiel & Fama, 1970; Schmidt, 2014). Uncertainty exists because there is an information deficit about future conditions (Schmidt, 2014).

The motivation for the current research is to study the German stock market, as it represents the largest exchange in Europe by capitalisation (Brida & Risso, 2010). Not only is the German economy the largest economy within Europe, but it is also one of the most important and a world-leading financial centre (Bartels & Holmes, 1993). The most important trading centre in Germany is the Frankfurt stock exchange. Concerning the unique character of this financial centre over other trading centres such as the London stock exchange or the New York stock exchange, distinctions are based on the criteria liquidity, human capital, regulation (legal framework, listing procedure, merger & acquisition administration, insider trading & price manipulation supervision), deposit guarantee, technical trading and communication system (Dietl et al., 1999). Publicly traded German companies are listed on one of the indices DAX, MDAX, SDAX and TecDAX, which are used for research among others by Graf and Stiglbauer (2008). According to the data obtained from Osiris (Data system from Bureau van Dijk, a Moody's Analytics company), the DAX consists of 30, the MDAX of 50, the SDAX of 50 and the TecDax of 30 listed companies. The listing in one index is another unique character of the German stock

market and is depending mainly on the size of the company (DAX, MDAX, SDAX). In case the company can be classified as a technology company, it is listed within the TecDax.

Despite the importance of the German stock market and its unique character, past research in the field of knowledge (fundamental analysis and disclosure research) is not intensive concerning the geographical area of Germany. For the current study, German companies are used for analysis, and therefore, the sample differ from other studies that used samples of UK companies, for example. The current study will contribute to existing knowledge by analysing the impact of KPIs and FLDs on MV in the German context. The research will provide a list of KPIs capable of determining the fundamental value of a company. Besides KPIs, the research will unveil that FLD is a further essential fundamental variable that impacts the MV of listed German companies.

## **2.3 Theoretical Concepts**

### **2.3.1 Efficient Capital Market Theory**

Investors and companies require an efficient capital market where financial resources are allocated at a fair price (Malkiel & Fama, 1970). In general, the task of an economy is the efficient allocation of savings to investment opportunities in order to encourage growth and eventually ensure common welfare (Healy & Palepu, 2001; Mankiw & Taylor, 2006). Efficiency is about obtaining as much as possible from scarce resources (Mankiw & Taylor, 2006). The market forces of supply and demand should lead to an efficient allocation of these resources. Market participants are thereby guided by "the invisible hand" towards market equilibrium (Mankiw & Taylor, 2006). Market equilibrium can be explained by "...a situation in which the price has reached the level where quantity supplied equals quantity demanded" (Mankiw & Taylor, 2006). Such a market equilibrium

requires perfect competition, which means that market participants or other externalities cannot influence market prices (Mankiw & Taylor, 2006).

As prices are determined in a market economy by supply and demand, they clearly contain information on how much, or how little of a good is available. The distribution of scarce resources works more efficiently the more information is reflected in the price (Mankiw & Taylor, 2006). For the prediction of prices, mathematical models are required to estimate market price development (Shiller, 2003). In other words, price relevant information needs to be expressed by specific variables combined in a mathematical formula. Ultimately, the prediction of prices based on the formula needs to be equal to the market prices (Shiller, 2003). According to Malkiel & Fama (1970), three different degrees characterize efficiency. The weak form of efficiency is present if the current price merely reflects the information on which the historical price is based. The semi-strong form is present if the price also reflects current, publicly accessible information. The strong form is present, the theoretical ideal if the price reflects all, even non-public information (Malkiel & Fama, 1970). The challenge is to find a model able to grasp the vague characterization of market efficiency (Campbell, 2014).

An efficient market will lower the cost of capital and will ease the resource allocation process as prices will reflect the real value (Beattie, 2014; Malkiel & Fama, 1970). Malkiel & Fama already stated in 1970 that the "...theory of efficient markets is concerned with whether prices at any point in time fully reflect available information" (Malkiel & Fama, 1970, p. 413) – or in other words the information efficiency of capital markets. An efficient capital market is a market "...in which prices [market value] provide accurate signals for resource [ownership] allocation" (Malkiel & Fama, 1970, p. 383). Information differences between market participants can cause inefficiency (Healy & Palepu, 2001). Optimal contracts between entrepreneurs and investors as well as regulation standard may provide incentives for full disclosure of private information, thereby eliminating evaluation differences (Healy & Palepu, 2001).



### 2.3.2 Signalling Theory

Signalling theory can be traced back to Spence (1973) and was initially developed to explain behaviour in job markets (Watson et al., 2002). The research of Spence (1973) was about determining the signal power of job applicants. The theory is about the issue of information asymmetry, which is the prerequisite for signalling (Morris, 1987). Companies have less information than the applicant himself, and therefore for companies hiring an employee it can be seen as an investment under uncertainty where specific signals of potential new employees require analysis and interpretation (Spence, 1973). This basic idea is also applicable to the context of the buyer and seller. In the case that a seller has information that his product has better quality than the others on the market, the seller of qualitative better products needs to signal their superiority to buyers in order to gain a higher price (Morris, 1987). Potential buyers need more information than sellers can provide, thereby decreasing information asymmetry (Morris, 1987). Eventually, the theory can be applied to any market with problems of information asymmetries (Morris, 1987). The basic principle can also be applied for capital market analysis, where companies are seen as investments (Graf & Stiglbauer, 2008). In this context, companies need to disclose information to signal why their company is seen as superior compared to others and worth investing in (Watson et al., 2002). Signalling theory implies that more profitable companies disclose more information (Wang & Hussainey, 2013). Such information is often referred to voluntary disclosures. Companies have generally more information than investors and therefore, managers of those companies need to disclose information to reduce asymmetries (Morris, 1987). Furthermore, it is necessary to disclose information through mandatory financial statements, in which accounting information can be defined as fundamental signals (Abarbanell & Bushee, 1997). The signalling effect can in turn influence behaviour of investors concerning investment decisions (Graf & Stiglbauer, 2008).

### 2.3.3 Intersection of both theories

As mentioned, prices are determined in a market economy by supply and demand (Mankiw & Taylor, 2006). Market efficiency, which means the allocation of scarce resources, depends on the degree of information reflected by the price (Mankiw & Taylor, 2006). This Principle is also applicable for a capital market as well, in which stock prices contain enough information about a company's real value. As already stated an efficient capital market is a market "...in which prices [market value] provide accurate signals for resource [ownership] allocation" (Malkiel & Fama, 1970, p. 383). A prerequisite for efficiency is, hence, signalling. Thus, it is necessary among others to disclose information through mandatory financial statements, in which accounting information can be defined as fundamental signals (Abarbanell & Bushee, 1997). The process to evaluate accounting information is called fundamental analysis and shall be explained in more detail in section 2.4.1. Moreover, voluntary disclosures are needed to signal why a company is seen as superior compared to another and hence, worthy of investing in (Watson et al., 2002). Voluntary statements can address diverse topics, such as social disclosures for example about the company's reputation (Sarkar & Bhattacharjee, 2017), risk disclosures for example voluntary information about oil reserves (McChlery et al., 2015), environmental disclosures for example about carbon emissions (Rahman et al., 2019), intellectual disclosures for example knowledge and skills of the company's employees (Chaabane Oussama Houssein et al., 2015). Despite the different topics addressed, voluntary disclosures shall nevertheless inform about the quality and value of the company (Hamrouni et al., 2015). One particular type of voluntary disclosures that address the future development and performance of a company are so called FLDs (Hussainey, 2004), which is discussed in section 2.4.2.

## 2.4 Approaches to test Market efficiency

In order to test market efficiency, the MV must equal the fundamental, or internal value, of a company (theoretical ideal) (Mankiw & Taylor, 2006). In theory, a change in any value relevant indicator should lead to a change in market value (Lev & Thiagarajan, 1993). The mathematical prediction of the price must be equal to the market price in order to claim any market efficient (Shiller, 2003). Research that tests the efficiency of markets aims to provide measures that are associated with the fundamental value of a firm (Holthausen & Watts, 2001). One way to determine the fundamental value is by discounting the future cash flows with an appropriate risk-adjusted rate of return in order to calculate the net present value (dynamic net present value method) (Kothari, 2001; Schmidt, 2014). One of the very first researchers was Fisher (1930), who described the early stage of discounting the cash flow to evaluate the present value (Alchian, 1955). Sophisticated models like the capital asset pricing model followed, but require problematic assumptions about future risk and return development (Nissim & Penman, 2001), as the capital asset pricing model is about the relationship between risk and return (Brealey et al., 2007). The model "... was developed in the early 1960s by William Sharpe (1964), Jack Treynor (1962), John Lintner (1965a, b) and Jan Mossin (1966)" (Perold, 2004, p. 3). Fama and French adjusted the capital asset pricing model by the three-factor asset pricing model. Their equation states that stock return can be explained by the market risk, the risk of the size and the market to book ratio (Fama et al., 1993). In a further adjustment, another two variables, namely profitability and investment factors, were added to the formula (Fama & French, 2017).

Despite the sophisticated contribution to knowledge with such models like the capital asset pricing model or the five-factor asset pricing model, assumptions about future risk returns and market risk are highly subjective. For example, concerning the calculation of the CAPM, the user has to make an assumption about the market portfolio, which is at the core of the mathematical model (Fama & French, 2004). As a consequence,

investment decisions have been favourably evaluated by using KPIs, a procedure more commonly known as fundamental analysis (statistical method) (Holthausen & Watts, 2001; Nissim & Penman, 2001; Schmidt, 2014). Such KPIs can be regarded as fundamental signals capable of predicting market prices (Abarbanell & Bushee, 1997).

On the one hand, there are studies that analyse the impact of KPIs on MV. KPIs are based on accounting information from the financial statement. On the other hand, there are studies that examine the value relevance of FLDs. It is the assumption that FLDs can be viewed as a fundamental signal as well. Disclosure studies try to enhance traditional evaluation methods by mixing traditional KPIs with the variable FLD, which should enable investors to determine the fundamental value of the firm and analyse the impact on MV, thereby detecting an inefficient or efficient market.

The current study focuses on the role of KPIs as well as FLDs and their impact on MV. Both types of fundamental signals are discussed in the following sections.

#### **2.4.1 The role of KPIs – A Review**

Financial statements should include value relevant information that affects stock prices (Francis and Schipper, 1999). Accounting numbers "...need to reflect the economic reality of enterprises, manifested in the price of equity" (Al-Akra & Ali, 2012, p. 534). The process to evaluate accounting numbers is called fundamental analysis, which, according to Nada and Igor (2016), should eventually determine the intrinsic value of a share. It is the process of evaluating a company's performance by using specific KPIs that can constitute a large quantity of financial data (Brealey et al., 2007). Abarbanell and Bushee (1997) define those indicators also as fundamental signals. Lewellen (2004) mentions the research of Kendall (1953), who tested capital market efficiency, by analysing the relationship between MV and past profit calculated with figures taken from the financial statement.

The evaluation of the company's performance through a fundamental analysis is the most traditional and "...powerful tool for decision-makers, including business analysts, creditors, investors, and financial managers" (Delen et al., 2013, p. 3970). Rather than employing discounted cash flow method that includes only two variables (cash flow figure and appropriate risk-adjusted rate of return), the use of several different ratios might obtain more accurate signs of the performance development of a company and hence, predictor of the MV (Delen et al., 2013; Ou & Penman, 1989).

Ball and Brown (1968) were one of the first researchers analysing and proving the usefulness of the accounting position earnings concerning their value relevance. In particular, they studied the "...content and the timing of existing annual net income number..." and the impact on stock prices for companies traded on the New York stock exchange between 1946 and 1966 (Ball & Brown, 1968, p. 160). Ou and Penman (1989) developed a single yet summative measure from corporate financial reports consisting of 68 different KPIs. They proved the significant relation between the combined KPI measure and stock returns of industrial companies traded on the NYSE or AMEX between 1973 and 1983. Lev and Thiagarajan (1993) extended existing research by adding further KPIs based on experts recommendations and tested their value relevance. In total Lev & Thiagarajan (1993) examined 12 different KPIs, of which ten are found to be significantly related to stock return. The research of Abarbanell & Bushee (1997) is based on ideas of Ou & Penmann (1989) and Lev & Thiagarajan (1993). Abarbanell and Bushee (1997) define KPIs as fundamental signals and proved their significance to explain a change in future earnings and the impact on stock prices for companies traded on NYSE or AMEX between 1983 and 1990. Barbee et al. (1996) proved, that sales price ratio and the debt to equity ratio are significantly related to the stock return of S&P companies between 1979 and 1991. Lau et al. (2002) analysed the beta ratio, size ratio, the earning price ratio, cash flow to price ratio, book to market ratio, and sales growth ratio. They proved the significant influence of the beta, size and earnings price ratio on stock returns of companies

listed on the Stock Exchange of Singapore and the Kuala Lumpur Stock Exchange between 1988 and 1996. Olson and Mossman (2003) used in total 61 different financial ratios to analyse their impact on Canadian stock returns between 1983 and 1993 using neural network forecast. They claimed that not only fundamental analysis as a method, but also neural network as a tool is essential to predict stock return. Cai and Zhang (2011) had a closer look at the leverage ratio and proved a significant impact on stock prices for companies listed on US stock markets between 1975 and 2002. They proved further that a high leverage leads to fewer future investments, which in turn impact significantly on firm value. Most recent research has been, for example, from Kamar (2017), who proved that return on equity has a significant effect while debt to equity ratio has an insignificant effect on company stock prices. This was shown by a study on companies listed on the Indonesian stock exchange, and belonging to the cement industry, between 2011 and 2015. Isidro and Dias (2017) analysed the quality of information of accounting earnings and the relationship to stock returns by comparing the two distinct conditions of a bull market versus crisis conditions and their impact on stock prices of US companies between 1997 and 2002. They suggest that earnings are more informative in a crisis situation. Ma et al. (2018) studied 25 different KPIs and analysed their significance on stock prices for companies, which either belonged to the media, power or steel industries in China between 2011 and 2015. In general, they claim the importance of fundamental analysis through using KPIs. However, they discovered that the significance of KPIs might differ depending on which industry the company belongs to.

It can be observed that each of the earlier conducted studies has detected a significant impact of KPIs on stock prices. In addition, the German stock market has not been considered in previous research despite its importance, as described in chapter 1.5. Additionally, there is the challenge of comparability and usability of existing studies. As ratios can differ in the calculation, it is impossible to rebuild past research. In general, a commonly agreed guidance for the usage of key performance indicators

that are related to the fundamental value of a company does not exist (Abarbanell & Bushee, 1997; Holthausen & Watts, 2001; Nissim & Penman, 2001). The traditional fundamental analysis focused on rather an ad hoc evaluation of financial statement measures in order to determine a company's performance (Nissim & Penman, 2001). Past research indicates little guidance which mix of ratios is best to forecast future development (Nissim & Penman, 2001). Despite there being a lack in guidance an "...association between financial performance and security prices or price changes is expected" (Kothari, 2001, p. 109), and accounting numbers that measure the development of company performance shall convey information and consequently affect MV changes (Holthausen & Watts, 2001). The goal is to test and change the mix of KPIs until either efficiency of markets can be proved or disproved (Robinson et al., 2015).

#### **2.4.2 The role of FLDs – A review**

The calculation of KPIs is, however, based on objective backward-looking accounting information, while stock analysts use KPIs in order to predict future development (Hussainey, 2004; Robinson et al., 2015). A look at the scientific area of voluntary disclosures can be helpful and might add value to traditional fundamental analysis, in order to enhance the evaluation of stock prices with not only the help of KPIs but also with voluntary disclosures. This point of view is supported by Diamond (1985), who found evidence that disclosures in annual reports have a positive impact on investors investment evaluation. Furthermore, Bassen and Kovács (2008) mention, that not only quantitative financial information, but also disclosures are necessary to assess company value.

According to Beattie (2014), there are two leading developments in disclosure research. First, the European tradition that is rooted in the knowledge area of social sciences. Regarding the European tradition, researchers are more likely to follow the constructivist than the realist approach (Beattie, 2014). The objective of this academic field is to evaluate subjective meaning, for example, the meaning behind words. Researchers

who study the impact of voluntary disclosures need to know firstly, which words are genuinely meaningful in an annual report before determining the consequences for market efficiency (Beattie, 2014; Healy & Palepu, 2001). This research area is, in particular, helpful for constructing a disclosure index in the case where no previous literature exists. The construction of a disclosure index is the first step of evaluating the impact of voluntary disclosures. To analyse the impact of voluntary disclosures and to determine market efficiency consequences is, according to Beattie (2014), based upon North American traditions. The philosophical belief is that of a realist or positivist rather than a constructivist (Beattie, 2014). The core assumption in disclosure research is that if a voluntary disclosure is sufficient, it will affect market efficiency positively by reducing information asymmetry (Healy & Palepu, 2001). This area of knowledge provides valuable insights for capital market research in accounting (Beattie, 2014).

Capital markets research indicates that information in annual reports, including mandatory and voluntary disclosures, as well as financial figures, influence MV (Healy & Palepu, 2001; Kothari, 2001). Because corporate disclosure is critical for the functioning of an efficient capital market the demand for more voluntary disclosures about the future development of a company has increased in recent times (Beretta & Bozzolan, 2008; Healy & Palepu, 2001; Kothari, 2001). The demand is increasing because additional information in annual reports reduces asymmetries between companies and investors thereby allowing to accurately determine future value development of the firm (Graf & Stiglbauer, 2008). Lowering information asymmetries is beneficial not only to accurately define a fair price of a companies share but also to lower the cost of capital (Graf & Stiglbauer, 2008). Usually investors tend to pay a higher price for those companies that provide accurate information (Graf & Stiglbauer, 2008). In particular FLDs are of interest as researchers imply their value relevance for the prediction of future value (Beretta & Bozzolan, 2008). The assumption is that future-related information in annual reports affects both the correlation between fundamental value and MV of a company. Such information refers to



"...current plans and future forecasts that enable shareholders and other investors to assess a company's future financial performance." (Hussainey, 2004, p. 38).

Hussainey (2004) is one of the first researcher's in this particular knowledge area that combines part of the traditional value analysis and the inclusion of FLDs for determining future value. He examines the effect of disclosure quality (quantity as estimation) on share price anticipation of earnings. Hussainey (2004) unveiled the significance for FLDs, but only those that are profit-related have an impact on the MV. FLDs, in general, are not found to be significant.

Al-Akra and Ali (2012) indicate that voluntary disclosure (not particular FLDs) is positively associated with the firm value of companies (market to book value of equity) listed on the Amman stock exchange between 1996 and 2004. They proved through correlation analysis that several control variables such as firm size expressed by the total assets, leverage ratio expressed by the ratio of total liabilities to shareholders equity, profitability ratio expressed by ROE have a significant positive correlation with voluntary disclosures. Their regression analysis finds the same results (Al-Akra & Ali, 2012).

Wang & Hussainey (2013) tested the relation between FLDs that are driven by corporate governance factors and future earnings. They proved the value relevance of FLDs in the case of a well-governed company listed on the Financial Times Stock Exchange (FTSE) between 1996 and 2007. Furthermore, Wang & Hussainey (2013) used profitability expressed by return on assets and leverage expressed by debt to asset ratio as control variables and proved their significant positive relationship to FLDs through correlation analysis. Looking at their regression results, the significant positive relationship between return on assets and FLDs becomes significantly negative.

Al-Najjar and Abed (2014) do not explicitly focus on the connection between firm value and voluntary disclosures. The purpose of their study is to examine the connection between corporate governance factors and FLDs

for the top 500 UK listed companies in 2006. Nevertheless, they used within their research several control variables. Through regression analysis, they prove a significant negative relationship between performance expressed by return on assets and FLDs. Moreover, they show a significant positive association between operating cash flow to asset and FLDs. In addition, they use MV as a control variable and prove a significant relationship to FLDs. The control variable leverage (debt to asset) is, however, not found to have a significant impact on FLDs. The positive relationship is also proved through regression analysis (Al-Najjar & Abed, 2014).

Another study by Hassanein & Hussainey (2015) examines whether a change in the amount of FLDs between two reporting periods is in relation to firm performance expressed by return on equity as well as to firm value expressed by Tobins Q for companies listed on the financial times stock exchange between 2005 and 2011. Looking at the regression results from Hassanein & Hussainey (2015), the variable firm performance is found to be significantly positively related to FLDs, while control variables, such as leverage expressed by debt to equity ratio, liquidity ratio expressed by the current ratio are not found to be significantly related to FLDs. The control variable firm size expressed by the market value of equity, on the other hand, does have a significant impact on FLDs. However, FLDs and MV expressed by Tobins Q are associated negatively. The control variables' firm growth expressed by sales growth, liquidity expressed by current ratio, profitability expressed by return on equity and capital expenditure expressed by capital expenditure to asset ratio have a positive and significant impact on MV expressed by Tobins Q (Hassanein & Hussainey, 2015).

Aly et al. (2018) analyse and prove a significant connection between tone disclosure (good versus bad news) and firm performance expressed by return on assets for companies listed on the Egyptian stock market between 2011 and 2013. They also used within their regression several control variables. To mention just a few of their results, correlation analysis indicates that net disclosure (amount of good news deducted by bad news)

is positive and significantly correlated with firm size expressed by total assets and liquidity expressed by current assets to current liabilities, while leverage expressed by current assets to current liabilities is significant but negatively related to net disclosures. A relationship between total assets or change in assets to net disclosure could not be proven (Aly et al., 2018).

A further study by Hassanein et al. (2019) investigate the impact of FLDs on firm value expressed by adjusted industrial Tobins Q and proves a significant positive relationship for companies listed on the FTSE between 2005 and 2014. These correlation results suggest, moreover, that firm size expressed by the market value of equity and return on assets are significantly negative when associated with FLDs. Leverage expressed by debt to equity ratio, firm growth expressed by sales growth and capital expenditure expressed by capital expenditure to assets is, however, not found to be significant (Hassanein et al., 2019).

All these research papers are, of course, not fully comparable to the current study. It seems that previous research is vast in terms of context and research objectives. However, previous research does not explicitly focus on the analysis of the interconnection between fundamental value and MV as suggested by market efficiency theory. Most research has used KPIs as mere control variables and further previous research is limited regarding the amount of KPIs if compared to research that purely investigates the relationship between KPIs and MV as mentioned in chapter 2.5.1. Additionally, market values are often not expressed by "pure" market value ratios. Often ratios such as Tobins Q are used, which are based on both fundamental values as well as market value components. Market efficiency theory suggests, however, the strict separation between fundamental and market values to test efficiency. Nevertheless, all of the mentioned research papers share a common research direction, which is to examine the interconnection between financial ratios, voluntary disclosures and the prediction of value development, which is also the basis for the current study. The list of financial ratios provided by these research papers is a starting point for the current study. Most of the analysed research papers

used, either, profitability, liquidity, leverage or growth ratios. This dissertation takes that into consideration when determining the KPIs to be included for the present study. Moreover, the German stock market has not been part of intensive research, neither in the research area of fundamental analysis as described in chapter 2.5.1 nor in knowledge field of disclosure studies.

To summarize, despite the fact that the use of KPIs is the most traditional tool to evaluate the fundamental value (Delen et al., 2013), the impact of FLD is not part of intensive discussion especially in the light of market efficiency theory. There is currently no conclusive evidence that FLDs, in general, are essential to understand the relationship between fundamental and MV of a firm. There is only evidence that FLDs matter in a specific context. The combination of both scientific areas, the research of traditional measures for value evaluation as well as the research of disclosures is required that test the impact of both KPIs and FLDs on MV as well as the interrelationship between KPIs and FLDs.

## **2.5 Information sources for evaluation purposes**

Any Information disclosed about or from companies occurs in a number of ways (Marston & Shrides, 1991). For example, there are analysts' reports, industry experts' discussions, general meetings, press releases, articles in newspapers or journals, and corporate reporting (Healy & Palepu, 2001; Pike et al., 1993; Samaha et al., 2015). In addition, there are prospectuses, employee reports, announcements to the stock exchange, conversations from meetings as well as conference calls (Marston & Shrides, 1991). Thus, information can be voluntary or mandatory, formal or informal (Elshandidy et al., 2015; Marston & Shrides, 1991).

Of particular importance is corporate reporting that discloses information through voluntary communication, such as management forecasts, presentations and conference calls, and through mandatory reporting (Healy & Palepu, 2001; Marston & Shrides, 1991). These

mandatory reports may be interim, quarterly or annual reports (Marston & Shrides, 1991). Annual reports, thereby, represent the main disclosure vehicle consisting of regulated financial statements, footnotes, management discussion and analysis as well as other regulatory filings (Healy & Palepu, 2001; Pike et al., 1993). Annual reports have been used as data collection sources by most of previous researchers, for example, by Al-Najjar & Abed (2014), Hassanein & Hussainey (2015) or Wang & Hussainey (2013).

The financial reporting council (FRC, 2018, p. 10) states that annual reports should "...provide shareholders with relevant information that is useful for making resource allocation decisions and assessment". The annual report is a statutory report that should provide information necessary for shareholders (Hussainey, 2004; McChlery et al., 2015). It represents one of the most important formal disclosure channels (Samaha et al., 2015). Information is either of a qualitative (written text) or quantitative nature (financial or non-financial), and might include further illustrations, diagrams and graphical presentations. (Marston & Shrides, 1991). The annual report consists of the strategic report, directors report, corporate governance report, director's remuneration report and the financial statement (FRC, 2018).

### **2.5.1 Information sources for KPIs**

The financial statement of an annual report is the most essential information source for financial figures and the basis for fundamental analysis (Chang et al., 1983). Regulated financial figures represent one of the most crucial means in order to determine company performance (Beretta & Bozzolan, 2008). The financial statement consists of the balance sheet, profit and loss statement and cash flow statement (Brealey et al., 2007). The balance sheet displays the figures of the company's assets and liabilities at a particular point in time, while the income statement shows figures about revenues, expenses and the profit of a company. Furthermore, the cash flow statement unveils the companies movements of

cash receipt and cash payments (Brealey et al., 2007, pp. 50-58). The figures are based on accounting rules. These accounting standards have the purpose of demanding from companies to unveil their financial figures (earnings, assets and liabilities, cash flow) necessary to evaluate a fair value of the company (Brealey et al., 2007).

### **2.5.2 Information sources for FLDs**

In addition to the financial information, other sections of the annual report are filled with so-called voluntary disclosures (Elshandidy et al., 2015). For example, the strategic report of an annual report becomes more and more critical (Beretta & Bozzolan, 2008). It consists of explanatory information on related figures within the financial statement (FRC, 2018). Of particular interest are forward-looking disclosures. Previous researchers imply their value relevance for future development, yet they are not part of any regulation (Beretta & Bozzolan, 2008).

Disclosures in annual reports are manifold and are either voluntary or mandatory (fulfilling specific accounting regulations) (Elshandidy et al., 2015). Disclosures include thereby different types of information such as historical (backward-looking), financial, social, environmental, intellectual capital, risk or compensation information (Laksmana et al., 2012; McChlery et al., 2015; Samaha et al., 2015). While most of the disclosures are historical financial information, investors demand more and more of other types of information, for example, intellectual capital information, that concerns the company's future developments, including information about its strategic and competitive advantage (Samaha et al., 2015). Academic research in this knowledge area classifies such information as FLDs (Al-Najjar & Abed, 2014; Hassanein & Hussainey, 2015). The management of a particular company provides for market participants any information relevant for possible future development which may affect the business (Barron et al., 1999). This, in turn, is needed to fairly evaluate the future earning of the company and hence, MV development (Healy & Palepu, 2001). The absence of these disclosures would lead to information

asymmetries and hence inefficient markets (Healy & Palepu, 2001). The question that arises is whether investors are efficiently served by the information provided, in particular from those provided by annual reports (Chung et al., 2016). FLDs are not part of any mandatory accounting standard, and hence, the reliability of such narratives is questionable. Nevertheless, auditing companies claim the importance of future information and offer guidance on how to address FLDs in annual reports. The current study evaluates whether investors value the existing FLDs in annual reports. As will be shown in section 4.2, the amount of FLDs differ between companies. The difference between the amount of FLDs published in annual reports can be explained by signal theory, as the company might disclose more future related information because managers see their company superior compared to other companies. The impact of FLDs on MV is tested in section 4.4.

## **2.6 Evaluation of KPIs**

To select KPIs and to determine the calculation procedure is not easy as a commonly agreed guidance for the usage of key performance indicators that are related with the fundamental value of a company is not present (Abarbanell & Bushee, 1997; Holthausen & Watts, 2001; Nissim & Penman, 2001). To solve this problem does not imply it is necessary to take all available key performance indicators into account (Delen et al., 2013; Wang & Lee, 2008). Wang & Lee (2008) suggest that available ratios should be clustered at first, and then typical indicators from each cluster should be selected (Wang & Lee, 2008). Wang & Lee (2008) use clustering terms of solvency, profitability, return on investment, asset and debt turnover (Wang & Lee, 2008). Brealey et al. (2007) name leverage, liquidity, efficiency and profitability as overall cluster definitions (Brealey et al., 2007). Delen et al. (2013) use liquidity, asset utilization/ turnover, profitability, net profit margin, growth ratios, asset structure, solvency (Delen et al., 2013). Moreover, Krause & Arora (2010) suggests profitability, liquidity, test of solvency,

financial structure, efficiency and cash flow as a cluster. As it becomes apparent, there is not a commonly agreed list of clusters. Nevertheless, this current research tries to identify a literature resource that offers the most sophisticated overview of available KPIs that are properly clustered.

For this research the suggestions of Krause and Arora (2010), have been taken and a categorisation of ratios has been established, including a total of 19 different KPIs. The suggestions from Krause & Arora (2010), have been followed because of their sophisticated and holistic overview of KPIs as well as their proper clusters. These ratios have been triangulated with existing literature. For example, looking back at the ratio list of Ou & Penman (1989), 8 out of 19 chosen KPIs are "most likely to be the same" (just from the wording of the mentioned ratio), 7 out 19 "seems to be similar", while 4 out of 19 ratios are different. To ensure validity, suggestions made by Delen et al. (2013) have also been included. As they provide a similar overview and calculation approach, as do Krause & Arora (2010). The question that remains is the number of KPIs to select. Wang and Lee (2008) suggests picking only representative KPIs, but not how many. For the purpose of this research 16 KPIs of Krause & Arora (2010) and 3 KPIs of Delen et al. (2013) have been included. The latter 3 KPIs represent the cluster "growth ratios". All seven KPI clusters of profitability, liquidity, test of solvency, financial structure, efficiency, cash flow and Growth have at least one representative KPI. Including the variable FLD the amount of total independent variables amounts to 20, which is according to Delen et al. (2013) an acceptable number.

Because neither an agreed list of the mix of KPIs, nor an agreed cluster exists, there were two further challenges which are explained in one example calculation. The in-depth description of all other KPIs and their calculation procedure is stated in chapter 3.5. The ratio return on equity, a profitability indicator, is, according to Krause and Arora (2010), calculated as follows:

$$\text{Return on Equity} = \frac{\text{Net Income} * 100}{(\text{Average}) \text{Stokholders Equity}}$$



The first challenge is that Krause and Arora (2010) stated that either average or year-end values can be used as the denominator. Delen et al. (2013), however, do not state the use of an average value. For this research year-end values have been used as the denominator, which thus respects both suggestions. The second challenge is that by looking into data provided by Osiris (Data system from Bureau van Dijk, a Moody's Analytics company), the nominator net income is named as earnings after tax, while the denominator is named total shareholders equity. Delen et al. (2013) use the name owners equity as the denominator, while Brealey et al. (2007) define it as shareholders equity. In this case, the denominator position, total shareholders equity includes the accounting positions share capital, share premium, retained earnings as well as other shareholders reserves. These positions are in line with the suggestion made by Krause and Arora (2010) despite the fact that the defined name as denominator differs. The calculation procedure and its accounting positions must be explained precisely in order to ensure validity (see chapter 3.6.1).

## **2.7 Evaluation of FLDs**

According to Beattie et al. (2004), there are different possibilities to evaluate voluntary disclosures (Beattie et al., 2004, p. 209). These can be distinguished between subjective and semi objective evaluation approaches, which include several measurement methods (Beattie et al., 2004). These methods can be analyst ratings, readability & linguistic analysis and content analysis (Beattie et al., 2004). The use of a disclosure index represents thereby a partial form of the content analysis (Beattie et al., 2004).

Firstly, analysts and academics can use subjective ratings (Beattie et al., 2004). The Association of Investment Management and Research (AIMR), as well as the American Institute of Certified Public Accountants (AICPA) are two leading associations which establish a subjective rating that evaluates the quality of voluntary disclosures (Beretta & Bozzolan,

2008). As the AIMR ranking is no longer available and the AICPA report represents a guideline rather than a sophisticated rating these were unable to be used.

Another method is to evaluate disclosures through a textual analysis which, in contrast to the above mentioned subjective rating, can be classified as a semi-objective method (Beattie, 2014). It can be distinguished between readability and linguistic analysis. Regarding readability, each formula available (Flesch, Fog, SMOG, Dale and Chal, Fry or Kincaid) analyses word frequency and sentence length in order to determine degree of difficulty to read and understand a text (Schriver, 1989). With regard to the research of annual report narratives, the aim is eventually to identify whether writers of annual reports try to obfuscate information (Sydserff & Weetman, 1999). The degree of obfuscation is in turn than associated with specific corporate attributes such as size, industrial classification or profitability indicators (Sydserff & Weetman, 1999). However, these readability formulas were originally established to assess the difficulty to read children books. Their applicability to formal texts, including unique vocabulary, as in the case of annual reports is questionable (Sydserff & Weetman, 1999)). It can, however, be assumed that readers of annual reports have the particular knowledge and educational background (Sydserff & Weetman, 1999).

Linguistic studies represent another text analysis approach and a more promising method for the current research. Beaugrande and Dressler (1981) are one of the first researchers that have studied the nature of narratives in linguistics (Sydserff & Weetman, 1999). They developed and defined seven standards on the communicative effectiveness of narratives, namely "...cohesion, coherence, acceptability, informativity, intentionality, intertextuality and situationality..." (p. 3). The terms cohesion and coherence concern the linkage and structure of the text, in particular the interconnection of sentences. Sydserff and Weetmann (1999) define this as the "...flow of ideas and the dependency of sentences on previous sentences" (p. 3). While the analysis of cohesion and coherence is purely

linguistic research, "user-centred standards", which are according to Sydserff and Weetman (1999) "intentionality, intertextuality, acceptability and informativity..." (p. 3) might also be relevant for other areas of knowledge. Intentionality concerns the required knowledge of the reader of annual reports, while intertextuality concerns the relevance of narratives for a specific context (Sydserff & Weetman, 1999). Most important for the current research are the terms acceptability and informativity, which concern the value relevance of narratives and information efficiency (de Beaugrand and Dressler, 1981, cited in Sydserff and Weetman, 1999). In this particular area, a connection between linguistic and disclosure research exists. Despite the fact that the current research is not grounded in linguistic theory, it is nevertheless affected by the research of linguistic studies, for example through the establishment of the text index. According to Beattie et al. (2004), Sydserff and Weetman (1999) added value to existing theory by establishing the text index as a tool to evaluate annual report disclosures. The development can not only be traced back to Sydserff and Weetman (1999), but also to the ideas of de Beaugrande and Dressler (1981), as well as to Roseberry (1995) (Beattie et al., 2004). The text index is mostly known in the area of capital market research in accounting as the disclosure index, which is a partial form of content analysis (Beattie et al., 2004). Disclosure indices are extensive lists of selected keywords, which may be disclosed voluntarily or even be mandatory in annual reports (Marston & Shives, 1991) The challenge is the definition of text units or words that are truly valuable for readers of annual reports (Marston & Shives, 1991).

### **2.7.1 Content Analysis to construct an FLD Index**

In the case where no existing literature is available, conventional content analysis is required as suggested by Hsiu-Fang & Sarah (2005) to construct an index of word patterns or keywords. Through interviews or surveys (as two possible research methods) those word patterns or keywords in a text (for example text in annual reports) that are value relevant for the addresser need to be identified (Beattie, 2014). Otherwise "...it would be difficult to measure the quality of information found in the annual report of any company" (Marston & Shrivess, 1991, p. 202).

In the case where previous literature exists, instead of the above-mentioned conventional analysis, summative content analysis as suggested by Hsiu-Fang & Sarah (2005) is required. Firstly, a literature review needs to be conducted in order to unveil existing indices (Hsiu-Fang & Shannon, 2005). The number of items in such an index can vary tremendously, and there is no agreed limitation (Marston & Shrivess, 1991). Nevertheless, the words of the index must be critically selected to answer the particular research question (Marston & Shrivess, 1991). In the case of disclosure research, for example, the choice of the most suitable index to use depends on the research focus, for example the focus on FLDs (Beattie, 2014).

In the case where an existing index shall be extended, there is the possibility, to combine the conventional as well as the summative content analysis. The directed content analysis suggests at first identifying leading research in the area under study (Hsiu-Fang & Shannon, 2005). This procedure is needed to unveil existing word indices (in the following disclosure indices) and to synthesise them as described. In the second step, based on predetermined coding schemes, the list can be extended before being tested. This procedure can occur through interviews, but this is not a necessary step (Hsiu-Fang & Shannon, 2005). Based on the ideas of Hsiu-Fang & Shannon (2005), existing disclosure indices can be extended by adding different word forms (preposition, verb conjugation, modal auxiliary, tense, noun, adjective, adverb as well as word combination) to the index of previously used keywords. In this way, the existing theory is not only tested,

but also extended (Hsiu-Fang & Shannon, 2005). This research has followed and used this approach.

### **2.7.2 Computerised Content Analysis**

To analyse a large amount of qualitative data can be time-consuming if manually conducted. The importance of computer software in research is growing, and many researchers acquire software for research assistance (Schönfelder, 2011). Due to the ongoing digitisation, the development of related and needed software is increasingly available to handle substantial amounts of data known today as "big data" (Beattie, 2014).

Computerised content analysis, for example, is a method for categorising and coding texts as well as quantifying words with the help of computer software (Beattie et al., 2004; Rosenberg et al., 1990). This process of using software programs should facilitate the predictive ability of company performance and the value relevance of annual reports (Beattie, 2014). For the current research computerised content analysis can further, assist in counting the occurrence of a word within the annual report, which is determined by a particular disclosure index (Hussainey, 2004). However, the "...danger is that it is all too easy to find spurious correlations/relationships" (Beattie, 2014, p.117). In spite of the use of software programs is increasing the question of their validity and reliability in comparison to manually analysis needs to be kept in mind (Rosenberg et al., 1990).

### **2.7.3 FLD Index – A review**

Previous research papers, including a list of keywords indicating forward-looking disclosures, are from Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) and Abed & Roberts (2016). Hussainey (2004) examines the effect of disclosure quality (quantity as estimation) on share price anticipation of earnings. Wang & Hussainey (2013) tested the relation between FLDs that are driven by corporate governance factors and future earnings. Hassanein & Hussainey (2015) examine whether the change in the amount of FLDs between two reporting periods impacts firm performance and firm value. Abed et al. (2016) investigated similarities and differences between voluntary disclosures evaluation methods.

Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) and Abed & Roberts (2016) all mention a disclosure index relevant to identify FLDs in annual reports. Table 1 unveils the list of keywords from each research paper:

**Table 1: FLD Index of Existing Literature**

Hussainey (2004)			Wang & Hussainey (2013)	Hassanein & Hussainey (2015)	Abed, Al-Najjar & Roberts (2016)
Ability	Forecast	Perspective	accelerate	Aim	Accelerate
Able	Forejudge	Pessimistic	anticipate	Anticipate	Aim
Accelerate	Foreknow	Plan	await	Believe	Anticipate
Additional	Foresee	Point toward	coming year	Coming	Await
Advance	Foresight	Possible	coming years	Estimate	Chance
Afterwards	Foretell	Potential	Coming financial year	Eventual	Coming (financial) year(s)
Ahead	Forethought	Precaution	Coming financial years	Expect	Coming months
Aim	Forma	Predict	Coming months	Following	Commitment
Allow	Forthcoming	Presume	Confidence	Forecast	Confidence
Ambition	Forward	Presuppose	Confident	Forthcoming Future	Confident
Anticipate	Future	Presurmise	Convince	Hope	Convince
Approaching	Go on	Prevent	(current) Financial year	Incoming	Estimate
Approximate	Go faster	Pro Forma	Envisage	Intend	Expect
Aspire	Goal	Proceed	Estimate	Intention	Forecast
Assume	Going to	Program	Eventual	Likely	Forthcoming
Await	Grow	Project	Expect	Look-ahead	Further
Become	Guess	Prolong	Forecast	Look-forward	Future
Beforehand	Hinder	Promise	Forthcoming	Next	Hope
Belief	Hope	Prophesy	Hope	Plan	Intend
Believe	Imagine	Propose	Intend	Predict	Intention
Can	Imminent	Prospect	Intention	Project	Likely
Capable	Impend	Purpose	Likely	Prospect	Look ahead
Carry	Improve	Realise	Unlikely	Seek	Look forward
Certainty	Increase	Reflect	Look forward	Shortly	Medium term
Challenge	Innovation	Remain	Look ahead	Soon	Near term
Chance	Insight	Renew	Next	Subsequent	Next
Change	Intend	Retain	Novel	Unlikely	Opportunity
Coming	Intention	Revitalise	Optimistic	Upcoming	Optimistic
Commitment	Judge	Risk	Outlook	Well-placed	Outlook
Committed	Keep	Scenario	Planned	Well-positioned	Plan
Confidence	larger	Scope	Planning	Will	Possible
Conjecture	Later	See coming	Predict	Year-ahead	Predict
Consider	Likelihood	Seek	Prospect		Probable
Contemplate	Likely	Shall	Remain		Remain
Contingency	Long for	Short-term	Renew		Renew
Continue	Long-term	Shortly	Scope for		Unlikely
Contract	Look	Should	Scope to		Well placed
Converted	Looks	Soon	Shall		Well positioned
Convince	Looking	Speculate	Shortly		Year ahead
Could	Maintain	Strategy	Should		
Decrease	Make	Stretch	Soon		
Deem	May	Strive	Will		
Designed for	Medium-term	Subject to	Well placed		
Designed to	Might	Suggest	Well positioned		
Desire	Model	Suppose	Year-ahead		
Difference	Near-term	Surmise	Years ahead		
Divine	New	Target	Future year number		
Envisage	Next	Turn			
Envision	No Later than	Varies			
Estimate	Novel	Vary			
Eventual	Objective	View			
Expand	Offer	Vision			
Expansion	Opportunity	Wait			
Expect	Optimistic	Well placed			
Extend	out	Well positioned			
Extension	Outlook	Will			
		Would			

At this point it has to be mentioned that, for example, Hussainey (2004) uses, in addition, several grammatical forms of a word. For example, concerning the verb "anticipate", he also uses "anticipates" or "is anticipated". This procedure has been followed and the FLD Index has been extended as illustrated in chapter 3.5.3.1.

#### **2.7.4 Scoring of FLD**

The assessment of disclosure quality is challenging. Most researchers assume that the quantity of disclosures is an adequate substitution to express the quality of disclosures (Beattie et al., 2004). Existing literature offers different approaches to score the number of disclosures (Beattie et al., 2004). One possibility is the use of a nominal score that indicates the existence or non-existence of particular keywords (Beattie et al., 2004). Such a nominal score is for example used by McChlery et al. (2015). Another possibility is a categorical score (for example 2, 1 or 0 which implies a high, medium or low number of disclosures) that benchmarks the disclosure quantity of one company to other companies (Sydserff & Weetman, 1999). A similar approach is applied by Hussainey (2004). A third possible approach is mentioned, among others, by Hassanein & Hussainey (2015). Their evaluation approach is to count the amount of the number of sentences which include forward-looking keywords based on a predetermined disclosure index. Following this, a change score is calculated, which indicates the increase or decrease of FLDs (in percentage) between two periods. This is the method mainly followed in this research, although a slightly different approach has been applied by counting the number of words in total and then calculating the change score in percentage (see chapter 3.5.4.1).



### 2.7.5 Summary

Although the current research is not grounded in linguistic theory, it is nevertheless affected by the research of linguistic studies (Beattie et al., 2004). According to Beattie et al. (2004), the researcher Sydserff and Weetman (1999) added value to existing linguistic theory by establishing the text index as a tool to evaluate annual reports disclosures. The text index is mostly known in the area of capital market research in accounting as the disclosure index (Hussainey, 2004).

The directed content analysis suggests firstly identifying leading research in the area under study (Hsiu-Fang & Shannon, 2005). This procedure is needed to unveil existing word indices (in the following disclosure indices) and to synthesise them as already explained. Based on ideas of Hsiu-Fang & Sarah (2005) existing disclosure indices can be extended by adding different grammatical word forms (preposition, verb conjugation, modal auxiliary, tense, noun, adjective, adverb as well as word combination) to the index of previously used keywords. In this way, the existing theory is not only tested but also extended (Hsiu-Fang & Shannon, 2005). This approach has also been mentioned among others by Hussainey (2004).

There are several options to score FLDs. The current research mainly follows the method explained by Hassanein & Hussainey (2015), although a slightly different approach has been applied by counting the number of words in total and then calculating the change score in percentage.

## 2.8 The research gap

This research contributes to the existing knowledge in several ways. First of all, past research is not intensive concerning the geographical area of Germany. For example, Al-Najjar & Abed (2014) have mainly focussed on the UK as a geographical area. Moumen et al. (2016) focussed on the Middle East while Laksmana et al. (2012) focussed on the USA. Only Elshandidy et al. (2015) focussed on the UK and Germany, but still, research is rare using Germany as a geographical area. Moreover, the sample of the current research is from 2008 to 2017. Most of the previous research uses earlier sample years such as Hassanein & Hussainey (2015), who analysed samples from 2005 to 2011.

Further, the calculation of the KPIs is one of the most traditional tool to evaluate a company performance (Delen et al., 2013). However, such ratios are based on objective backward-looking accounting information, while stock analysts use KPIs in order to predict future development (Hussainey, 2004; Robinson et al., 2015). A look at the scientific area of voluntary disclosures can be helpful and might add value to traditional fundamental analysis. The evaluation of stock prices will be enhanced with not only the help of KPIs, but also with voluntary disclosures, in particular FLDs. Hussainey (2004) is one of the first researchers in this particular knowledge area that combines part of the traditional value analysis and the inclusion of FLDs for determining future value. However, current research in that particular field of knowledge is limited to a maximum of 7 KPIs used within the developed regression formula. Moreover, the KPIs used are mostly defined as mere control variables. Therefore, this current research has extended the number of KPIs considered and tested their impact on both MV, and also the relationship between KPIs and FLDs.

Additionally, there is currently no conclusive evidence that FLDs, in general, are essential to enhance the understanding of the relationship between KPIs (fundamental value) and MV of a firm. The limitation is because previous research often uses KPIs and FLDs as variables in a specific context, for example, in the context of corporate governance like for

example (Wang & Hussainey, 2013). Hussainey (2004) found a significant impact of FLDs on MV, but only those that are profit relevant. Further research is necessary, to unveil if FLDs in general are affecting the MV.

## 2.9 Hypothesis

Previous capital market research indicates that information in annual reports influences MV (Healy & Palepu, 2001; Kothari, 2001). From its inherent nature information can be mandatory or voluntary, formal or informal, qualitative (written text) or quantitative (financial or non-financial) (Elshandidy et al., 2015; Marston & Shrivess, 1991). Mankiw & Taylor (2006) state that the fundamental value is based on different information on a company's financial accounts (Mankiw & Taylor, 2006). Accounting information in financial statements as part of the annual report is processed to evaluate the fundamental value of a company by using KPIs, a procedure more commonly known as fundamental analysis (Holthausen & Watts, 2001; Nissim & Penman, 2001; Schmidt, 2014). Fundamental analysis is required to predict market value development and to test efficiency (Mankiw & Taylor, 2006). The challenge is not only to define measures able to calculate the fundamental value of a company, but also to compare the value with actual market prices to test market efficiency. Investors and companies require an efficient capital market where financial resources are allocated at a fair price (Malkiel & Fama, 1970). Based on market efficiency theory, which requires that the fundamental value equals the market value, the following first null hypothesis can be constructed:

$H_0$  for Objective 1: Changes in KPIs do not have any significant impact on changes in MV.

However, market efficiency theory is not limited to KPIs only. The theory states that all publicly available information that is relevant to evaluate an asset (or company) needs to be taken into account (Mankiw & Taylor, 2006).

As well as mandatory financial disclosures, the demand for more voluntary disclosures about the future development of a company is increasing (Beretta & Bozzolan, 2008; Healy & Palepu, 2001; Kothari, 2001). According to signalling theory, it can be assumed that companies with better profitability are likely to disclose more information (Watson et al., 2002). Therefore, before testing the direct impact of FLDs on MV, this research has assessed the interdependencies between FLDs and KPIs more closely. The purpose is to understand whether FLDs are helpful to evaluate the fundamental value and relevance, as required by statements such as from Mankiw & Taylor (2006) mentioned above. In total, 19 different KPIs are used for the research. These KPIs are not only related to profitability but also to liquidity, test of solvency, financial structure, efficiency, cash flow and growth ratios. The implication is tested by following the second null hypothesis:

*H<sub>0</sub> for Objective 2a:* Changes in KPIs do not impact changes in the number of FLDs.

Based on signalling theory, the objective of voluntary disclosures is eventually to inform potential investors about the firm value (Hamrouni et al., 2015). The assumption is that companies are increasing the number of voluntary disclosures in the belief that their company is and will stay better than others, and it is worthy of investing in (Watson et al., 2002). This implies that an increase of voluntary disclosures might lead to better profitability in the nearby future. Consequently, signalling theory can be interpreted, that in the case of voluntary disclosures is increasing (positive signal), an increase of profitability can be expected (interpretation). For this research, the near future is considered to be one year ahead. This decision is based on trial and error, as suggested by Eva & Oskar (2012). It is necessary to understand whether FLDs do in fact contain information about the future. Therefore, in the context of interdependencies between FLDs and KPIs, the following null hypothesis can be formulated:

$H_0$  for Objective 2b: Changes in the number of FLDs do not imply changes in one year ahead KPIs.

A rise in a KPI should, in turn, affect a rise in MV as suggested by the market efficiency theory (Lev & Thiagarajan, 1993). The first hypothesis was, therefore, about the impact of KPIs on MV. The question is whether FLDs not only impact KPIs but also directly affect MV as well. Hussainey (2004) proved the significance of the impact of profit relevant FLDs on MV and Wang & Hussainey (2013), unveiled a significant relationship between FLDs and MV in cases where the company is well-governed. This research, however, tests the general effect of FLDs on MV. Hence, the following null hypothesis for objective 3 is:

$H_0$  for Objective 3: Changes in the number of FLDs do not have any significant impact on changes in MV.

Disclosure studies try to enhance traditional evaluation methods by using both, traditional KPIs as well as the variable FLDs to determine the development of the MV. After testing the impact of KPIs on MV and the impact of FLDs on MV, the present study is, eventually, interested in testing the combined impact of KPIs and FLDs on MV. Therefore, the null hypothesis for objective four is as follows:

$H_0$  for Objective 4: The combined changes in KPIs and in the number of FLDs do not have any significant impact on changes in MV.

## 2.10 Summary

The stock market is one of the most important capital markets where securities (traded financial assets such as shares of stock) are issued and traded (Brealey et al., 2007, p. 31). Investors and companies require an efficient capital market where financial resources are allocated at a fair price (Malkiel & Fama, 1970). In order to test market efficiency, the market value must equal the fundamental of a company (Mankiw & Taylor, 2006). The challenge is not only to define measures able to calculate the fundamental value of a company, but to compare this value with actual market prices to test market efficiency.

The performance of a company can be determined by using specific KPIs (Brealey et al., 2007). The evaluation process can be determined by fundamental analysis, which is the most traditional performance analysis tool (Delen et al., 2013) and aims to determine the intrinsic (Nada & Igor, 2016) or fundamental value (Mankiw & Taylor, 2006) of a company. The calculation of KPIs is, however, based on objective backward-looking accounting information, while stock analysts use KPIs in order to predict future development (Hussainey, 2004; Robinson et al., 2015). A look at the scientific area of voluntary disclosures can be helpful and might add value to traditional fundamental analysis. Disclosure studies, such as that from Hussainey (2004), try to enhance traditional evaluation methods by mixing traditional KPIs with the variable FLD, which should enable investors to determine the fundamental value of a firm and analyse the impact on MV.

The purpose of the current research is to analyse the impact of KPIs and FLDs on MV using the German stock market (DAX, SDAX, MDAX, TecDAX) as a case study. The literature review shows that previous research is limited regarding the amount of KPIs defined within the developed regression formula. Further, there is currently no conclusive evidence that FLDs are essential to enhance the understanding of the relationship between fundamental value and MV of a firm as stated by the market efficiency theory. Previous research has proved the significance of FLDs on MV mostly in a specific context, for example corporate governance.

## **Chapter 3: Methodology**

### **3.1 Overview**

The purpose of this chapter is to discuss the methodology for the present research. Section 3.2 addresses the methodological choice, which is about the philosophical view chosen for this current research. The philosophical view is essential as it affects the overall research approach explained in section 3.3. Section 3.4 describes the research design, which is about the business sector, the geographical area, the sample unit, the data collection and the data analysis methods. Section 3.5 discusses the evaluation framework of the current study, thereby determining not only the regression formula but also the composition of the FLD Index. The research validity and reliability is considered in section 3.6. Finally, in section 3.7, a summary is given.

### **3.2 Methodological Choice**

For the current research, the realism approach has been chosen. The ontological truth the realist seeks to find is rational and determinant (Skorupski, 1988). The realist as observer gathers data about certain concrete phenomena thereby constructing ordering models that unveil reciprocal relationships (Oswick, 2013; Sayer, 2003; Sobh & Perry, 2006; Zinkhan & Hirschheim, 1992). Realists want to discover powers, capabilities or tendencies inherent in a particular phenomenon under particular circumstances in order to understand, classify and describe it, and finally, to conclude with general statements (Burrell & Morgan, 2016; Oswick, 2013).

According to the epistemological view of realism, the reality is observable, value-free and measurable, at which the researcher "...does not intervene in the phenomena under study, but describes it as it is." (Lektorskii, 2010, p. 9). Realists "...see knowledge as being stable, general,

and separate from the learner or knower, capable of being codified" (Lueddeke, 1999, p. 244). Reality can be seen as structures that depend on causal tendencies (Fei, 2014; Oswick, 2013), which are yet, contingent on time, place, people and process and hence fragile (Sobh & Perry, 2006, p. 1200).

The ontological truth the realist seeks to find is rational. Different perceptions, values and beliefs of questioned individuals are small windows through which one can look upon the one "true" and objective reality (Sobh & Perry, 2006). A reality that is independent and determinant (Skorupski, 1988). However, although it is the belief of a realist able to fully understand and predict the truth of a specific phenomenon (Yuguo, 2014), the researcher will never be able to prove and gain full knowledge about the truth with certainty. Instead, the observer will only be able to falsify it (Zinkhan & Hirschheim, 1992).

### **3.3 Research Approach**

The realist view is appropriate because the current research seeks to quantitatively evaluate the impact of KPIs and FLDs on MV, which eventually either supports or rejects the developed hypothesis by using a deductive research approach. This involves five major steps, namely developing a hypothesis from theory, expressing the hypothesis in operational terms (regression formula), testing the hypothesis using data from annual reports, evaluating the findings and confirming or rejecting the null hypothesis and eventually conclusion on the findings (Saunders et al., 2009, pp. 124-125).



### **3.4 Research Design**

#### **3.4.1 Sample**

The proposed research study is on the impact of KPIs and FLDs in annual reports on MV of companies listed on one of the four German stock indices (DAX, SDAX, MDAX, TecDAX). Past research has its geographical focus mainly on stock markets in the Middle East, in North Africa (Moumen et al., 2016) or in the United Kingdom (Hassanein & Hussainey, 2015; Hussainey, 2004; Wang & Hussainey, 2013). For correlation and regression analysis data between 2007 and 2017 has been analysed. Consequently the first growth value is from 2008 (increase/decrease value from 2007 to 2008) as described thoroughly in section 3.4.3.3.

The German stock markets consists of 160 companies. The first step was to determine those companies listed on one of the four German indices (DAX, MDAX, SDAX, TecDAX) in 2017. In the next step, companies listed later than 2007 were determined. These companies are not included in the current research, because they do not fulfil the required sample years. Further, the current research faced problems with some annual reports, as the technical format is not compatible with the analysis software tool MAXQDA. Those corresponding companies are therefore not included in the current research. Another problem was that the financial statements of financial companies differ from those of other types of business. Due to comparability issues, companies that belong to the financial service industry are not included. Moreover, some companies have a fiscal year that differs from the calendar year and have therefore been, excluded from the current study. Additionally, for some companies Osiris (Data system from Bureau van Dijk, a Moody's Analytics company) does not provide sufficient data and hence, those companies could not be included either.

Finally, out of 160 companies, 65 were selected after the elimination process. Appendix A (Table 62) lists the companies, which were selected and those which were not. Further, the Table 62 gives information about the release date of annual reports. It has been assumed that annual reports

have been published in the same month each year as the publication of the annual report 2017.

Eight years were analysed initially, but the number of years were extended until additional data analysis could not provide any new insights into the strength of the relationship between the tested variables. This strength can be expressed by correlation analysis (for example, through the Pearson correlation measure) (Hair et al., 2014). Advice given by previous researchers has been followed, which suggests periods of four (Hussainey, 2004), seven (Hassanein & Hussainey, 2015) and twelve years (Wang & Hussainey, 2013).

### **3.4.2 Data Collection**

Firstly, required data concerning the MV as well as required accounting figures was collected. The data can be downloaded from university resources (using Osiris as the Data system – provided by Bureau van Dijk, a Moody's Analytics company). In a further step, annual reports were downloaded, which is either possible through Osiris or Corporate Websites. This procedure can be classified as archival analysis method (Beattie, 2014).

The necessary accounting information is part of the annual report, more specifically of the financial report, which consists of the financial statement as well as additional voluntary and mandatory disclosures (Robinson et al., 2015). The illustrations of the balance sheet, the profit & loss statement as well as the cash flow statement can be found in Appendix B. These are required to explain the KPIs calculation procedure, which is explained in section 3.5.3. This study has followed the ideas of Marston & Shrives (1991), who indicate that reliability is about clearly explaining how research is conducted. Reliability is further discussed in section 3.6.2.

For data collection purposes, annual reports are downloaded from the company Osiris or corporate websites. Afterwards, information from annual reports are analysed by the software tool "MAXQDA", which aids in counting

word frequency of particular keywords (based on FLD Index) within annual reports.

Some data have been missing from Osiris and hence, needed to be manually added. The data basis for the adjustments are the annual reports of each company. This information is needed in order to ensure validity of the research.

### **3.4.3 Data Analysis Methods**

In the following sections the current research methods are explained. These are archival analysis method, correlation and regression analysis method, single and average evaluation method (smoothing method) and the sensitivity analysis method. Further, the usage of software programmes are discussed.

#### **3.4.3.1 Archival Analysis Method**

Annual reports, which can either be classified as primary or secondary data depending on the user, can be directly accessed online, through internet databases such as Osiris, corporate websites or library catalogues (Smith, 2011). Based on ideas of Smith (2011) the process to search for annual reports requires a specification of the research sample, and further, access needs to be in line with the time and budget constraints. Despite the difficulty of classification, for the current study, annual reports refer to primary rather than secondary data. The present research uses only original information from the annual reports, for example, the management report or the financial statements. The process to gain access to the reports can be claimed as archival analysis method (Smith, 2011).

### 3.4.3.2 Regression and Correlation Analysis Method

Firstly, the strength of a relationship between two or more variables using correlation as a method (Hair et al., 2014) is determined. The following overview, provided by Bühl and Zöfel (2000, p. 320), delivers a general description that is use for the current research to categorise the strength between variables:

- Values to 0,2 are "very low" correlations
- Values to 0,5 are "low" correlations
- Values to 0,7 are "medium" correlations
- Values to 0,9 are "high" correlations
- Values above 0,9 are "very high" correlations

Although the correlation describes how strong variables are interrelated, it requires a regression (simple or multiple) analysis to describe this relationship and test the significance (Poddig et al., 2008). "The objective of regression analysis is to predict a single dependent variable from the knowledge of one or more independent variables" (Hair et al., 2014, p. 158). The multiple regression line, which is defined in more detail in section 3.5, can be described through the following formula (Poddig et al., 2008):

$$y_E = a + \beta_1 x_1 + \dots \beta_n x_n + \varepsilon$$

Whereas:

$y_E$  = *Expected Value of the searched and to be described dimension y*

$a$  = *Absolute term of regression line*

$\beta$  = *Regression Coefficient*

$\varepsilon$  = *Residue Coefficient*

In order to estimate the coefficients  $\beta_n$  the OLS (ordinary least square) method is required (Poddig et al., 2008). The formula to estimate  $\beta_n$  is as follows<sup>1</sup>:

$$\widehat{\beta}_n = (X'X)^{-1}X'y$$

Whereas:

$X'$  = Row Vector

$X$  = Column Vector

$y$  = Scalar

If  $\beta = 0$  then a change of value  $x$  does not have any impact on value  $y$  and the null hypothesis can be approved (Poddig et al., 2008). The question is, at which value of  $\beta$  significance can be claimed in order to reject the null hypothesis. For this purpose a two-tailed t-test is required - a so-called test of significance (Poddig et al., 2008). The prerequisite is that variables are normally distributed (Poddig et al., 2008). This function known as standard normal distribution has the form of a symmetrical bell curve and can be subdivided into rejection and approval areas (Poddig et al., 2008). To determine the rejection area a level of significance needs to be defined. For economic science at least a significance level of 0,05 is usually defined, which means that with a probability of 95% the null can be rejected if  $\beta$  is proven significant (Poddig et al., 2008).

To determine the rejection area, a level of significance needs to be defined. For economical science at least a significance level of 0,05 is usually defined, which means that with a probability of 95% the null can be rejected if  $\beta$  is proven significant (Poddig et al., 2008). After determining the level of significance the so called  $t_{critical}$  value needs to be evaluated, which represents the border of the "critical region". In addition to the level

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<sup>1</sup> For more information see Poddig et al. (2008, pp. 224-252).

of significance, the determination of the so called "degrees of freedom" are additionally needed, and are calculated as follows (Poddig et al., 2008):

$$\text{Degree of Freedom} = n - k - 1$$

Whereas:

$n$  = Number of Observations

$k$  = Number of independent variables

1 = Represents the number of the regression constant

A reference table on the t - distribution provides the value  $t_{critical}$ , which is based on both the level of significance and the degree of freedom (Poddig et al., 2008). After defining the critical area, the t - value of the regression coefficient  $\beta$  has to be calculated using the following formula (Poddig et al., 2008):

$$t_n = \frac{\widehat{\beta}_n}{\widehat{SE}}$$

Whereas:

$t_n$  = t - Value of Regressioncoefficient  $\beta_n$

$\widehat{\beta}_n$  = Estimated Coefficient of variable  $x_n$

$\widehat{SE}$  = Estimated Standard Error of Estimated Coefficient  $\widehat{\beta}_n$

$n$  = Number of Observations

Now  $t_b$  and  $t_{critical}$  must be compared (Poddig et al., 2008). The regression coefficient  $\beta$  is significant, if:

$$|t_b| > t_{critical}$$

This formula means that the change of the x value by one unit has a significant impact on the change of the y value. Thus, the hypothesis  $H_0$  can

be rejected, and the hypothesis  $H_1$  accepted. Instead of checking whether the t-value of a variable is higher or smaller than the significant t-value, the P-value displayed by the respective software program can also be used. The P-value represents the so-called error probability (Poddig et al., 2008). In the case where the value of 5% is set as the significance level, the P-value, must not be higher than 0,05. If the P-value of the respective variable is less than 0,05, this variable can be classified as significant (Poddig et al., 2008).

Despite the fact that the t-test is applicable to test the significance of each variable, it requires at a last point a F-test to determine the overall quality of the regression model (Poddig et al., 2008). The formula is, according to Poddig et al. (2008), as follows:

$$F = \frac{R^2}{1 - R^2} * \frac{n - (k + 1)}{k}$$

Whereas:

$R^2 =$  *Coefficient of Determination*

$n =$  *Number of Observations*

$k =$  *Number of Independent Variables*

$1 =$  *Represents the number of the regression constant*

Now the procedure is the same as with the t-test. A reference table about the F-distribution provides the value  $F_{critical}$ , which is based on both the level of significance and the degree of freedom (Poddig et al., 2008).

Now  $F_b$  and  $F_{critical}$  must be compared (Poddig et al., 2008). The regression coefficient  $\beta$  is significant, if:

$$|F_b| > F_{critical}$$

Poddig et al. (2008) suggest for calculation purposes to use specific software and SPSS has been used here. Existing research such as that by McChlery et al. (2015) and Wang and Hussainey (2013) has been followed by using regression and correlation analysis.

#### **3.4.3.3 Single and Average Calculation Method**

Two different paths have been followed to analyse existing data, namely using single as well as average values. The two paths consists of four sub-steps, including different sensitivity analysis, explained in the following chapter. The theoretical term for the use of average values is called smoothing method, for example, the simple exponential smoothing method, and is appropriate for time series analysis to predict dependent variables (Ostertagová & Oskar, 2012). It is a widely used method because of the accurate results it delivers (Ostertagová & Oskar, 2012). In this study a 3-year average approach has been applied, which is commonly used in previous research, for example, by Cho and Pucik (2005), although in a different context. The decision to take a 3-year average approach is a decision based on trial and error, as suggested by Eva & Oskar (2012). In case the outcome is not satisfactory, judgment may need to be altered after analysing whether a different approach might change the results.

The tables 2 to 5 explain the calculation procedure. Table 2 discusses how to calculate the percental change of a KPI. It has to be distinguished between single and average value change. The KPI chosen for the example is return on sales. The detailed calculation procedure of that KPI is explained in section 3.5.3.1.



**Table 2:** Single & Average Change in KPI

Single Change in KPI					
	A	B	C	D	
1	2008	2009	2010	2011	
2	Earnings after Tax	5.894	7.040	6.740	13.717
3	Net Sales	419.989	409.813	446.800	469.043
4	Return on Sales	= A2 / A3	= B2 / B3	= C2 / C3	= D2 / D3
5	Return on Sales	1,40%	1,72%	1,51%	2,92%
6	Growth	= (B5-A5) / A5		= (C5-B5) / B5	= (D5-C5) / A5
7			<b>22,41%</b>	<b>-12,19%</b>	<b>93,87%</b>
Average Change in KPI					
	A	B	C	D	
1	2008	2009	2010	2011	
2	Return on Sales	1,40%	1,72%	1,51%	2,92%
3	Average	= (A2+B2+C2) / 3		= (B2+C2+D2) / 3	
4			=AVG C	=AVG D	
5			1,54%	2,05%	
6	Growth			= (D5-C5) / C5	
7				<b>32,85%</b>	

Table 3 discusses how to calculate percental change of the variable FLD. Again, it must be distinguished between single and average value change. The detailed procedure to calculate the value of FLDs is explained in section 3.5.3.

**Table 3:** Single & Average Change in FLDs

Single Change in FLDs					
	A	B	C	D	
1	2008	2009	2010	2011	
2	Number of FLDs	1.590	1.815	1.938	2.225
3	Growth	= (B2-A2) / A2		= (C2-B2) / B2	= (D2-C2) / A2
4			<b>14,15%</b>	<b>6,78%</b>	<b>14,81%</b>
Average Change in FLDs					
	A	B	C	D	
1	2008	2009	2010	2011	
2	Number of FLDs	1.590	1.815	1.938	2.225
3	Average	= (A2+B2+C2) / 3		= (B2+C2+D2) / 3	
4			=AVG C	=AVG D	
5			1.781	1.993	
6	Growth			= (D5-C5) / C5	
7				<b>12%</b>	

Table 4 discusses how to calculate the percental change of KPIs that belong to the ratio cluster "Growth" as is explained in detail in chapter 3.5.2.7. Again, it must be distinguished between single and average value change.

**Table 4:** Single & Average Growth Ratio

Single Growth Ratio (such as Sales Growth)					
		A	B	C	D
1		2008	2009	2010	2011
2	Sales	419.989	409.813	446.800	469.043
3	Growth		= (B2-A2) / A2	= (C2-B2) / B2	= (D2-C2) / A2
4			<b>-2,42%</b>	<b>9,03%</b>	<b>4,98%</b>
Average Growth Ratio (such as Sales Growth)					
		A	B	C	D
1		2008	2009	2010	2011
2	Sales	419.989	409.813	446.800	469.043
3	Average			= (A2+B2+C2) / 3	= (B2+C2+D2) / 3
4				=AVG C	=AVG D
5				425.534	441.885
6	Growth				= (D5-C5) / C5
7					<b>3,84%</b>

Table 5 discusses of how to calculate percental change of MV. The detailed procedure to calculate the value of MV will be addressed in chapter 3.5.1. Again, it has to be distinguished between single and average value change.

**Table 5:** Calculation Single & Average Change in MV

Single Change MV					
		A	B	C	D
1		2008	2009	2010	2011
2	MV	138.596	115.571	206.898	234.832
3	Growth		= (B2-A2) / A2	= (C2-B2) / B2	= (D2-C2) / A2
4			<b>-16,61%</b>	<b>79,02%</b>	<b>13,50%</b>
Average Change MV					
		A	B	C	D
1		2008	2009	2010	2011
2	MV	138.596	115.571	206.898	234.832
3	Average			= (A2+B2+C2) / 3	= (B2+C2+D2) / 3
4				=AVG C	=AVG D
5				153.689	185.767
6	Growth				= (D5-C5) / C5
7					<b>20,87%</b>

### 3.4.3.4 Sensitivity Analysis Method

Sensitivity analysis is about the analysis of possible consequences on specific dependent variables while changing input or independent factors (Jovanovic, 1999). It can be viewed as a process based on trial and error as mentioned in the previous section for the calculation of average values. The purpose is to understand the effect of changing input factors so that researcher can enhance their evaluation formula consisting of independent

and dependent variables (Jovanovic, 1999). Sensitivity analysis method has been used for four distinct purposes.

First, the sensitivity of the FLD Index is tested. This is carried out by looking at the effect of how one word might affect the overall regression. For this purpose, the word "may" is removed from the disclosure index because it might be confused with the month "May". The software program cannot handle this issue. There is, hence, the risk that also the indication of the month May is counted as forward-looking information. It is necessary to know how sensitive regression results will react to such changes, in order to increase construct validity of the disclosure index (see section 3.6.1).

Secondly, the sensitivity of the timeliness of KPIs, FLDs and MV is analysed. Timeliness can be defined as the gap between year end financial accounting figures and the release date of the annual reports (Chambers & Penman, 1984). Based on ideas of Chambers & Penman (1984) it is assumed that stock prices react timely around the announcement date of corporate reporting. Due to the fact that most companies publish their annual report in March (see Appendix A), it has been assumed that the timely impact of KPIs and FLDs on MV could be expected to occur end of March. Nevertheless, whether a later point in time as the release date of annual reports does affects the relationship between KPIs, FLDs and MV has also been tested. To prove this assumption, this study determines the MV at the end of April instead of March and tests the impact of KPIs and FLDs on the newly defined MV.

Thirdly, the sensitivity of the overall regressions formula is tested by identifying whether FLDs affects the overall relationship between KPIs and MV. Based on ideas of previous research such as Hassanein et al. (2019) and Hassanein & Hussainey (2015), who investigate the impact of FLDs on firm value, the variable FLD is excluded from the current regression formula. The question to be answered is whether the multiple R increases or decreases while eliminating the variable FLD. The detailed regression formulas with and without FLDs are determined and explained in section 3.5.

Fourthly, whether a more extended data period increases the overall quality of the regression of the current research as suggested in section 3.4.1 is determined. For this purpose, the research study has been extended by two years (from eight to ten years) to determine whether a more extended period increases the overall quality of the regression. As mentioned in section 3.4.1 advice by previous researches, which suggests periods between four and twelve years, is being followed.

#### **3.4.3.5 Computerised Content Analysis Method**

There are several computer packages available, that assist with research in conducting the intended analysis. For example, a software tool able to count the amount of FLDs keywords within annual reports. There are several options such as NVivo (older version called *Nud\*ist*), ATLAS.ti or MAXQDA<sup>2</sup> that help to assist in the research (Franzosi et al., 2013). Byrne (2006) mentions the programs Qualrus, HyperRESEARCH and QDA Miner. Among these computer aiding programs the software systems NVivo and MAXQDA are the most used (Oliveira et al., 2016). For example, Hussainey et al. (2012) use *Nud\*ist* (NVivo) to identify FLDs in annual reports. Both MAXQDA and NVivo, are yet to offer similar software packages (Oliveira et al., 2016). For the current research the software MAXQDA is used, which assists in counting the predetermined FLD words within annual reports.

Further, the author requires a software tool able to calculate the KPIs is required. Microsoft Excel to calculate KPIs has been used, and this is described thoroughly in section 3.5. To handle large amounts of data, the Excel pivot table described by Abdulezer (2004), as one example, can aggregate data. As Microsoft Excel is limited, however, to 16 variables concerning the regression analysis, the author decides to use in addition the software SPSS has also been used to conduct correlation and regression analysis as described by Pallant (2010).

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<sup>2</sup> For detail information see <http://www.maxqda.com/products/maxqda-analytics-pro>

### 3.5 Evaluation Framework for regression analysis

This section discusses the evaluation framework for the current research, thereby determining not only the new formula but also the new composition of the FLD Index. The regression formula consists of 19 KPIs covering profitability, liquidity, test of solvency, financial structure, efficiency, cash flow and growth ratios. Krause & Arora (2010), as well as Delen et al. (2013), determine the basic concept for the calculation of KPIs. Concerning the evaluation of the variable FLD, disclosure indices of Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) and Abed & Roberts (2016) are synthesised and then extended to a list of 690 words using grammatical terms. This new framework is used to test the impact of KPIs and FLDs in annual reports on MV of companies listed on one of the four German stock indices (DAX, SDAX, MDAX, TecDAX).

#### 3.5.1 Regression Formula

Mankiw & Taylor (2006) state that the fundamental value is based on information concerning different company's financial accounts and KPIs, for example leverage, liquidity, efficiency, and profitability ratios). According to them, fundamental analysis is required to predict market value and eventually, market value development. In mathematical terms, the regression line is, therefore, as follows:

$$MV_i^{t+n \text{ month}} = \alpha + \beta_1 \times KPI 1_i^t + \beta_2 \times KPI 2_i^t + \dots \beta_n \times KPI n_i^t + \varepsilon$$

Whereas:

$MV_i^{t+n \text{ month}}$  = Market Value at period t + n month of company i

$KPI n_i^t$  = Key Performance Indicator n at period t of company i

$\varepsilon$  = Residue Coefficient

As stated the calculation of KPIs is based on backward-looking accounting information, while stock analysts use them in order to predict future development (Hussainey, 2004; Robinson et al., 2015). A look at the scientific area of voluntary disclosures can be helpful and might add value to traditional fundamental analysis, in order to enhance the evaluation of stock prices with not only the help of KPIs, but also with voluntary disclosures. In addition to traditional fundamental analysis on the usage of financial measurements, the impact of forward-looking disclosures is expected to contain ancillary and value relevant data. Among others Mankiw & Taylor (2006; p. 166) state that besides accounting numbers, valuable news should be part of fundamental analysis. Therefore, the regression formula should also contain FLDs as a variable. A similar approach is mentioned by Hussainey (2004), Moumen et al. (2016), Wang & Hussainey (2013) and Hassanein & Hussainey (2015). The revised regression formula reads as follows:

$$MV_i^{t+n \text{ month}} = \alpha + \dots \beta_n \times KPI n_i^t + \beta_f * FLDs_i^t + \varepsilon$$

Whereas:

$MV_i^{t+n \text{ month}}$  = Market Value at period t + n month of company i

$KPI n_i^t$  = Key Performance Indicator n at period t of company i

$FLDs_i^t$  = Number of FLDs at period t of company i

$\varepsilon$  = Residue Coefficient

The problem that arises is that the mathematical unit of MV is EUR, that of KPI is in percentage, and the one for FLD is in quantity. Previous researchers have identified this problem and have different approaches to solve it. As just one example, McChlery et al. (2015) used a binary logistic regression in order to solve the issue of mathematical units (in their case the dependent variable is dichotomous, while the independent variables are either continuous or categorical) (McChlery et al., 2015, p. 5925).

A binary logistic regression could be used, but the suggestions made by Hassanein & Hussainey (2015), Elshandidy et al. (2013), Moumen et al. (2016) as well as Wang & Hussainey (2013) have been followed where growth rates (change in percentage) are used in order to solve the problem of the mathematical unit. The unit growth can be negative as well as positive. Consequently, the expression of the formula must be altered slightly. The variables are discussed in the sections 3.5.2, 3.5.3 and 3.5.4.

$$\begin{aligned} \text{Growth of } MV_i^{t+n \text{ month}} \\ = \alpha + \dots \beta_n \times \text{Growth of KPI } n_i^t + \beta_f \times \text{Growth of FLDs}_i^t + \varepsilon \end{aligned}$$

Whereas:

Growth of  $MV_i^{t+n \text{ month}}$  = Change of MV at period t of company i in %

Growth of  $KPI n_i^t$  = Change of KPI n at period t of company i in %

Growth of  $FLDs_i^t$  = Change of FLDs at period t of company i in %

$\varepsilon$  = Residue Coefficient

To test specifically the hypothesis 4 mentioned in section 2.9 (the combined changes in KPIs and the number of FLDs do not have any significant impact on changes in MV), the above-mentioned regression formula should be reformulated as follow:

$$\begin{aligned} \text{Growth of } MV_i^{t+n \text{ month}} \\ = \alpha + \dots \beta_n \times (\text{Growth of KPI } n_i^t \times \text{Growth of FLDs}_i^t) + \varepsilon \end{aligned}$$

Whereas:

Growth of  $MV_i^{t+n \text{ month}}$  = Change of MV at period t of company i in %

Growth of  $KPI n_i^t$  = Change of KPI n at period t of company i in %

Growth of  $FLDs_i^t$  = Change of FLDs at period t of company i in %

$\varepsilon$  = Residue Coefficient

### 3.5.2 MV as a the dependent variable

The MV for the current research is calculated by multiplying the closing price of a stock at a particular month multiplied by the outstanding shares. Table 6 provides an overview of this calculation process. The required Data is provided by Osiris.

**Table 6:** Determining Market Capitalization

Type	Year	Month	Value	Calculation
High Prices (EUR)	2008	March	23,00	
Low Prices (EUR)	2008	March	18,40	
Closing Prices (EUR)	2008	March	18,78	
Trading volume per month (shares)	2008	March	3.699	
Average daily volume (shares)	2008	March	195	
Number of days traded	2008	March	19	
Outstanding shares (th)	2008	March	7.380	
Market capitalisation (th EUR)	2008	March	138.596	= Closing Price x Outstanding Share

Market capitalization, a proxy for MV, has also been used by (Omair Alotaibi & Hussainey, 2016). The precalculated figure provided by Osiris is used in order to determine the following ratio:

$$\text{MV Growth} = \frac{(\text{Market Value}_t - \text{Market Value}_{t-1}) * 100}{\text{Market Value}_{t-1}}$$

The determination date for evaluating the MV is end of March each year. As discussed in section 3.4.3.4 the publication dates (see Appendix A) of annual reports determine the timing. Nevertheless, whether a later point in time as the release date of annual reports does affects the relationship between KPIs, FLDs and MV has also been tested. To test the sensitivity of the timeliness as discussed in section 3.4.3.4, the MV is determined at the end of April each year as well.



### 3.5.3 KPI as the independent variable

19 different KPIs are chosen for the current research covering the cluster profitability, liquidity, test of solvency, financial structure, efficiency, cash flow and growth ratios KPIs. Krause & Arora (2010), as well as Delen et al. (2013), determine the basic concepts for the calculation of KPIs. The sections are named according to the KPI cluster. The determination date for evaluating the KPIs is at the end of each year. The calculation of the change value is described in section 3.4.3.4.

#### 3.5.3.1 Profitability

Profitability ratios focus mainly on company earnings as well as income (Brealey et al., 2007). Shareholders, for example, want to know about how much of their investments (shareholders equity) generate profit. For companies, it is likewise, essential. They need, for example, to know the company's profit margin, which illustrates how a company's sales generate profit (Brealey et al., 2007). In general, profitability ratios measure the company's ability to generate profits from its resources (Robinson et al., 2015). Krause & Arora (2010) suggest the following five ratios:

$$1) \text{ Ebit – Turnover Yield} = \frac{\text{EBIT} * 100}{\text{Sales}}$$

- a) This indicator defines the margin of operating income a company is able to achieve from sales.
- b) For the nominator the precalculated figure provided by Osiris has been used (see Appendix B). For the denominator the net sales figure has been used (gross sales deducted by adjustments).
- c) Within the income statement, the position EBIT illustrates the operating income of a company before interest and taxes. The standard definition is net income plus taxes on income (or minus if it is a tax refund) plus interest (Krause & Arora, 2010). The definition of interest can be, according to Krause and Arora (2010), defined in

two different ways: Either the position includes only the interest expense of a company, or, interest is defined as interest expenses minus interest revenue. Krause and Arora (2010) also state that EBIT can eventually be the operating income (or loss) from ordinary business that excludes the financial structure (Krause & Arora, 2010, p. 16). This fact implies that all financial profit and loss items shall be excluded while calculating the position (EBIT). Looking into data provided by Osiris, calculated EBIT is harmonious with the second definition of Krause and Arora (2010). EBIT is within data a calculated position that represents earnings before financial profit/loss as well as before taxes on income (or tax refund). Hence the calculated and predetermined position provided by Osiris is used. In addition, for the calculation of the position of EBITDA (earnings before interest, tax, depreciation, and amortisation), Osiris excludes financial profit or loss and additional depreciation and amortisation which is in line with Krause and Arora (2010). The accounting position "Sales", a regular expression for calculating key performance indicators, is defined as "Net Sales". The accounting position "Net Sales" is determined by deducting the accounting positions "Adjustments as well as Excise Tax" from the accounting position "Gross Sales". Concerning the current research, such adjustments are applicable for three companies only.

$$2) \text{ Return on Sales} = \frac{\text{Net Income} * 100}{\text{Net Sales}}$$

- a) This indicator defines the margin of profit a company can achieve from sales (Krause & Arora, 2010). In practice, the nominator net income is just one way to define the profit of a company. Other possible measures which claim to determine the profit of a company are operating income, EBIT, or net income plus interest debt (Krause & Arora, 2010).
- b) The advice from Krause and Arora (2010) to define net income as profit after-tax is followed in this study.
- c) Looking into data provided by Osiris, the accounting position "Earnings After Tax" is used as the nominator and "Net Sales" as the denominator.

$$3) \text{ Return on Equity} = \frac{\text{Net Income} * 100}{(\text{Average}) \text{ Stokholders Equity}}$$

- a) Delen et al. (2013) do not state the use of an average value as the denominator. In addition, Krause and Arora (2010) state that one could either use "average" as well as year-end values. For this study, the year-end values have been taken as denominator.
- b) Looking into Data provided by Osiris, the accounting position "Earnings After Tax" is used as the nominator while "Total Shareholders Equity" is used as denominator (Brealey et al., 2007).
- c) The denominator includes the accounting positions "Share Capital", "Share Premium", "Retained Earnings" as well as "Other Shareholders Reserves". These positions are in line with the suggestions made by Krause and Arora (2010).
- d) Return on equity has been used by Hassanein & Hussainey (2015) and Elshandidy (2015) as well.

$$4) \text{ Return on Assets} = \frac{(\text{Net Income} + \text{Interest Expense}) * 100}{(\text{Average}) \text{ Total Assets}}$$

- a) Delen et al. (2013) use as nominator net income and total assets as denominator. This research follows the advice of Delen et al. (2013) not to consider interest expense as part of the nominator as it simplifies the calculation as well as the interpretation of the ratio. Further, the use of average values as the denominator is not mentioned by Delen et al. (2013) either. Krause and Arora (2010) state that the use of year-end values is legitimate as well. This advice has been followed by not using average values as the denominator.
- b) Looking into data provided by Osiris, the accounting position "Earnings After Tax" is used as the nominator and "Total Assets" as the denominator.
- c) Return on assets has been used by Al-Najjar & Abed (2014) and Wang & Hussainey (2013).

For the following financial KPI formula, return on investment, Krause and Arora (2010) suggest two methods to calculate them. The first is the same as the KPI mentioned above on the return on assets, while for the second method, the denominator has to be exchanged with the measure assets employed. However, Krause and Arora (2010) state that average assets employed might be the same amount as total assets (p.46). Therefore the the ratio return on investment has not been used.

A further profitability indicator mentioned by Krause and Arora (2010) is the return on capital employed. The formula, according to Krause and Arora (2010) reads as follows:

$$5) \text{ Return on Capital Employed} = \frac{EBIT*100}{(Average) \text{ Capital Employed}}$$

Whereas:

$$\text{Capital Employed} = \text{Stockholders Equity} + \text{Pension Reserves} + \\ (\text{long - term}) \text{ External Borrowings}$$

- a) Average values for this formula have not been used thereby following consistency in previous ratio calculations and the suggestion made by Krause and Arora (2010) (see the calculation of return on equity and return on assets). Alexander and Nobes (2016) also claim the use of long-term borrowings plus owners' equity, yet they do not mention any use of average values within the calculation of ratios itself.
- b) Furthermore, Alexander and Nobes (2016) suggest using owners' equity, and this is followed in this study. A synonym for owners' equity is shareholders equity (Krause & Arora, 2010, p. 99).
- c) Looking into data provided by Osiris, the corresponding accounting positions to calculate the ratio return on capital employed are defined as follows:
  - i) EBIT = EBIT (see Appendix B)
  - ii) Stockholders Equity equals Total Shareholders Equity
  - iii) Pension Reserves = Pension Fund Provision
  - iv) External Borrowings = Bank loans (non-current)

### 3.5.3.2 Liquidity

Liquidity indicators are of great interest as they show whether a company can repay its creditors (Brealey et al., 2007). Liquidity ratios measure the company's ability to meet its short-term obligations (Robinson et al., 2015). Krause and Arora (2010) suggest the following, which is in line with Delen et al. (2013):

$$1) \text{ Cash Ratio} = \frac{(\text{Cash} + \text{Cash Equivalents}) * 100}{\text{Current Liabilities}}$$

- a) Looking into data provided by Osiris (see Appendix B), the accounting position "Cash or Equivalent" is used as the nominator and "Total Current Liabilities" as the denominator.

$$2) \text{ Quick Ratio} = \frac{(\text{Current Assets} - \text{Inventory}) * 100}{\text{Current Liabilities}}$$

- a) Looking into Data provided by Osiris, the accounting position "Total Current Assets minus Net Stated Inventory" is used as the nominator and "Total Current Liabilities" as the denominator.

$$3) \text{ Current Ratio} = \frac{\text{Current Assets} * 100}{\text{Current Liabilities}}$$

- a) Looking into Data provided by Osiris, the accounting position "Total Current Assets" is used as the nominator and "Total Current Liabilities" as the denominator.
- b) The current ratio is used by Hassanein & Hussainey (2015), but as control variable.

### 3.5.3.3 Test of solvency

Solvency indicators measure the degree of financial leverage the company bears (Brealey et al., 2007). It mainly gives information about the creditworthiness of a company expressed by the relationship between capital provided by creditors versus shareholders (Krause & Arora, 2010). It is, moreover, about the ratio unveiling the companies' ability to repay its interest from the operating profit (Brealey et al., 2007). Solvency ratios measure a company's ability to meet long-term obligations. Subsets of these ratios are also known as leverage and long-term debt ratios (Robinson et al., 2015).

Krause and Arora (2010) suggest the following two ratios, which are also mentioned by Delen et al. (2013) in the same way:

$$1) \text{ Debt to Equity Ratio} = \frac{\text{Total Liabilities} * 100}{\text{Total Owners Equity}}$$

- a) Looking into data provided by Osiris, the accounting position "Total Liabilities and Debt" is used as the nominator and "Total Shareholders Equity" as the denominator. Both measures are in line with the ideas provided by Krause and Arora (2010).
- b) The debt to equity ratio is used by Hassanein & Hussainey (2015), McChlery (2015) and Elshandidy (2015).

$$2) \text{ Interest Coverage Ratio} = \frac{\text{EBIT} * 100}{\text{Interest Expenses}}$$

- a) Looking into data provided by Osiris, the accounting position "EBIT" is used as the nominator and "Financial Expenses" as the denominator.

### 3.5.3.1 Financial structure

Financial structure indicators can determine the financial strength of a company, more precisely how equity can cover assets. Krause and Arora (2010) suggest the following financial structure indicators:

$$1) \text{ Equity Ratio} = \frac{\text{Total Owners Equity} * 100}{\text{Total Assets}}$$

- a) Looking into data provided by Osiris (see Appendix B), the accounting position "Total Shareholders Equity" is used as nominator and "Total Assets" as denominator.

$$2) \text{ Equity to Fixed Assets} = \frac{\text{Stockholders Equity} * 100}{\text{Long-Term Assets}}$$

- a) The definition of long-term assets includes accounting position like "...land, building, machinery, equipment, furniture and fixtures." (Krause & Arora, 2010, p. 93).
- b) Looking into data provided by Osiris, the accounting position "Total Shareholders Equity" is used as the nominator. The corresponding denominator is the sum of the accounting position "Other Long-Term Assets" and "Net Property, Plant & Equipment". The accounting positions like "Other Fixed Assets" (except "Other Long-Term Assets" see above) and "Intangibles" are not part of the calculation. Krause and Arora (2010) do not mention these positions.
- c) Krause and Arora (2010) mentioned two more alternatives to calculate the equity fixed assets ratio, which might be included in further studies.



### 3.5.3.2 Efficiency

Efficiency ratios "...can entail complex and subtle issues, so in practice, analysts are usually content to use turnover ratios that measure how much the firm produces for every dollar of assets employed" (Brealey et al., 2007, p. 462). Taking the ratios provided by Krause and Arora (2010) or Brealey et al. (2007) into consideration, it becomes evident that efficiency ratios are mainly for internal use. For example, company employees can calculate the average collection period, which is about the duration of customer payments (Krause & Arora, 2010). This is, however, difficult to calculate by external analysts (Krause & Arora, 2010). Due to the difficulties of calculation, the current research uses only one ratio mentioned by Krause and Arora (2010) added by recommendation of Brealey et al. (2007):

$$1) \text{ Asset Turnover Ratio} = \frac{\text{Net Sales} * 100}{(\text{Average}) \text{ Net Assets or Capital}}$$

- a) Average value for this formula has not been used thereby following consistency in previous ratio calculations (see calculation of return on equity and return on assets). There is a choice according to Krause and Arora (2010) either to use average or year-end values. The use of year-end values is also suggested by Delen et al. (2013) as well.
- b) Krause and Arora (2010) suggests using net assets, which is total assets minus depreciation. Yet, the necessary data for the calculation is difficult to obtain for external users of annual reports (Krause & Arora, 2010). Brealey et al. (2007) suggest using (average) total assets instead.
- c) Looking into data provided by Osiris, the accounting position "Net Sales" is used as the nominator and "Total Assets" as the denominator.

### 3.5.3.3 Cash Flow

Cash flow indicators are becoming more and more important as they neutralize policy issues that impact balance sheets figures and, moreover, they express the financial earning capacity of a company. Cash flow indicators are used to express whether a company is able to fulfil its payment obligations (Krause & Arora, 2010). As with the efficiency indicators, most of cash flow indicators are difficult to calculate as data for external analysts is rare. Yet, two ratios mentioned by Krause and Arora (2010) are chosen for the current research as the corresponding data is able to be determined:

$$1) \text{ Cash Flow Return Margin} = \frac{\text{Operating Cashflow} * 100}{\text{Net Sales}}$$

- a) Looking into data provided by Osiris, the accounting position "Net Cash from Operating Activities" (see Appendix B) is used as the nominator and "Net Sales" as the denominator.

$$2) \text{ Cash Flow Return on Equity} = \frac{\text{Free Cash Flow} * 100}{\text{Year End Stockholders Equity}}$$

- a) The accounting position free cash flow is calculated by subtracting the cash flow used for investing activities from the net cash flow generated by operating activities (Krause & Arora, 2010).
- b) Looking into Data provided by Osiris, the accounting position "Net Cash Used by Investing Activities" and "Net Cash from Operating Activities" have been selected (see Appendix B) to determine the nominator. The accounting position "Total Shareholders Equity" is used as the denominator.

$$3) \text{ EBITDA – Turnover Yield} = \frac{\text{EBITDA} * 100}{\text{Sales}}$$

- a) According to Delen et al. (2013), the EBITDA Turnover Yield ratio belongs to the family of profitability ratios. Krause and Arora (2010) also state that this ratio is an essential measure for the "intrinsic business profitability". EBITDA as nominator is, however, a cash measure as it illustrates the self-financing capacity of a company. The figure can be hence, considered as a measure for the actual cash flow (Krause & Arora, 2010). The ratio of EBITDA turnover yield is about the relation between cash and sales (Krause & Arora, 2010). Hence, the ratio can despite the arguments of Delen et al. (2013) be categorized as the cash flow indicator.
- b) Looking into Data provided by Osiris, the accounting position "EBITDA" is used as the nominator and "Net Sales" as the denominator.

#### 3.5.3.4 Growth ratios (Performance)

In addition to the ratios of Krause and Arora (2010), Delen et al. (2013) mention three further ratios that can indicate the performance of a company, by analysing the historical growth development of certain accounting positions.

$$1) \text{ Asset Growth Rate} = \frac{(\text{Total Assets}_t - \text{Total Assets}_{t-1}) * 100}{\text{Total Assets}_{t-1}}$$

- a) Looking into data provided by Osiris (see Appendix B), the accounting position "Total Assets" used as the nominator as well as the denominator.
- b) Asset growth rate is also used by Moumen et al. (2016), Hussainey (2004) and Wang & Hussainey (2013).

$$2) \text{ Net Profit Growth Rate} = \frac{(\text{Net Income}_t - \text{Net Income}_{t-1}) * 100}{\text{Net Income}_{t-1}}$$

- a) Looking into data provided by Osiris, the accounting position "Earnings after Tax" is used as the nominator as well as the denominator.

$$3) \text{ Sales Growth Rate} = \frac{(\text{Sales}_t - \text{Sales}_{t-1}) * 100}{\text{Sales}_{t-1}}$$

- a) Looking into data provided by Osiris, the accounting position "Net Sales" is used as the nominator as well as the denominator.
- b) Sales growth rate has also been used by Hassanein & Hussainey (2015) and Elshandidy (2015) as well.

### **3.5.4 FLDs as the independent variable**

#### **3.5.4.1 FLD Index**

Concerning the evaluation of FLDs, the different FLD indices established by Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) as well as Abed et al. (2016) are synthesised and afterwards extended to a list of 696 words through utilising grammatical terms as suggested by Hussainey (2004). The procedure can be defined as directed content analysis as described in section 2.7.1. In Table 7 the results of the synthesis are presented:

**Table 7: Word Synthesis Existing Literature**

FLD Words				
ability	contingency	go on	no later than	risk
able	continue	goal	novel	scenario
accelerate	contract	going to	objective	scope for
additional	converted	grow	offer	scope to
advance	convince	guess	opportunity	see coming
afterwards	could	hinder	optimistic	seek
ahead	decrease	hope	out	shall
aim	deem	imagine	outlook	short-term
allow	designed for	imminent	perspective	shortly
ambition	designed to	impend	pessimistic	should
anticipate	desire	improve	plan	soon
approaching	difference	incoming	planned	speculate
approximate	divine	increase	planning	strategy
aspire	envisage	innovation	point toward	stretch
assume	envision	insight	possible	strive
await	estimate	intend	possibly	subject to
become	eventual	intention	potential	subsequent
beforehand	expand	judge	precaution	suggest
belief	expansion	keep	predict	suppose
believe	expect	larger	presume	surmise
can	extend	later	presuppose	target
capable	extension	likelihood	presurmise	turn
carry	financial year	likely	prevent	unlikely
certainty	following	long for	pro forma	upcoming
challenge	forecast	long-term	probable	varies
chance	forejudge	look	proceed	vary
change	foreknow	look ahead	program	view
coming	foresee	look forward	project	vision
coming financial year	foresight	look-ahead	prolong	wait
coming financial years	foretell	look-forward	promise	well placed
coming months	forethought	maintain	prophecy	well positioned
coming year	forma	make	propose	well-placed
coming years	forthcoming	medium term	prospect	well-positioned
commitment	forthcoming future	medium-term	purpose	will
committed	forward	might	realise	year-ahead
confidence	further	model	reflect	years ahead
confident	future	near term	remain	
conjecture	future year number	near-term	renew	
consider	go faster	new	retain	
contemplate		next	revitalise	

According to Hussainey (2004) the synthesised FLD Index can be extended by adding different word forms such as prepositions, verb conjugations, model auxiliary forms, tenses, nouns, adjectives, adverbs as and word combinations. Online tools like [konjugator.reverso.net](http://konjugator.reverso.net), [dict.leo.org](http://dict.leo.org), [wordhippo.com](http://wordhippo.com) as well as [dictionary.cambridge.org](http://dictionary.cambridge.org) are supporting the procedure. The detailed results of the extension are listed in Appendix C. The extended index is presented in Table 8 to 10:

**Table 8:** FLD Index after extending Existing Literature (1)

FLD Words				
abilities	approximate	awaits	conjectures	desirable
ability	approximately	become	conjecturing	desirably
able	approximates	becomes	consider	desire
ably	approximating	becoming	considerably	desires
accelerate	approximation	beforehand	consideration	desiring
accelerates	are accelerated	belief	considerations	differ
accelerating	are anticipated	believe	considering	difference
acceleratingly	are assumed	believes	considers	differences
acceleration	are awaited	believing	contemplate	different
accelerative	are challenged	can	contemplates	differentially
acceleratively	are conjectured	capabilities	contemplating	differing
addition	are continued	capability	contemplation	differs
additional	are divined	capable	contemplative	divination
additionally	are envisaged	capably	contemplatively	divinations
advance	are envisioned	carriable	contingencies	divine
advancement	are estimated	carries	contingency	divines
advances	are expected	carry	contingent	divining
advancing	are extended	carrying	contingently	enlarge
advancingly	are judged	certain	continual	enlargeable
afterwardness	are maintained	certainly	continually	enlargedly
afterwards	are surmised	certainty	continuation	enlargement
ahead	ascertain	challenge	continue	enlarges
aheadness	ascertainable	challenges	continuedly	enlarging
aim	ascertainably	challenging	continues	envisage
aiming	ascertaining	challengingly	continuing	envisages
aimless	ascertains	chance	continuingly	envisaging
aimlessly	aspirant	chances	continuous	envision
aims	aspiration	change	continuously	envisioning
allow	aspirational	changeable	contract	envisionment
allowance	aspirationally	changeably	contracts	envisionments
allowing	aspire	changes	conversion	envisions
allows	aspires	changing	conversions	estimate
ambition	aspiring	coming	convert	estimates
ambitious	aspiringly	coming financial year	converting	estimating
ambitiously	assumable	coming financial years	converts	estimation
anticipatable	assume	coming months	convince	estimations
anticipate	assumedly	coming year	convinces	eventually
anticipatedly	assumes	coming years	convincing	expand
anticipates	assuming	commitment	could	expanding
anticipating	assumingly	commitments	decrease	expands
anticipatingly	assumption	committed	decreases	expansion
anticipation	assumptions	confidence	decreasing	expect
anticipatorily	assumptive	confident	deem	expectantly
anticipatory	assumptively	conject	deeming	expectation
approach	at the latest	conjectural	deems	expectedly
approaches	await	conjecturally	designed for	expecting
approaching	awaiting	conjecture	designed to	expectingly

**Table 9:** FLD Index after extension (2)

FLD Words				
expects	going on	improvement	is surmised	nextly
extend	going to	improves	judge	nextness
extending	grow	improving	judgement	nextnesses
extends	growing	improvingly	judgemental	no later than
extension	growingly	incoming	judgements	novel
extensively	grown	increasable	judges	novelistic
financial year	grows	increase	judging	novelistically
following	growth	increases	judgmentally	novelize
forecast	guess	increasing	keep	novelizes
forecastable	guessable	increasingly	keepable	novelizing
forecasting	guesses	innovate	keeping	novelly
forecasts	guessing	innovates	keeps	novelty
forejudge	guessingly	innovating	larger	objective
forejudges	hinder	innovation	late	objectives
forejudging	hindering	innovational	later	offer
foreknow	hinderingly	innovative	likelihood	offerable
foreknowing	hinders	innovatively	likeliness	offering
foreknowingly	hindrance	innovatory	likely	offers
foreknowledge	hindrances	insight	long for	opinion
foreknowledges	hope	insightful	long term	opinions
foreknown	hopeful	insightfully	long-term	opportunely
foreknows	hopefully	insights	long-termly	opportunistic
foresee	hopeless	intend	longing	opportunities
foreseeing	hopes	intendedly	longs for	opportunity
foresees	hoping	intending	look	optimism
foresight	hopingly	intends	looking	optimistic
foretell	imaginable	intent	looks	optimistically
foretellable	imaginably	intention	maintain	outlook
foretells	imaginarily	intentional	maintaining	outlooks
forethink	imaginary	intentionally	maintains	perspectival
forethinking	imagination	intently	make	perspective
forethinks	imaginative	is accelerated	makes	perspectively
forethought	imaginatively	is anticipated	making	pessimism
forethoughts	imagine	is assumed	may	pessimistic
fortelling	imagines	is awaited	medium term	pessimistically
forward	imagining	is challenged	medium-term	plan
forwardly	imminence	is conjectured	medium-termly	planlessly
future	imminences	is continued	might	planned
go faster	imminent	is divined	model	planning
go on	imminently	is envisaged	modelling	plans
goal	impend	is envisioned	models	point toward
goalless	impending	is estimated	near term	pointed toward
goallessly	impendingly	is expected	near-term	pointing toward
goals	impends	is extended	near-termly	points toward
goes faster	improvable	is intended	new	possibilities
goes on	improvably	is judged	newly	possibility
going faster	improve	is maintained	next	possible

**Table 10:** FLD Index after extension (3)

FLD Words				
possibly	projects	remaining	soon	surmisable
potential	prolong	remains	speculate	surmisably
potentially	prolongation	renew	speculated	surmise
precaution	prolongations	renewable	speculates	surmises
precautionarily	prolonged	renewably	speculating	surmising
precautionary	prolongedly	renewal	speculation	target
precautions	prolonging	renewals	speculations	turn
presumable	prolongs	renewing	speculative	unforeseeably
presumably	promise	renews	speculatively	unforeseen
presume	promised	retain	strategic	unlike
presumed	promises	retaining	strategical	unlikelihood
presumedly	promising	retains	strategically	unlikely
presumes	promisingly	retentive	strategies	upcome
presuming	prophecies	retentively	strategise	upcoming
presumption	prophecy	revitalisable	strategises	variation
presumptions	prophesies	revitalisably	strategising	variational
presumptive	prophesy	revitalisation	strategize	variationally
presumptively	prophesying	revitalisations	strategizes	variations
presuppose	prophetical	revitalise	strategizing	varies
presupposes	prophetically	revitalises	strategy	vary
presupposing	proposal	revitalising	stretch	varying
presuppositional	proposals	revitalizable	stretches	view
presuppositionally	propose	revitalizably	stretching	views
presuppositions	proposed	revitalization	strive	vision
presuppositions	proposedly	revitalizations	striven	visionarily
presurmise	proposes	revitalize	strives	visionary
prevent	proposing	revitalizes	striving	wait
preventable	propositional	revitalizing	strivingly	waitable
preventative	propositionally	risk	subject to	waiting
preventatively	prospect	riskily	subsequent	waitingly
preventible	prospects	risking	subsequently	waits
preventing	purpose	riskless	suggest	well placed
preventingly	realisation	risks	suggested	well positioned
prevention	realise	risky	suggesting	well-placed
preventive	realises	scenario	suggestingly	well-positioned
preventively	realising	scenarios	suggestion	will
prevents	realisingly	scope for	suggestions	year ahead
probabilities	realizingly	scope to	suggestive	years ahead
probability	reflect	seek	suggestively	
probable	reflecting	seeking	suggests	
probably	reflectingly	seekingly	suppose	
proceed	reflection	seeks	supposed	
proceeding	reflections	shall	supposedly	
proceeds	reflective	short term	supposes	
program	reflectively	short-term	supposing	
programs	reflects	short-termly	supposition	
project	remain	should	suppositions	



### 3.5.4.2 Evaluation of FLDs

In this section the formula for evaluating FLD is explained. The determination date for evaluating the FLDs is based on the year end annual report. Hassanein and Hussainey (2015) suggest the following growth ratio:

$$FLDs\ Growth = \frac{(Number\ of\ FLDs_t - Number\ of\ FLDs_{t-1}) * 100}{Number\ of\ FLDs_{t-1}}$$

- a) A summative content analysis shall unveil FLDs using disclosure indices from existing literature in particular from Hussainey (2004), Wang & Hussainey (2013) as well as Hassanein & Hussainey (2015).
- b) Previous researches such as from Wang & Hussainey (2013) identify and counts sentences that include words of the FLD Index. The current research applies a slightly different approach by counting the number of words that are based on the FLD Index. Self-constructed unweighted indices can be applied to measure the number of disclosures by scoring specified items (Beretta & Bozzolan, 2008). To define the "item" as word and not as sentence offers a considerable advantage, as it allows the identification of which words are used most frequently (ranking) in annual reports. Furthermore, it indicates those words that are generally not used within annual reports. To date, such analysis has not been part of previous researches. Moreover, the annual reports as a whole have been studied in this research.

## **3.6 Research Validity & Reliability**

### **3.6.1 Validity**

The term validity is a measure for the quality of a quantitative study (Heale & Twycross, 2015). A researcher needs to ensure that the measurement is efficient and effective to answer the research question (Saunders et al., 2009). Thus this research study needs to explain reasonably the procedure of how the study is conducted without having any apparent mistakes (Beattie et al., 2004). Despite there being no guarantee of how to ensure validity, research can conduct a literature review and use recommendations from other researchers (Saunders et al., 2009). This procedure can be defined as content validity (Heale & Twycross, 2015). For example, concerning a disclosure index as is required for the current research, a sophisticated literature review can unveil which keywords have been used by past research. For the current research the FLD indices from Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) and Abed & Roberts (2016) have been synthesised and extended by grammatical terms as suggested by Hussainey (2004). The procedure of a literature review is also required to define the KPIs as well as to determine the MV. In this way, validity is given for a particular field of interest or context (Marston & Shrives, 1991). The MV, for example, is determined by the market capitalisation, a proxy for MV, that has also been used by Omair Alotaibi and Hussainey (2016). Concerning the KPIs, this current research identifies the research of Krause and Arora (2010) and Delen et al. (2013) as the literature resources that offer the most sophisticated overview of available KPIs that are properly clustered (see section 2.6).

Marston & Shrives (1991) state, however, that the judgement of constructing an index is highly subjective. Therefore, the current research does not only rely on synthesising previous research, as stated above, but also it has tested the validity of the FLD Index by removing the word "may" from the disclosure index and examining the effect on correlation and regression results (see section 4.4.1.1.1 and 4.4.2.1.1). It can be assumed

that critics on subjectivity diminish in the case where the index is not sensitive to changing a few words of the FLD Index, and correlation as well as regression results remain the same. Based on the ideas of Heale and Twycross (2015), this procedure can be claimed to test the construct validity, as conclusions about results can be drawn from changing the research instrument (FLD Index).

A further test of construct validity is the analysis of convergency (Heale & Twycross, 2015). In section 4.4.4, the FLD Index has been revised by more than just one word. Afterwards, the correlation of the disclosures scores between revised and originally used FLD Index has been analysed. Based on the ideas of Heale and Twycross (2015), convergent validity (a type of construct validity) is present in the case that both the disclosure scores of the "revised" FLD Index as well as the disclosure scores of the "originally used" FLD Index are highly correlated.

The additional process of face validity, which is the consultations of experts using interviews as a tool and a subcategory of content validity (Heale and Twycross, 2015), is not applied by the current research.

### **3.6.2 Reliability**

Correlation analysis is generally the method to express the reliability of research (Moosbrugger & Kelava, 2012). The overall framework of research can be claimed as reliable when that correlation unveils significance between chosen variables (Heale & Twycross, 2015). The Pearson correlation, as described in chapter 3.4.3.2, is applied by the current research to determine the strength between selected KPIs, FLDs and MV. In addition to analysing the strength of variables used in this research, the relationship (goodness of fit) between those mentioned variables as described by Hartung et al. (2015) is illustrated through regression analysis. Furthermore, several sensitivity analyses such as the timeliness of the MV, the exclusion of the variable FLD from the regression formula and the extension of the data period, have been applied to enhance regression formula and to increase the correlation strength between KPIs, FLDs and

MV. In addition, to test the stability of the results, an attribute of reliability (Heale & Twycross, 2015), a stepwise regression analysis with the aid of the software tool has been conducted. The purpose is to triangulate the results of the current research with the help of the stepwise regression tool, SPSS.

Moreover, as well as quantitative measurements that determine reliability, the term replication is another method to state whether research results are reliable or not. Regarding the reliability of the disclosure index as an example, construction and extension of such indices can be determined as reliable if other researchers can replicate results (Marston & Shrives, 1991). This particular point shows that reliability is interconnected with validity, as only a valid procedure defined by the authors of research can be used for replicating results.

### 3.7 Summary

Based on the philosophical belief of a realist, a quantitative research approach using regression and correlation analysis as a method has been selected for this research study. The variables within the regression formula are calculated by using the single and average value analysis method (smoothing method). The regression formula consists of 19 KPIs covering profitability, liquidity, test of solvency, financial structure, efficiency, cash flow and growth ratios. Krause & Arora (2010), as well as Delen et al. (2013), determine the basic concept for the calculation of KPIs. Concerning the evaluation of variable FLD, the disclosure indices of Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) and Abed & Roberts (2016) are synthesised and extended to a list of 690 words using grammatical terms. The evaluation framework is tested using companies listed on one of the four German stock indices (DAX, SDAX, MDAX, TecDAX) as a research sample. The German stock indices consist of 160 companies. Out of those 160 companies, 65 have been selected. The data concerning the market capitalisation of a company (market value multiplied with outstanding shares) as well as necessary accounting figures (for KPI calculation) can be downloaded from university resources (using Osiris as Datasystem – provided by Bureau van Dijk, a Moody's analytics company). Further, annual reports must be downloaded either through Osiris or corporate websites (for FLD analysis). Further, to test the impact and consequences of input changes, sensitivity analysis has been used to gain understanding about the sensitivity of the FLD Index, the MV evaluation timing, the exclusion of the variable FLD and the sensitivity of the extension of research data. Research can be claimed valid, if the procedure of the research is reasonably explained, without obvious mistakes, and other researchers can use and extend the knowledge produced by that research. When that replication is possible, the research can be claimed as reliable. In addition, Pearson correlation is used as a method to ensure reliability as well.

## **Chapter 4: Empirical Analysis**

### **4.1 Overview**

In the previous chapter, the research design on how to conduct empirical analysis on the impact of KPIs and FLDs on MV was thoroughly discussed. The new evaluation approach should now be applied to answer the research objectives. The current research starts in section 4.2 to discuss the descriptive statistics, which are about the analysis of the variable FLD. This section should unveil which keywords of the FLD Index are found within annual reports. Moreover, it should uncover which keywords have been used most frequently. Next, in section 4.3, the interdependencies among KPIs are described. Further the regression analysis is presented in section 4.4, which is about assessing the impact of KPIs and FLDs on MV. This section includes two different paths to analyse existing data, namely using single as well as average values. Section 4.5 discusses the results of correlation and regression results in the light of existing literature. Section 4.6 addresses the endogeneity problem and in section 4.7 the thesis presents a summary of the empirical analysis section.

### **4.2 Descriptive Statistics of FLD Words**

#### **4.2.1 FLDs keywords number**

The current research unveils at first the total number of words in total that indicate FLDs. Table 11 shows the differences between companies and years. The values presented are needed for calculating the growth ratio of FLDs as described in section 3.5.4.2. The company names have been eliminated due to privacy requirements.

**Table 11: Number of FLDs per company and year**

Co.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	1.048	1.089	1.036	1.135	1.244	1.311	1.361	1.434	1.626	1.133	2.457
7	1.551	1.660	2.039	1.880	2.012	1.955	1.865	1.753	1.773	2.076	1.685
13	2.113	2.115	2.356	2.460	2.508	2.504	2.762	2.999	3.299	3.276	3.456
14	4.318	4.347	4.393	4.594	4.818	4.705	4.710	4.939	4.946	4.875	5.417
15	3.294	3.765	4.152	4.255	4.233	4.574	5.525	4.657	5.423	5.336	5.458
16	3.321	3.124	3.479	3.372	3.570	3.587	4.151	4.257	4.329	3.963	4.303
17	2.298	2.492	2.389	2.782	2.843	2.752	3.185	3.504	3.052	2.791	2.901
18	1.679	1.579	1.790	1.897	2.252	1.745	1.750	1.726	1.770	1.929	2.321
21	2.331	2.468	2.655	2.981	2.991	3.389	3.353	3.215	3.670	4.411	5.014
22	2.142	2.074	2.306	1.825	1.916	2.108	2.170	2.244	2.256	2.465	3.013
25	1.430	1.514	1.566	1.546	1.549	1.762	2.103	2.469	2.558	2.921	3.218
28	1.487	1.590	1.815	1.938	2.225	2.613	3.148	3.158	3.232	3.123	3.002
31	3.161	2.940	4.050	3.985	3.962	3.947	4.265	4.301	4.271	4.280	4.036
33	1.188	1.203	1.313	1.643	1.669	1.884	2.286	2.467	2.518	2.734	2.864
34	4.061	3.997	4.832	5.071	5.895	6.681	6.428	6.861	7.887	7.998	8.884
42	3.040	3.303	3.307	3.328	3.770	3.698	3.946	3.993	3.750	3.590	3.550
43	4.010	3.920	4.348	4.557	5.227	5.570	7.333	6.814	7.430	6.669	7.833
44	1.786	1.828	1.498	1.586	1.613	1.664	2.057	2.508	2.845	3.006	3.535
49	2.454	3.071	2.616	2.862	3.063	3.001	3.255	3.309	3.090	2.720	3.212
50	1.872	2.288	2.203	2.573	2.707	2.810	3.278	2.866	2.982	4.152	2.997
51	2.921	2.407	2.748	3.127	3.386	3.625	3.605	3.745	3.204	3.200	3.488
52	4.180	4.510	4.538	3.565	3.859	4.085	4.400	4.565	4.500	4.328	4.170
53	1.701	1.817	2.332	2.741	2.842	2.869	3.270	3.354	3.243	3.334	3.942
56	2.170	2.051	2.284	2.584	3.049	3.668	3.864	3.531	3.152	3.372	3.492
57	870	828	913	938	978	1.039	1.170	1.198	1.269	1.306	1.484
58	2.644	2.894	3.420	3.230	3.356	3.099	3.905	3.970	4.379	4.385	5.304
60	4.163	4.216	4.416	4.785	4.569	4.959	5.127	4.814	4.119	4.180	4.844
61	3.490	3.768	3.947	4.410	4.569	4.754	3.921	3.886	3.748	4.128	4.808
62	1.368	1.374	1.384	1.683	2.022	1.979	2.516	2.526	2.376	2.347	2.752
63	1.779	1.961	2.686	2.726	3.018	3.307	3.484	3.660	3.695	3.674	4.079
65	2.081	1.858	2.292	2.595	2.499	2.782	3.032	3.056	3.111	3.129	3.480
71	1.708	1.766	2.095	3.444	3.734	4.237	4.507	5.272	4.966	4.999	4.951
74	2.021	2.115	2.414	2.986	3.121	3.589	3.443	3.673	3.830	3.683	3.505
75	3.635	4.010	4.118	4.684	4.462	4.272	4.237	4.798	4.913	4.753	4.977
79	989	1.158	1.631	2.067	2.328	2.289	2.530	2.574	2.801	3.109	3.308
83	2.862	2.435	2.801	3.390	3.658	3.547	3.401	3.883	3.711	3.710	3.906
85	1.408	1.500	1.693	1.850	1.904	1.971	2.316	2.097	2.068	2.122	2.166
86	2.995	2.883	3.700	4.080	3.932	3.985	3.309	3.026	3.746	3.826	3.809
90	1.493	1.171	1.352	1.557	1.569	1.599	1.895	1.994	2.051	2.375	2.477
92	3.249	2.946	3.497	3.935	4.278	4.721	4.664	4.398	4.552	4.223	4.041
94	1.915	2.276	2.429	2.683	2.844	2.962	3.059	3.150	3.767	3.401	3.520
95	3.757	4.318	4.148	4.460	4.993	4.994	5.920	5.343	4.863	4.263	4.539
97	1.778	1.522	1.870	2.665	2.549	2.898	4.481	4.329	4.913	5.007	5.717
100	3.121	4.277	4.886	4.099	3.960	3.661	3.531	3.635	3.797	3.589	4.008
103	1.345	1.735	1.463	2.527	1.905	2.078	2.410	2.414	2.938	2.538	2.660
106	1.511	1.299	1.506	1.618	1.922	2.020	1.791	2.146	1.822	1.848	1.821
107	1.192	1.380	1.475	1.705	1.582	1.498	1.629	1.531	1.589	1.584	2.096
109	1.159	1.173	1.247	2.482	2.651	2.499	2.357	2.697	2.572	2.765	3.213
111	1.357	1.537	1.316	1.400	1.653	1.668	2.019	1.689	1.810	2.054	1.924
112	1.378	1.557	2.501	2.187	2.527	2.426	2.827	3.129	2.883	3.004	3.464
113	2.170	2.699	2.866	2.878	2.853	2.970	2.921	2.792	2.699	3.022	2.841
117	3.007	3.493	3.117	3.638	3.619	3.440	3.794	3.761	3.312	3.605	3.520
120	2.752	2.728	2.716	2.928	2.647	2.599	2.701	2.839	2.766	1.933	2.266
121	4.420	5.161	5.117	4.886	5.142	6.374	6.698	6.225	7.607	7.226	7.077
122	1.818	1.596	1.718	2.080	2.052	2.224	2.426	2.336	2.358	2.516	3.166
128	1.494	1.554	1.594	1.665	1.800	1.731	1.952	2.109	4.576	2.331	2.746

Co.	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
133	2.038	2.970	3.470	3.539	3.824	3.907	3.896	4.014	4.248	3.731	4.365
136	2.140	3.062	2.906	3.006	3.214	2.694	2.680	2.689	2.841	3.012	3.066
138	1.553	1.626	1.766	1.858	2.219	2.472	2.930	3.093	3.364	3.726	3.907
145	2.271	2.348	2.513	2.741	3.078	3.107	3.335	3.404	3.572	3.553	4.040
146	3.897	4.320	4.183	4.594	5.592	5.076	6.086	6.819	7.546	7.527	6.234
148	1.522	1.532	1.248	1.657	1.501	1.654	2.099	2.535	2.196	1.062	1.482
150	1.839	2.369	2.719	3.271	3.926	4.018	4.528	4.602	4.509	3.893	4.090
152	2.086	1.840	1.697	2.077	2.457	2.243	2.492	2.166	1.996	1.907	2.143
155	1.825	1.974	2.318	2.210	2.002	1.674	2.171	2.016	2.026	1.987	2.281

From the 715 company years (11 years \* 65 companies) 395 values are under the disclosure mean (all years) of 3.070 FLD indicating words found in annual reports. The lowest number of FLDs is observed in the year 2008 for company 57, where the number of FLD words numbers 828. The highest number of FLD words is 8.884 and is observed for company 34 in the year 2017. In total there are 2.194.934 FLD indicating words which have been found during computerised content analysis. Concerning the mean per year the results are shown in Table 12:

**Table 12:** Descriptive Analysis Number of FLDs

	Minimum	Maximum	Mean	Std. Deviation
2007	870	4.420	2.302	953
2008	828	5.161	2.437	1.053
2009	913	5.117	2.634	1.105
2010	938	5.071	2.854	1.062
2011	978	5.895	3.011	1.150
2012	1.039	6.681	3.100	1.243
2013	1.170	7.333	3.358	1.328
2014	1.198	6.861	3.399	1.303
2015	1.269	7.887	3.519	1.452
2016	1.062	7.998	3.457	1.410
2017	1.482	8.884	3.697	1.424
Valid N = 65 per year				

The findings imply that there is widespread use of the number that companies intend to disclose in the future. The reason for this may be due to the size, the competitive environment, the litigious environment or due to managerial ownership as proved by Hassanein & Hussainey (2015), or due to corporate governance factors such as "...directors' ownership, board size, board composition, and the duality of the CEO's role..." (Wang & Hussainey, 2013, p. 26). In addition, Al-Najjar and Abed (2014) examined the connection between corporate governance factors and FLDs and



proved that board size, and the independence of the audit committee is significantly related to the level of FLDs.

Rather than analysing the reasons for the increase or decrease of FLDs the current research focuses on the consequences, meaning the impact of FLDs on MV (see again section 1.4). Looking at the general development of FLDs and MV, it can be observed that FLDs increased by 61% during the years 2007 and 2017, while the MV increased during the same period by 65%:

**Table 13:** Sum of FLDs and MV per year

<b>Years</b>	<b>Sum of FLDs of selected companies</b>	<b>Sum of MV of selected companies in kEUR</b>
2007	149.656	572.890.943
2008	158.381	546.781.114
2009	171.193	317.866.053
2010	185.501	484.307.539
2011	195.712	566.056.667
2012	201.523	572.727.552
2013	218.260	632.378.268
2014	220.957	770.169.120
2015	228.711	966.873.640
2016	224.715	819.333.925
2017	240.325	943.514.665

This observation implies that the change in FLDs might be connected to the change in MV, which is discussed more closely during regression and correlation analysis. However, one issue deserves attention at this point – the development of the MV compared to the development of the number of FLDs.

The MV of selected companies decreased by 228.915.016 kEUR or 42% between 2008 and 2009. Between 2009 and 2010 the MV of selected companies increased by 166.441.485 kEUR or 52%. Rapid rises often occur because investors are willing to pay more for a stock than the value indicated by fundamental analysis (Mankiw & Taylor, 2006). Conversely, abrupt price falls can occur if such speculation leads to "...speculative bubbles..." (Mankiw & Taylor, 2006). Each person reacts differently to information, which is reflected in the valuation of investments (Hachmeister, 1999).

In contrast to the MV development, the number of FLDs increased by 8,1% from 2008 to 2009, and from 2009 to 2010 by 8,3%. During the period between 2008 and 2010 the development of the MV of selected companies compared to the number of FLDs does not match, which will also become clear during the correlation and regression analysis.

The period between 2008 and 2009 is marked by the financial crisis severely hitting the stock markets as described by Mazumder and Ahmad (2010), Ressas and Hussainey (2014) as well as Altman (2009). The underlying reasons for this crisis include the exceptionally low-interest-rate combined with a high rate of liquidity (Altman, 2009). In order to gain a higher yield, money flow was directed to the subprime mortgage sector toward weak borrowers (Altman, 2009). The whole situation created a speculative bubble which, in the end, collapsed with the consequence that borrowers had adjusted loan conditions they could not afford (Altman, 2009). With such tremendous external factors, the current regression formula reached its limits. The financial crisis in 2008 had a unique character that is not easy to explain, and that has to be investigated in more detail by separate research studies such as the one of Ressas and Hussainey (2014), who analysed positive and negative news at the time of the financial crisis. There are indications that during a crisis, the number of voluntary disclosures increases, in particular in the statement of the chairman (Ressas & Hussainey, 2014). For the current research, the question of why FLDs are not found to be significant during this period cannot be clarified thoroughly as this question is not part of the current research objectives. The aim of this work is only to clarify the impact of KPIs and FLDs on the MV of selected companies. This has been successfully proven by the study, as identified in section 4.4.

#### 4.2.2 FLDs signalling keywords per share

The following FLDs keywords are found through the computerized content analysis of annual reports as described in chapter 2.8.2, and sorted by share of the total. The purpose of the following Table 14 is to demonstrate those words most used in annual reports to indicate FLDs.

**Table 14:** FLD Words - TOP 100 Years 2007 to 2017

No	FLD Word	Share	No	FLD Word	Share	No	FLD Word	Share
1	risk	4,35%	36	make	0,69%	71	offers	0,35%
2	new	4,21%	37	differences	0,67%	72	growing	0,35%
3	will	4,10%	38	certain	0,65%	73	making	0,35%
4	risks	3,80%	39	forward	0,65%	74	conversion	0,34%
5	growth	3,04%	40	assumptions	0,61%	75	goal	0,34%
6	changes	2,80%	41	forecast	0,58%	76	opinion	0,33%
7	can	2,72%	42	model	0,56%	77	next	0,33%
8	increase	2,62%	43	should	0,55%	78	remain	0,32%
9	future	2,44%	44	offer	0,55%	79	approach	0,32%
10	may	2,34%	45	expansion	0,54%	80	improvement	0,31%
11	following	2,12%	46	remaining	0,53%	81	commitment	0,30%
12	change	1,83%	47	estimates	0,50%	82	goals	0,30%
13	addition	1,82%	48	short-term	0,50%	83	difference	0,28%
14	plan	1,76%	49	view	0,49%	84	become	0,28%
15	long-term	1,37%	50	different	0,48%	85	advance	0,28%
16	financial year	1,32%	51	contingent	0,47%	86	expand	0,27%
17	additional	1,30%	52	increasing	0,47%	87	increasingly	0,27%
18	carrying	1,27%	53	innovation	0,46%	88	likely	0,26%
19	opportunities	1,20%	54	innovative	0,46%	89	makes	0,26%
20	strategy	1,18%	55	increases	0,45%	90	proceeds	0,26%
21	contracts	1,12%	56	approximately	0,45%	91	shall	0,25%
22	plans	1,04%	57	decrease	0,44%	92	is expected	0,25%
23	potential	0,96%	58	outlook	0,42%	93	objective	0,25%
24	possible	0,95%	59	planned	0,41%	94	continuously	0,25%
25	projects	0,95%	60	opportunity	0,41%	95	objectives	0,25%
26	could	0,89%	61	aim	0,40%	96	proposal	0,24%
27	target	0,87%	62	improve	0,40%	97	grow	0,24%
28	project	0,85%	63	purpose	0,40%	98	ability	0,22%
29	contract	0,82%	64	expect	0,40%	99	forecasts	0,22%
30	able	0,80%	65	models	0,39%	100	continues	0,21%
31	program	0,80%	66	consideration	0,38%	<b>85,85%</b>		
32	subject to	0,78%	67	commitments	0,37%			
33	continue	0,72%	68	continuing	0,36%			
34	strategic	0,70%	69	subsequent	0,36%			
35	planning	0,70%	70	programs	0,36%			

The first 100 keywords amount to 85,85% of all FLDs words counted. The top 25 keywords, which amounts to 52,61% of total, are: risk(s), new, will, growth, change(s), can, increase, future, may, following, change, addition, plan, long-term, financial year, additional, carrying, opportunities, strategy, contracts, plans, potential, possible, projects. The word risk (including its

plural form) is the most used word to indicate FLDs. Hussainey (2004) was one of the first researchers to define that word as a future indicating keyword. However, Elshandidy et al. (2013) define this word as a risk indicating word with the purpose of analysing risk disclosures rather than FLDs. There is apparently confusion at times, to define whether a word truly indicates FLDs. For the word risk, a closer look at synonyms might help at this point. Using the software tool on thesaurus.com indicates that a synonym for "risk" is the word "opportunity", which is, according to Abed, Al-Najjar, & Roberts (2016) a future related word. It is not the intention of the current research to delve deep into linguistics, but this small example illustrates the difficulty at times of which words can and cannot be included within the FLD Index. Words such as "will" (no. 3) and "future" (no. 9) are, in contrast to the word "risk", less disputable. The reasonable doubts of inclusion and exclusion of words are addressed by sensitivity analysis in section 4.4.1.1.1 and 4.4.2.1.1 as well as in section 4.4.4 in order to ensure validity and reliability of the index. As is shown in section 4.4.1.1.1 and 4.4.2.1.1 removing the word "may", which is the 10th most used word implying FLDs, does not affect either the correlation or regression results. Such a result indicates that even to take one word out of the FLD Index does not have any impact on the overall relationship strength between KPIs, FLDs and MV. This result indicates that FLDs are based on a mix of many words, where one alone is not significant.

Table 15 shows the list of FLDs indicating words, which only amount to 11,06% of the total. One word alone amounts to no more than 0,21% of the total and clearly has no effect on the regression results either. Nevertheless, it could be assumed that the top 101 to 200 FLD keywords as a whole are important.

**Table 15:** FLD Words - TOP 101 to 200 Years 2007 to 2017

FLD Word	Share	No	FLD Word	Share	No	FLD Word	Share
additionally	0,21%	136	differ	0,13%	171	probably	0,07%
remains	0,21%	137	renewable	0,13%	172	advances	0,07%
expanding	0,20%	138	allowance	0,13%	173	capabilities	0,07%
continuous	0,20%	139	possibility	0,13%	174	challenging	0,07%
offering	0,20%	140	strategies	0,13%	175	assumes	0,07%
newly	0,20%	141	turn	0,13%	176	assuming	0,06%
looking	0,20%	142	continually	0,13%	177	potentially	0,06%
probable	0,20%	143	changing	0,12%	178	promising	0,06%
long term	0,19%	144	becoming	0,12%	179	late	0,06%
maintain	0,19%	145	anticipate	0,12%	180	opinions	0,06%
probability	0,19%	146	designed to	0,11%	181	keeping	0,06%
carry	0,19%	147	perspective	0,11%	182	vary	0,06%
challenges	0,18%	148	keep	0,11%	183	retain	0,06%
expects	0,18%	149	vision	0,10%	184	prevention	0,06%
believe	0,17%	150	prevent	0,09%	185	ambitious	0,06%
might	0,17%	151	larger	0,09%	186	maintains	0,05%
coming	0,17%	152	look	0,09%	187	incoming	0,05%
improving	0,17%	153	assume	0,09%	188	waiting	0,05%
estimate	0,17%	154	extend	0,09%	189	allowing	0,05%
reflect	0,17%	155	assumption	0,09%	190	likelihood	0,05%
reflects	0,16%	156	maintaining	0,09%	191	intention	0,05%
aims	0,16%	157	propose	0,09%	192	considering	0,05%
allows	0,16%	158	extension	0,09%	193	possibilities	0,05%
considerably	0,16%	159	coming years	0,09%	194	extending	0,05%
committed	0,16%	160	believes	0,08%	195	is assumed	0,05%
are expected	0,15%	161	confidence	0,08%	196	carries	0,05%
allow	0,15%	162	unlikely	0,08%	197	seek	0,05%
proposed	0,14%	163	intends	0,08%	198	approaches	0,04%
prospects	0,14%	164	becomes	0,08%	199	capable	0,04%
ahead	0,14%	165	considers	0,08%	200	certainty	0,04%
intend	0,14%	166	soon	0,08%			
consider	0,14%	167	medium term	0,08%			
later	0,14%	168	challenge	0,07%			
medium-term	0,13%	169	suggestions	0,07%			
subsequently	0,13%	170	proposals	0,07%			
							<b>11,06%</b>

As becomes clear, one word such as "additionally" amounts to not more than 0,21% of the total. To remove a word because of doubts of its ability to indicate forward-looking statements clearly does not impact the results.

For the next 150 words it is questionable whether the words even as a whole matter. The importance of the following list in Table 16 of keywords (201-350) is negligible as they only make up 2,16% of the total share. It can be assumed that the exclusion of the words in ranks 201 and higher will not affect the results. They are nevertheless, included for the current research.

**Table 16:** FLD Words - TOP 201 to 350 Years 2007 to 2017

No	FLD Word	Share	No	FLD Word	Share	No	FLD Word	Share
201	continuation	0,04%	251	promised	0,02%	301	accelerating	0,01%
202	insight	0,04%	252	years ahead	0,02%	302	ambition	0,01%
203	reflecting	0,04%	253	optimistic	0,02%	303	precaution	0,01%
204	preventive	0,04%	254	proposing	0,02%	304	desire	0,01%
205	strategically	0,04%	255	expectation	0,02%	305	impending	0,01%
206	scenarios	0,04%	256	renew	0,02%	306	prospect	0,01%
207	is intended	0,04%	257	preventing	0,02%	307	foresee	0,01%
208	seeking	0,04%	258	looks	0,02%	308	probabilities	0,01%
209	decreases	0,04%	259	converting	0,02%	309	no later than	0,01%
210	estimation	0,04%	260	keeps	0,02%	310	judgements	0,01%
211	forecasting	0,04%	261	retains	0,02%	311	imminent	0,01%
212	anticipates	0,04%	262	estimating	0,02%	312	convincing	0,01%
213	scenario	0,04%	263	aspire	0,02%	313	preventative	0,01%
214	short term	0,04%	264	estimations	0,02%	314	prevents	0,01%
215	considerations	0,04%	265	differs	0,02%	315	suggests	0,01%
216	strive	0,04%	266	is anticipated	0,02%	316	variation	0,01%
217	confident	0,04%	267	striving	0,02%	317	contingency	0,01%
218	accelerate	0,04%	268	speculative	0,02%	318	ascertain	0,01%
219	convert	0,04%	269	precautions	0,02%	319	reflection	0,01%
220	contingencies	0,03%	270	expands	0,02%	320	presumably	0,01%
221	capability	0,03%	271	advancement	0,02%	321	contingently	0,01%
222	seeks	0,03%	272	advancing	0,02%	322	are maintained	0,01%
223	renewal	0,03%	273	prolonged	0,02%	323	convince	0,01%
224	innovate	0,03%	274	scope for	0,02%	324	optimism	0,01%
225	varying	0,03%	275	suggest	0,02%	325	approximates	0,01%
226	extends	0,03%	276	varies	0,02%	326	judge	0,01%
227	expecting	0,03%	277	abilities	0,02%	327	are assumed	0,01%
228	realisation	0,03%	278	approximate	0,02%	328	afterwards	0,01%
229	unlike	0,03%	279	precautionary	0,02%	329	are anticipated	0,01%
230	extensively	0,03%	280	unforeseen	0,02%	330	approaching	0,01%
231	grown	0,03%	281	proceeding	0,02%	331	suggested	0,01%
232	aiming	0,03%	282	proceed	0,02%	332	desirable	0,01%
233	improves	0,03%	283	stretch	0,02%	333	intentional	0,01%
234	novel	0,03%	284	promises	0,02%	334	belief	0,01%
235	insights	0,03%	285	hope	0,02%	335	eventually	0,01%
236	differing	0,03%	286	realise	0,01%	336	deems	0,01%
237	upcoming	0,03%	287	chances	0,01%	337	approximation	0,01%
238	well positioned	0,03%	288	anticipating	0,01%	338	hopes	0,01%
239	continual	0,03%	289	judgement	0,01%	339	anticipation	0,01%
240	chance	0,03%	290	ably	0,01%	340	wait	0,01%
241	views	0,03%	291	proposes	0,01%	341	is maintained	0,01%
242	retaining	0,03%	292	acceleration	0,01%	342	well-positioned	0,01%
243	strives	0,03%	293	speculation	0,01%	343	envisages	0,01%
244	is estimated	0,02%	294	coming year	0,01%	344	scope to	0,01%
245	variations	0,02%	295	going to	0,01%	345	anticipatory	0,01%
246	designed for	0,02%	296	intent	0,01%	346	go on	0,01%
247	promise	0,02%	297	are estimated	0,01%	347	realising	0,01%
248	possibly	0,02%	298	certainly	0,01%	348	well placed	0,01%
249	at the latest	0,02%	299	suggestion	0,01%	349	aspiration	0,005%
250	decreasing	0,02%	300	grows	0,01%	350	near term	0,005%

Table 17 shows the list of 180 FLDs indicating words that are found within annual reports, yet the share of each word compared to the total amounts to less than 0,005%. These words can be disregarded in future research, but nevertheless are included in the current study. The results are as follows:

**Table 17:** FLD Words - TOP 351 to 530 Years 2007 to 2017

accelerates	converts	hoping	opportunistic	renews
aimlessly	convinces	imaginable	optimistically	revitalisation
ambitiously	deem	imaginary	outlooks	revitalise
approximating	deeming	imagination	perspectively	revitalising
are accelerated	desires	imaginative	pessimism	revitalization
are challenged	desiring	imaginatively	pessimistic	revitalize
are continued	differentially	imagine	point toward	revitalizing
are envisaged	divine	imagining	pointing toward	risking
are envisioned	enlarge	imminence	points toward	riskless
are extended	enlargeable	imminently	presumable	risky
are judged	enlargement	impend	presume	speculate
ascertainable	enlarges	innovates	presumed	speculated
ascertaining	enlarging	innovating	presumes	speculating
ascertains	envisage	innovational	presuming	speculations
aspirant	envisaging	innovatively	presumption	speculatively
aspirational	envision	innovatory	presumptions	strategical
aspires	envisioning	insightful	presuppose	strategize
aspiring	envisions	intending	presupposes	strategizing
await	expectantly	intentionally	presupposing	stretches
awaiting	expectedly	intently	preventable	stretching
awaits	foresees	is accelerated	preventatively	striven
beforehand	foresight	is awaited	preventively	suggesting
believing	foretell	is continued	prolong	suppose
capably	goes on	is envisaged	prolongation	supposed
changeable	going faster	is envisioned	prolongations	supposedly
coming financial year	going on	is extended	prolonging	supposes
coming financial years	guess	is judged	prolongs	supposing
coming months	guesses	judgemental	promisingly	suppositions
conject	guessing	judges	prophecies	surmise
conjecture	hinder	judging	prophecy	surmises
conjectures	hindering	likeness	realises	unforeseeably
contemplate	hinders	long for	reflections	unlikelyhood
contemplates	hindrance	longing	reflective	visionary
contemplating	hindrances	modelling	renewably	waits
continuingly	hopeful	near-term	renewals	well-placed
conversions	hopefully	novelty	renewing	year ahead

Table 18 contains 166 words that have not been found within annual reports. These words can be mainly classified as adverbs and adjectives.

The results are presented in Table 18:

**Table 18:** FLD Words - not found

acceleratingly	divination	guessable	novelizing	revitalisable
accelerative	divinations	guessingly	novelly	revitalisably
acceleratively	divines	hinderingly	offerable	revitalisations
advancingly	divining	hopeless	opportunistically	revitalises
afterwardness	enlargedly	hopingly	perspectival	revitalizable
aheadness	envisionment	imaginably	pessimistically	revitalizably
aimless	envisionments	imaginarily	planlessly	revitalizations
anticipatable	expectingly	imagines	pointed toward	revitalizes
anticipatedly	forecastable	imminences	precautionarily	riskily
anticipatingly	forejudge	impendingly	presumedly	seekingly
anticipatorily	forejudges	impends	presumptive	short-termly
are awaited	forejudging	improvable	presumptively	speculates
are conjectured	foreknow	improvably	presupposition	strategise
are divined	foreknowing	improvingly	presuppositional	strategises
are surmised	foreknowingly	increasable	presuppositionally	strategising
ascertainably	foreknowledge	insightfully	presuppositions	strategizes
aspirationally	foreknowledges	intendedly	presurmise	strivingly
aspiringly	foreknown	is challenged	preventible	suggestingly
assumable	foreknows	is conjectured	preventingly	suggestive
assumedly	foreseeing	is divined	prolongedly	suggestively
assumingly	foretellable	is surmised	prophesies	supposition
assumptive	foretells	judgmentally	prophesy	surmisable
assumptively	forethink	keepable	prophesying	surmisably
carriable	forethinking	long-termly	prophetic	surmising
challengingly	forethinks	longs for	prophetically	upcome
changeably	forethought	medium-termly	proposedly	variational
conjectural	forethoughts	near-termly	propositional	variationally
conjecturally	fortelling	nextly	propositionally	visionarily
conjecturing	forwardly	nextness	realisingly	waitable
contemplation	go faster	nextnesses	realizingly	waitingly
contemplative	goalless	novelistic	reflectingly	
contemplatively	goallessly	novelistically	reflectively	
continuedly	goes faster	novelize	retentive	
desirably	growingly	novelizes	retentively	



### 4.3 Interdependencies among KPIs

The following analysis is mostly descriptive without interpretation, but should nevertheless, show that each KPI is between 5 and 18 times related to another KPI. The analysis is based on the 3-year AVG 2012 to 2017 data. It reveals the problem to determine the perfect mix to evaluate MV development by only taking the correlation values into consideration. As described in section 4.4.2 the number of significant variables numbers 15 while the number of significant variables, according to correlation analysis (see section 4.4.1), numbers 18. The reason for this are interdependencies, which are described in the following paragraph.

The KPI asset growth is 7 times significantly related to other variables including KPIs, FLDs and MV. Asset turnover ratio is 12 times significantly related to other variables including KPIs and MV, but not to FLDs. Cash ratio is 10 times significantly related to other variables including KPIs and MV, but not to FLDs. The cash flow return margin is 5 times significantly related to other variables including KPIs, but neither to MV nor to FLDs. The cash flow return on equity, in contrast, is only significantly related to return on capital employed. Current ratio is 10 times significantly related to other variables including KPIs and MV, but not to FLDs. The debt to equity ratio is 9 times significantly related to other variables, including KPIs and MV, but not to FLDs. The EBIT turnover yield is 9 times significantly related to other variables, including KPIs and MV, but not to FLDs. EBITDA turnover yield is 16 times significantly related to other variables including KPIs and MV, but not to FLDs. The equity ratio is 14 times significantly related to other variables including KPIs and MV, but not to FLDs. FLDs are not only significantly related to MV, but also to asset growth and return on capital employed. The KPI equity to long-term assets is 9 times significantly related to other variables, including KPIs and MV, but not to FLDs. The KPI interest coverage ratio is 12 times significantly related to other variables including KPIs and MV, but not to FLDs. The profit growth is 12 times significantly related to other variables including KPIs and MV, but not to FLDs. The KPI quick ratio is 10 times significantly related to other variables including KPIs

and MV, but not to FLDs. The ratio return on assets is 12 times significantly related to other variables including KPIs and MV, but not to FLDs. Return on capital employed is 18 times significantly related to other variables including KPIs, FLDs and MV. The return on equity is 10 times significantly related to other variables including KPIs and MV, but not to FLDs. The return on sales is 8 times significantly related to other variables, including KPIs and MV, but not to FLDs. The ratio sales growth is 13 times significantly related to other variables including KPIs and MV, but not to FLDs growth.

**Table 19: Correlation Interdependencies (1)**

		Asset Growth	Asset Turnover Ratio	Cash Ratio	Cash Flow Return Margin
Asset Growth	Pearson Correlation	1	-,145**	-,158**	0,061
	Sig. (2-tailed)		0,004	0,002	0,230
Asset Turnover Ratio	Pearson Correlation	-,145**	1	0,010	0,084
	Sig. (2-tailed)	0,004		0,850	0,098
Cash Ratio	Pearson Correlation	-,158**	0,010	1	-0,011
	Sig. (2-tailed)	0,002	0,850		0,823
Cash Flow Return Margin	Pearson Correlation	0,061	0,084	-0,011	1
	Sig. (2-tailed)	0,230	0,098	0,823	
Cash Flow Return on Equity	Pearson Correlation	-0,001	-0,034	0,070	0,066
	Sig. (2-tailed)	0,987	0,498	0,168	0,191
Current Ratio	Pearson Correlation	-,173**	-0,049	,723**	-0,063
	Sig. (2-tailed)	0,001	0,333	0,000	0,218
Debt to Equity Ratio	Pearson Correlation	-,237**	-,242**	-0,037	0,088
	Sig. (2-tailed)	0,000	0,000	0,462	0,082
EBIT Turnover Yield	Pearson Correlation	0,076	,241**	0,029	,503**
	Sig. (2-tailed)	0,134	0,000	0,574	0,000
EBITDA Turnover Yield	Pearson Correlation	0,082	,318**	,174**	,451**
	Sig. (2-tailed)	0,105	0,000	0,001	0,000
Equity Ratio	Pearson Correlation	-0,032	0,07	,315**	-0,072
	Sig. (2-tailed)	0,524	0,166	0,000	0,156
Equity to Long-Term Assets	Pearson Correlation	-0,05	0,087	,326**	-0,012
	Sig. (2-tailed)	0,329	0,087	0,000	0,811
Interest Coverage Ratio	Pearson Correlation	0,012	,475**	,311**	0,032
	Sig. (2-tailed)	0,81	0,000	0,000	0,529
Profit Growth	Pearson Correlation	0,069	,131**	0,047	-,295**
	Sig. (2-tailed)	0,171	0,010	0,354	0,000
Quick Ratio	Pearson Correlation	-,171**	0,045	,761**	-0,044
	Sig. (2-tailed)	0,001	0,374	0,000	0,385
Return on Assets	Pearson Correlation	0,013	,172**	0,042	-,409**
	Sig. (2-tailed)	0,804	0,001	0,411	0,000
Return on Capital Employed	Pearson Correlation	-0,006	,446**	,266**	-0,022
	Sig. (2-tailed)	0,913	0,000	0,000	0,665
Return on Equity	Pearson Correlation	0,030	,117*	0,027	-,417**
	Sig. (2-tailed)	0,560	0,021	0,592	0,000
Return on Sales	Pearson Correlation	0,020	,100*	0,061	-0,001
	Sig. (2-tailed)	0,689	0,048	0,227	0,983
Sales Growth	Pearson Correlation	,704**	,469**	-,119*	0,091
	Sig. (2-tailed)	0,000	0,000	0,019	0,071

\*\* Correlation is significant at the 0.01 level (2-tailed).  
\* Correlation is significant at the 0.05 level (2-tailed).

Source: Data output from SPSS

**Table 20:** Correlation Interdependencies (2)

		Cash Flow Return on Equity	Current Ratio	Debt to Equity Ratio	EBIT Turnover Yield
Asset Growth	Pearson Correlation	-0,001	-,173**	-,237**	0,076
	Sig. (2-tailed)	0,987	0,001	0,000	0,134
Asset Turnover Ratio	Pearson Correlation	-0,034	-0,049	-,242**	,241**
	Sig. (2-tailed)	0,498	0,333	0,000	0,000
Cash Ratio	Pearson Correlation	0,07	,723**	-0,037	0,029
	Sig. (2-tailed)	0,168	0,000	0,462	0,574
Cash Flow Return Margin	Pearson Correlation	0,066	-0,063	0,088	,503**
	Sig. (2-tailed)	0,191	0,218	0,082	0,000
Cash Flow Return on Equity	Pearson Correlation	1	0,031	-0,025	-0,032
	Sig. (2-tailed)		0,538	0,626	0,527
Current Ratio	Pearson Correlation	0,031	1	-0,06	0,014
	Sig. (2-tailed)	0,538		0,235	0,782
Debt to Equity ratio	Pearson Correlation	-0,025	-0,06	1	-0,010
	Sig. (2-tailed)	0,626	0,235		0,846
EBIT Turnover Yield	Pearson Correlation	-0,032	0,014	-0,010	1
	Sig. (2-tailed)	0,527	0,782	0,846	
EBITDA Turnover Yield	Pearson Correlation	-0,013	,117*	-0,013	,810**
	Sig. (2-tailed)	0,793	0,021	0,798	0,000
Equity Ratio	Pearson Correlation	0,053	,346**	-,367**	0,056
	Sig. (2-tailed)	0,299	0,000	0,000	0,267
Equity to Long- Term Assets	Pearson Correlation	0,027	,419**	-,229**	0,059
	Sig. (2-tailed)	0,591	0,000	0,000	0,244
Interest Coverage Ratio	Pearson Correlation	-0,046	,227**	-0,095	,208**
	Sig. (2-tailed)	0,369	0,000	0,062	0,000
Profit Growth	Pearson Correlation	-0,044	0,091	-0,099	,124*
	Sig. (2-tailed)	0,387	0,073	0,051	0,014
Quick Ratio	Pearson Correlation	0,044	,940**	-0,078	0,017
	Sig. (2-tailed)	0,389	0,000	0,125	0,732
Return on Assets	Pearson Correlation	-0,025	0,074	-,102*	,145**
	Sig. (2-tailed)	0,628	0,144	0,044	0,004
Return on Capital Employed	Pearson Correlation	-,185**	,198**	-,130*	,304**
	Sig. (2-tailed)	0,000	0,000	0,01	0,000
Return on Equity	Pearson Correlation	-0,016	0,081	-,150**	0,09
	Sig. (2-tailed)	0,759	0,110	0,003	0,076
Return on Sales	Pearson Correlation	0,003	0,023	-0,054	0,075
	Sig. (2-tailed)	0,947	0,653	0,287	0,141
Sales Growth	Pearson Correlation	-0,018	-,163**	-,475**	,170**
	Sig. (2-tailed)	0,727	0,001	0,000	0,001
** Correlation is significant at the 0.01 level (2-tailed)					
* Correlation is significant at the 0.05 level (2-tailed)					

Source: Data output from SPSS

**Table 21: Correlation Interdependencies (3)**

		EBITDA Turnover Yield	Equity Ratio	Equity to Long-Term Assets	Interest Coverage Ratio
Asset Growth	Pearson Correlation	0,082	-0,032	-0,05	0,012
	Sig. (2-tailed)	0,105	0,524	0,329	0,810
Asset Turnover Ratio	Pearson Correlation	,318**	0,070	0,087	,475**
	Sig. (2-tailed)	0,000	0,166	0,087	0,000
Cash Ratio	Pearson Correlation	,174**	,315**	,326**	,311**
	Sig. (2-tailed)	0,001	0,000	0,000	0,000
Cash Flow Return Margin	Pearson Correlation	,451**	-0,072	-0,012	0,032
	Sig. (2-tailed)	0	0,156	0,811	0,529
Cash flow Return on Equity	Pearson Correlation	-0,013	0,053	0,027	-0,046
	Sig. (2-tailed)	0,793	0,299	0,591	0,369
Current Ratio	Pearson Correlation	,117*	,346**	,419**	,227**
	Sig. (2-tailed)	0,021	0,000	0,000	0,000
Debt to Equity Ratio	Pearson Correlation	-0,013	-,367**	-,229**	-0,095
	Sig. (2-tailed)	0,798	0,000	0,000	0,062
EBIT Turnover Yield	Pearson Correlation	,810**	0,056	0,059	,208**
	Sig. (2-tailed)	0,000	0,267	0,244	0,000
EBITDA Turnover Yield	Pearson Correlation	1	,108*	,132**	,453**
	Sig. (2-tailed)		0,032	0,009	0,000
Equity Ratio	Pearson Correlation	,108*	1	,478**	,219**
	Sig. (2-tailed)	0,032		0,000	0,000
Equity to Long- Term Assets	Pearson Correlation	,132**	,478**	1	,147**
	Sig. (2-tailed)	0,009	0,000		0,004
Interest Coverage Ratio	Pearson Correlation	,453**	,219**	,147**	1
	Sig. (2-tailed)	0,000	0,000	0,004	
Profit Growth	Pearson Correlation	,165**	,160**	0,069	,133**
	Sig. (2-tailed)	0,001	0,002	0,171	0,009
Quick Ratio	Pearson Correlation	,164**	,380**	,372**	,365**
	Sig. (2-tailed)	0,001	0,000	0,000	0,000
Return on Assets	Pearson Correlation	,195**	,187**	0,08	,111*
	Sig. (2-tailed)	0,000	0,000	0,115	0,028
Return on Capital Employed	Pearson Correlation	,549**	,233**	,159**	,835**
	Sig. (2-tailed)	0,000	0,000	0,002	0,000
Return on Equity	Pearson Correlation	,135**	,198**	0,097	0,079
	Sig. (2-tailed)	0,008	0,000	0,056	0,121
Return on Sales	Pearson Correlation	,133**	,136**	0,073	0,061
	Sig. (2-tailed)	0,009	0,007	0,152	0,23
Sales Growth	Pearson Correlation	,214**	-,136**	0,037	,238**
	Sig. (2-tailed)	0,000	0,007	0,468	0,000
** Correlation is significant at the 0.01 level (2-tailed)					
* Correlation is significant at the 0.05 level (2-tailed)					

Source: Data output from SPSS

**Table 22:** Correlation Interdependencies (4)

		Profit Growth	Quick Ratio	Return on Assets	Return on Capital Employed
Asset Growth	Pearson Correlation	0,069	-,171**	0,013	-0,006
	Sig. (2-tailed)	0,171	0,001	0,804	0,913
Asset Turnover Ratio	Pearson Correlation	,131**	0,045	,172**	,446**
	Sig. (2-tailed)	0,010	0,374	0,001	0,000
Cash Ratio	Pearson Correlation	0,047	,761**	0,042	,266**
	Sig. (2-tailed)	0,354	0,000	0,411	0,000
Cash Flow Return Margin	Pearson Correlation	-,295**	-0,044	-,409**	-0,022
	Sig. (2-tailed)	0,000	0,385	0,000	0,665
Cash Flow Return on Equity	Pearson Correlation	-0,044	0,044	-0,025	-,185**
	Sig. (2-tailed)	0,387	0,389	0,628	0,000
Current Ratio	Pearson Correlation	0,091	,940**	0,074	,198**
	Sig. (2-tailed)	0,073	0,000	0,144	0,000
Debt to Equity Ratio	Pearson Correlation	-0,099	-0,078	-,102*	-,130*
	Sig. (2-tailed)	0,051	0,125	0,044	0,01
EBIT Turnover Yield	Pearson Correlation	,124*	0,017	,145**	,304**
	Sig. (2-tailed)	0,014	0,732	0,004	0,000
EBITDA Turnover Yield	Pearson Correlation	,165**	,164**	,195**	,549**
	Sig. (2-tailed)	0,001	0,001	0,000	0,000
Equity Ratio	Pearson Correlation	,160**	,380**	,187**	,233**
	Sig. (2-tailed)	0,002	0,000	0,000	0,000
Equity to Long-Term Assets	Pearson Correlation	0,069	,372**	0,080	,159**
	Sig. (2-tailed)	0,171	0,000	0,115	0,002
Interest Coverage Ratio	Pearson Correlation	,133**	,365**	,111*	,835**
	Sig. (2-tailed)	0,009	0,000	0,028	0,000
Profit Growth	Pearson Correlation	1	0,086	,848**	,299**
	Sig. (2-tailed)		0,088	0,000	0,000
Quick Ratio	Pearson Correlation	0,086	1	0,064	,297**
	Sig. (2-tailed)	0,088		0,207	0,000
Return on Assets	Pearson Correlation	,848**	0,064	1	,278**
	Sig. (2-tailed)	0,000	0,207		0,000
Return on Capital Employed	Pearson Correlation	,299**	,297**	,278**	1
	Sig. (2-tailed)	0,000	0	0,000	
Return on Equity	Pearson Correlation	,774**	0,073	,913**	,241**
	Sig. (2-tailed)	0,000	0,148	0,000	0,000
Return on Sales	Pearson Correlation	,302**	0,021	,328**	,186**
	Sig. (2-tailed)	0,000	0,683	0,000	0,000
Sales Growth	Pearson Correlation	,115*	-,118*	0,090	,191**
	Sig. (2-tailed)	0,023	0,020	0,074	0,000
** Correlation is significant at the 0.01 level (2-tailed)					
* Correlation is significant at the 0.05 level (2-tailed)					

Source: Data output from SPSS

**Table 23:** Correlation Interdependencies (5)

		Return on Equity	Return on Sales	Sales Growth
Asset Growth	Pearson Correlation	0,030	0,020	,704**
	Sig. (2-tailed)	0,560	0,689	0,000
Asset Turnover Ratio	Pearson Correlation	,117*	,100*	,469**
	Sig. (2-tailed)	0,021	0,048	0,000
Cash Ratio	Pearson Correlation	0,027	0,061	-,119*
	Sig. (2-tailed)	0,592	0,227	0,019
Cash Flow Return Margin	Pearson Correlation	-,417**	-0,001	0,091
	Sig. (2-tailed)	0,000	0,983	0,071
Cash Flow Return on Equity	Pearson Correlation	-0,016	0,003	-0,018
	Sig. (2-tailed)	0,759	0,947	0,727
Current Ratio	Pearson Correlation	0,081	0,023	-,163**
	Sig. (2-tailed)	0,110	0,653	0,001
Debt to Equity Ratio	Pearson Correlation	-,150**	-0,054	-,475**
	Sig. (2-tailed)	0,003	0,287	0,000
EBIT Turnover Yield	Pearson Correlation	0,090	0,075	,170**
	Sig. (2-tailed)	0,076	0,141	0,001
EBITDA Turnover Yield	Pearson Correlation	,135**	,133**	,214**
	Sig. (2-tailed)	0,008	0,009	0,000
Equity Ratio	Pearson Correlation	,198**	,136**	-,136**
	Sig. (2-tailed)	0,000	0,007	0,007
Equity to Long-Term Assets	Pearson Correlation	0,097	0,073	0,037
	Sig. (2-tailed)	0,056	0,152	0,468
Interest Coverage Ratio	Pearson Correlation	0,079	0,061	,238**
	Sig. (2-tailed)	0,121	0,230	0,000
Profit Growth	Pearson Correlation	,774**	,302**	,115*
	Sig. (2-tailed)	0,000	0,000	0,023
Quick Ratio	Pearson Correlation	0,073	0,021	-,118*
	Sig. (2-tailed)	0,148	0,683	0,020
Return on Assets	Pearson Correlation	,913**	,328**	0,090
	Sig. (2-tailed)	0,000	0,000	0,074
Return on Capital Employed	Pearson Correlation	,240**	,186**	,191**
	Sig. (2-tailed)	0,000	0,000	0,000
Return on Equity	Pearson Correlation	1	,458**	0,072
	Sig. (2-tailed)		0,000	0,154
Return on Sales	Pearson Correlation	,458**	1	0,066
	Sig. (2-tailed)	0,000		0,193
Sales Growth	Pearson Correlation	0,072	0,066	1
	Sig. (2-tailed)	0,154	0,193	
** Correlation is significant at the 0.01 level (2-tailed)				
* Correlation is significant at the 0.05 level (2-tailed)				

Source: Data output from SPSS

## **4.4 Regression & Correlation Analysis**

This section shows the results of the regression & correlation analyses. Based on the method mentioned in section 3.4.3.3, the following sections include two different paths to determine KPIs, FLDs and MV, namely using a single as well as average values method. For both calculation methods, the current research also covers four different sensitivity analyses. Consequently, ten different correlation regression analyses are conducted in the following sections.

### **4.4.1 Impact of KPIs, FLDs on MV**

Firstly, the results of the regression analysis using single value calculation are unveiled in section 4.4.1.1. Further, in section 4.4.1.1.1, the sensitivity of the disclosure index is analysed. The current research evaluates the effect of how one word of the FLD Index might affect the overall regression analysis. In section 4.4.1.1.2, the determination of the MV is changed to the end of April to test the sensitivity of timeliness. In section 4.4.1.1.3, the sensitivity of the variable FLD is tested to establish whether it affects the overall regression. Further, in section 4.4.1.1.4, the sensitivity of the amount of data is examined by adding two more years to the regression and correlation analysis.

#### **4.4.1.1 Results for Years 2010 to 2017**

Initially, a correlation analysis should determine the strength between selected KPIs, the variable FLD and the dependent variable MV. MV is determined at the end of March of the respective year. The KPIs are based on year-end values of the annual report. FLDs are based on year-end annual reports. In other words, the determination of KPI and FLD is always 3 months ahead of the MV determination.



**Table 24:** Correlation Years 2010 to 2017

Correlation Years 2010 to 2017		MV
Asset Growth	Pearson Correlation	,182**
	Sig. (2-tailed)	0,000
Asset Turnover Ratio	Pearson Correlation	,190**
	Sig. (2-tailed)	0,000
Cash flow Return Margin	Pearson Correlation	-0,009
	Sig. (2-tailed)	0,835
Cash Ratio	Pearson Correlation	0,003
	Sig. (2-tailed)	0,938
Cash Flow Return on Equity	Pearson Correlation	-0,028
	Sig. (2-tailed)	0,525
Current Ratio	Pearson Correlation	0,019
	Sig. (2-tailed)	0,672
Debt to equity Ratio	Pearson Correlation	-0,050
	Sig. (2-tailed)	0,256
EBIT Turnover Yield	Pearson Correlation	,119**
	Sig. (2-tailed)	0,006
EBITDA Turnover Yield	Pearson Correlation	,152**
	Sig. (2-tailed)	0,001
Equity Ratio	Pearson Correlation	0,045
	Sig. (2-tailed)	0,303
Equity to Long-Term Assets	Pearson Correlation	0,036
	Sig. (2-tailed)	0,414
FLDs Growth	Pearson Correlation	0,075
	Sig. (2-tailed)	0,086
Interest Coverage Ratio	Pearson Correlation	0,066
	Sig. (2-tailed)	0,132
Profit Growth	Pearson Correlation	,235**
	Sig. (2-tailed)	0,000
Quick Ratio	Pearson Correlation	0,014
	Sig. (2-tailed)	0,755
Return on Assets	Pearson Correlation	,216**
	Sig. (2-tailed)	0,000
Return on Capital Employed	Pearson Correlation	,113*
	Sig. (2-tailed)	0,010
Return on Equity	Pearson Correlation	,216**
	Sig. (2-tailed)	0,000
Return on Sales	Pearson Correlation	,198**
	Sig. (2-tailed)	0,000
Sales Growth	Pearson Correlation	,335**
	Sig. (2-tailed)	0,000
** Correlation is significant at the 0.01 level (2-tailed).		
* Correlation is significant at the 0.05 level (2-tailed).		

Source: Data Output from SPSS

The correlation demonstrates that asset growth, asset turnover ratio, EBIT turnover yield, EBITDA turnover yield, profit growth, return on assets, return on equity, return on sales and sales growth are significantly correlated to market value at the 0,01 level. Return on capital employed is significant at the 0,05 level. FLDs are not significantly correlated to market value. Despite the significance, the correlation values can be categorized according to Bühl & Zöffel (2000) as "very low", respectively "low" correlation. The ratio sales

growth indicates the highest correlation to MV with a value of 0,335. A closer look at the regression results should indicate whether a mix of several KPIs and FLDs might increase the "low" relationship. The results of the regression analysis with data from the years 2010 to 2017 are shown in Table 25:

**Table 25:** Regression Years 2010 to 2017

Regression Analysis Year 2010 - 2017					
<b>1.) Model Summary:</b>					
Multiple R	0,475				
R Square	0,226				
Adjusted R Square	0,195				
Standard Error	0,500				
Observations	520,000				
<b>2.) ANOVA Analysis:</b>					
	Degrees of freedom	Sum of Squares	Mean Square	F	Signif. F
Regression	20,000	36,451	1,822	7,275	0,000
Residual	499,000	124,974	0,250		
Total	519,000	161,426			
<b>3.) Variable Coefficient Analysis:</b>					
	Unstand. Coefficients	Stand. Error	t Stat	P-value	
Intercept	0,176	0,028	6,352	0,000	
Sales Growth	1,254	0,389	3,228	0,001	
Debt to Equity Ratio	0,252	0,083	3,04	0,002	
EBITDA Turnover Yield	0,027	0,010	2,614	0,009	
Equity Ratio	0,252	0,119	2,120	0,035	
Return on Assets	0,227	0,110	2,068	0,039	
Current Ratio	0,294	0,145	2,025	0,043	
Profit Growth	-0,143	0,083	-1,721	0,086	
Quick Ratio	-0,198	0,128	-1,555	0,121	
FLDs Growth	0,241	0,165	1,464	0,144	
Return on Sales	-0,113	0,098	-1,153	0,250	
Return on Equity	0,059	0,058	1,022	0,307	
Cash Ratio	-0,019	0,019	-1,001	0,317	
Return on Capital Employed	0,021	0,021	0,972	0,332	
EBIT Turnover Yield	-0,020	0,027	-0,759	0,448	
Cash Flow Return Margin	-0,006	0,009	-0,733	0,464	
Cash Flow Return on Equity	-0,002	0,003	-0,684	0,494	
Asset Turnover Ratio	-0,241	0,445	-0,541	0,589	
Equity to Long-Term Assets	-0,017	0,038	-0,454	0,650	
Interest Coverage Ratio	0,001	0,003	0,201	0,841	
Asset Growth	0,043	0,335	0,129	0,897	

Source: Data output from SPSS, Layout from Excel

The regression output is sorted by P-Value. A variable is significant if  $|t_{Stat}| > t_{critical}$  (1,9602) or P-value is smaller than 0,05 (see explanations in section 3.4.3.2). The multiple R counts to 0,475 which indicates a "low" correlation of the overall regression.

The Significance F is 0 and hence, lower than F (7,275). This relationship is needed to confirm the quality and significance of the overall regression analysis. The values of sales growth, EBITDA turnover yield, return on assets, debt to equity ratio, equity ratio and current ratio are significant for the regression formula (t-stat value bigger than t-critical), while FLDs are not found to be significant.

Interdependencies among variables are responsible for the number of significant KPIs indicated by regression analysis that differs from the results of the correlation analysis. This issue is explained in section 4.3.

To conclude, the current section proves the significant impact of several KPIs on MV. Correlation analysis proves the significance of 9 different KPIs (at significant level 0,01), and the regression analysis shows the significance of 6 different KPIs. Therefore, hypothesis 1 of the current research can be rejected. Changes in KPIs do have a significant impact on the development of MV.

#### 4.4.1.1.1 Sensitivity of FLD Index

The research analyses how a change in the FLD Index constructed in section 3.5.3 might affect the regression analysis conducted in section 4.4.1.1. For this purpose, the word "may" is removed from the disclosure index. As presented in section 4.2, the word "may" is the 10th most used word indicating forward-looking information. However, it might be confused with the month "may". The software program cannot handle this issue. There is, hence, the risk that the indication of the month May is also counted as forward-looking information. Due to reasonable doubt the word "may" should be removed from the FLD Index. The comparison of results before and after the removal is needed to test the construct validity of the FLD Index.

Firstly, the numbers of words intended to be removed from the total number of disclosures (see section 4.2.1) are analysed. Table 26 reveals the number of how many times the word "may" is used per annual report per year:

**Table 26:** Disclosure Number – FLD word "may"

Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	33	39	38	48	41	51	75	61	77	51	123
7	71	61	84	71	90	95	93	84	85	125	77
13	17	27	42	46	45	46	32	45	48	53	62
14	45	54	46	56	78	55	52	68	82	75	127
15	81	103	119	114	108	127	124	106	113	152	132
16	38	50	61	59	58	59	56	62	72	73	78
17	32	42	35	41	47	44	41	37	44	30	35
18	27	32	36	33	38	20	24	22	33	22	31
21	28	65	26	29	73	35	34	53	65	111	108
22	66	80	75	74	73	93	80	67	64	60	92
25	49	58	47	38	32	43	66	59	68	68	78
28	12	41	32	32	39	53	54	89	97	81	84
31	73	71	122	120	82	85	98	68	85	69	64
33	32	44	56	104	68	96	89	99	82	95	90
34	59	51	62	66	62	89	85	79	107	95	123
42	89	129	50	64	102	110	121	141	128	132	78
43	136	126	138	142	138	166	203	194	158	135	174
44	15	16	22	37	44	33	62	54	58	62	86
49	51	65	60	89	76	68	100	64	74	53	78
50	42	91	64	74	73	77	101	67	61	96	63
51	72	30	22	55	94	75	79	68	71	81	97
52	91	107	116	121	117	107	91	97	105	92	90
53	61	69	62	60	69	71	64	62	76	75	120
56	50	99	89	89	83	97	82	74	67	66	70
57	8	6	7	8	9	13	12	12	10	7	12
58	54	79	65	60	71	69	92	95	101	82	107
60	102	100	98	113	96	133	152	125	108	171	183
61	54	85	67	102	96	104	103	108	109	152	122
62	32	39	40	37	63	28	40	39	46	42	70
63	47	50	97	90	89	99	103	100	101	107	122
65	35	31	37	64	62	77	126	116	156	107	132
71	42	54	87	96	93	95	106	115	97	110	111
74	46	42	49	56	61	58	57	65	71	77	71
75	51	65	70	109	159	73	85	108	109	127	107
79	24	26	23	28	30	25	24	33	41	70	82
83	26	30	24	45	50	45	52	51	68	52	81
85	23	18	15	33	38	28	39	43	39	68	41
86	106	103	132	123	88	98	81	111	150	141	174
90	14	11	13	14	14	15	15	12	20	26	25
92	82	77	78	128	128	124	134	142	145	140	142
94	63	44	50	61	63	81	62	69	90	77	83
95	89	115	119	150	162	194	254	188	153	154	149
97	13	12	26	31	32	55	49	91	60	50	62
100	80	101	102	86	94	81	85	69	66	83	70
103	61	93	87	80	66	43	62	57	72	91	63
106	13	16	21	23	23	20	21	19	27	26	21
107	18	24	27	36	43	43	43	40	42	46	49
109	27	30	38	38	39	50	46	38	53	53	46
111	29	34	32	34	43	43	41	40	31	37	40

Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
112	45	60	69	90	81	113	89	90	84	108	120
113	36	28	37	52	62	79	61	55	50	62	44
117	41	66	84	79	95	76	94	94	100	87	102
120	53	90	88	63	59	52	91	64	71	51	43
121	276	282	235	277	209	174	159	212	200	102	124
122	20	15	24	27	41	91	39	31	38	37	36
128	45	52	33	32	28	30	28	27	74	35	36
133	79	93	89	73	92	84	65	69	74	73	55
136	38	59	84	81	92	93	79	68	102	116	98
138	33	36	36	33	25	47	33	38	42	35	44
145	91	93	102	76	112	118	109	103	106	97	116
146	54	56	58	79	129	75	85	101	155	124	139
148	31	47	38	66	65	55	65	88	63	27	36
150	28	56	41	51	55	46	54	51	61	48	56
152	57	65	50	78	76	88	95	69	60	82	99
155	31	46	70	73	105	68	87	60	42	41	56
<b>Total</b>	<b>3.367</b>	<b>3.979</b>	<b>4.046</b>	<b>4.537</b>	<b>4.768</b>	<b>4.778</b>	<b>5.023</b>	<b>4.926</b>	<b>5.207</b>	<b>5.173</b>	<b>5.529</b>

After removing the word "may" from the disclosure index, a correlation analysis shall reveal the effect upon the relationship between KPIs, FLDs and MV. The correlation results for the years 2010 to 2017 based on the new FLD Index indicate that FLD correlation with MV remains at the same level. Of course, the impact of KPIs on MV also remains at the same level as the calculation procedure is not changed. The results indicate that even to take one word out of the FLD Index does not have any impact on the overall relationship strength between KPIs, FLDs and MV. A regression analysis should unveil further, whether the change in the FLD Index has any impact on the overall regression formula.

The regression analysis demonstrates that multiple R remains at 0,475 the same level as in section 4.4.1.1. The significant KPIs are also the same, namely sales growth, EBITDA turnover yield, return on assets, debt to equity ratio, equity ratio and current ratio. The overall quality remains at the same level as in section 4.4.1.1.

To conclude, removing the word "may" does not affect the overall regression between KPIs, FLDs and MV. The results of both, the correlation as well as regression analysis show that a change in the FLD Index is not sensitive to minor changes such as removing or adding one word. Consequently, construct validity, as stated by Heale and Twycross (2015),

is given. Critics such as the subjectivity in judgement, while constructing an index (Marston & Shrives, 1991) are certainly diminished.

#### 4.4.1.1.2 Sensitivity of MV Timeliness

Primarily, the end of March is chosen as the point in time to determine the MV, despite other researchers such as Hussainey (2004) using the end of April as the determination date. This decision has been based upon the release date of the annual reports. Most of the companies that are included in the present research (54 out of 65 companies) release their annual reports during March (publication date of annual report 2017 has been the assumption for previous annual reports – see Appendix A). The other 11 companies publish their annual reports in February. Since most companies publish their annual reports in March, the impact on market value could be expected to occur at the end of March. This assumption has been the basis for the regression analysis conducted in section 4.4.1.1.

In this section, it should be identified how the correlation and regression results of the variables KPIs, FLDs and MV change, in the case that MV is determined at the end of April. The correlation results are presented in Table 27.

**Table 27:** Correlation Years 2010 to 2017 – MV End of April

<b>Correlation Years 2010 to 2017 (Market Date changed)</b>		<b>before</b>	
		<b>MV</b>	<b>MV</b>
Asset Growth	Pearson Correlation	,194**	,182**
	Sig. (2-tailed)	0,000	0,000
Asset Turnover Ratio	Pearson Correlation	,141**	,190**
	Sig. (2-tailed)	0,001	0,000
Cash Flow Return Margin	Pearson Correlation	-0,020	-0,009
	Sig. (2-tailed)	0,644	0,835
Cash Ratio	Pearson Correlation	0,014	0,003
	Sig. (2-tailed)	0,752	0,938
Cash Flow Return on Equity	Pearson Correlation	-0,041	-0,028
	Sig. (2-tailed)	0,348	0,525
Current Ratio	Pearson Correlation	0,013	0,019
	Sig. (2-tailed)	0,763	0,672
Debt to Equity Ratio	Pearson Correlation	-0,029	-0,050
	Sig. (2-tailed)	0,503	0,256
EBIT Turnover Yield	Pearson Correlation	,088*	,119**
	Sig. (2-tailed)	0,045	0,006
EBITDA Turnover Yield	Pearson Correlation	0,081	,152**
	Sig. (2-tailed)	0,066	0,001
Equity Ratio	Pearson Correlation	0,038	0,045
	Sig. (2-tailed)	0,392	0,303
Equity to Long-Term Assets	Pearson Correlation	0,047	0,036
	Sig. (2-tailed)	0,286	0,414
FLDs Growth	Pearson Correlation	,088*	0,075
	Sig. (2-tailed)	0,046	0,086
Interest Coverage Ratio	Pearson Correlation	0,046	0,066
	Sig. (2-tailed)	0,293	0,132
Profit Growth	Pearson Correlation	,250**	,235**
	Sig. (2-tailed)	0,000	0,000
Quick Ratio	Pearson Correlation	-0,003	0,014
	Sig. (2-tailed)	0,937	0,755
Return on Assets	Pearson Correlation	,235**	,216**
	Sig. (2-tailed)	0,000	0,000
Return on Capital Employed	Pearson Correlation	,094*	,113*
	Sig. (2-tailed)	0,041	0,012
Return on Equity	Pearson Correlation	,234**	,216**
	Sig. (2-tailed)	0,000	0,000
Return on Sales	Pearson Correlation	,219**	,198**
	Sig. (2-tailed)	0,000	0,000
Sales Growth	Pearson Correlation	,297**	,335**
	Sig. (2-tailed)	0,000	0,000
** Correlation is significant at the 0.01 level (2-tailed).			
* Correlation is significant at the 0.05 level (2-tailed).			

Source: Data output from SPSS

In section 4.4.1.1, nine variables are found to be significant at level 0,01, and one significant at level 0,05, using the end of March as the point in time to determine MV. Using April as the determination date for MV, the results show that only seven variables are found to be significant at level 0,01, yet three variables at level 0,05. Further, the correlation strength between quick ratio and MV become negative if the MV date is changed to the end of April. However, most surprisingly is that FLD is now significant at the 0,05 level

as the strength increased from 0,075 to 0,088. However, according to the classification of Bühl & Zöffel (2000), this value still demonstrates a "very low" correlation. A further regression analysis shows that the relationship between FLDs and MV is not significant. The results of the regression analysis are presented in Table 28.

**Table 28:** Regression Years 2010 to 2017 – MV End of April

<b>Regression Analysis Year 2010 to 2017 (market value Date end of April)</b>					
<b>1.) Model Summary:</b>					
Multiple R	0,460				
R Square	0,212				
Adjusted R Square	0,180				
Standard Error	0,405				
Observations	520,000				
<b>2.) ANOVA Analysis:</b>					
	Degrees of Freedom	Sum of Squares	Mean Square	F	Signif. F
Regression	20,000	21,966	1,098	6,706	0,000
Residual	499,000	81,723	0,164		
Total	519,000	103,689			
<b>3.) Variable Coefficient Analysis:</b>					
	Unstand. Coefficients	Stand. Error	t Stat.	P-value	
Intercept	0,170	0,022	7,579	0,000	
Debt to Equity Ratio	0,218	0,067	3,255	0,001	
Sales Growth	0,999	0,314	3,18	0,002	
Return on Assets	0,228	0,089	2,561	0,011	
Profit Growth	-0,165	0,067	-2,465	0,014	
Current Ratio	0,215	0,117	1,836	0,067	
Cash Ratio	-0,026	0,016	-1,661	0,097	
FLDs Growth	0,216	0,133	1,621	0,106	
Equity Ratio	0,147	0,096	1,528	0,127	
EBIT Turnover Yield	-0,031	0,021	-1,429	0,154	
Return on Capital Employed	0,024	0,017	1,418	0,157	
Quick Ratio	-0,132	0,103	-1,279	0,202	
EBITDA Turnover Yield	0,007	0,008	0,865	0,387	
Cash Flow Return on Equity	-0,002	0,002	-0,792	0,429	
Cash Flow Return Margin	-0,005	0,007	-0,75	0,454	
Return on Sales	-0,059	0,08	-0,742	0,459	
Asset Turnover Ratio	-0,256	0,36	-0,71	0,478	
Return on Equity	0,030	0,047	0,644	0,520	
Equity to Long-Term Assets	0,010	0,031	0,315	0,753	
Interest Coverage Ratio	0,001	0,002	0,253	0,801	
Asset Growth	0,067	0,271	0,246	0,806	

Source: Data output from SPSS, Layout from Excel

The results from the regression analysis reveal that changing the determination date for the MV from the end of March to the end of April affects the impact of KPIs and FLDs on MV. The regression results of the current section convey the significance of four variables: sales growth, return on assets, profit growth and debt to equity ratio. The results of section



4.4.1.1, however, illustrate a significance of six variables while using the end of March as the point in time to determine the MV. In section 4.4.1.1, the KPIs, EBITDA turnover yield, equity ratio and current ratio are found to be significant as well, while Profit Growth has in contrary not been found significant. Moreover, multiple R changes from 0,475 (see section 4.4.1.1 Table 20) to 0,460.

To conclude, choosing the end of March as the point in time to determine MV results unveils the most significant impact of KPIs and FLDs on MV. The ideas of Chambers & Penman (1984) that stock prices react around the announcement date of corporate reporting can be approved. Most companies publish their annual report in March (see Appendix A), and the current research has proved that the value impact of mandatory financial accounting information occurs within the same month.

#### 4.4.1.1.3 Sensitivity of Regression Formula

It should be analysed whether FLDs affect the relationship between KPIs and MV. This is a legitimate question as traditional fundamental analysis has focused on rather an ad hoc evaluation of financial statement measures in order to determine company performance (Nissim & Penman, 2001). In theory, a change of any relevant value indicator should lead to a change in MV (Lev & Thiagarajan, 1993). Correlation and regression analysis in section 4.4.1.1 did not prove any value significance of FLDs. In the case that MV is determined at the end of April, correlation analysis unveiled a significant impact of FLDs on MV; however regression analysis in section 4.4.1.1.2 could not confirm this significance. Despite these contradictory results, FLDs may still impact the relationship between KPIs and MV. Therefore, the change in the multiple R by excluding the variable FLD from regression formula should be analysed. The results are presented in Table 29.

**Table 29:** Regression Years 2010 to 2017 – FLD variable excluded

Regression Analysis Year 2010 to 2017 – FLD variable excluded					
<b>1.) Model Summary:</b>					
Multiple R	0,472				
R Square	0,222				
Adjusted R Square	0,193				
Standard Error	0,501				
Observations	520,000				
<b>2.) ANOVA Analysis:</b>					
	Degrees of Freedom	Sum of Squares	Mean Square	F	Signif. F
Regression	19,000	35,907	1,877	7,528	0,000
Residual	500,000	125,518	0,252		
Total	519,000	161,426			
<b>3.) Variable Coefficient Analysis:</b>					
	Unstand. Coefficients	Stand. Error	t Stat.	P-value	
Intercept	0,188	0,026	7,159	0,000	
Sales Growth	1,232	0,389	3,171	0,002	
Debt to Equity Ratio	0,255	0,083	3,073	0,002	
EBITDA Turnover Yield	0,028	0,01	2,674	0,008	
Return on Assets	0,233	0,11	2,115	0,035	
Equity Ratio	0,249	0,119	2,087	0,037	
Current Ratio	0,301	0,145	2,072	0,039	
Profit Growth	-0,143	0,083	-1,724	0,085	
Quick Ratio	-0,209	0,128	-1,641	0,101	
Return on Equity	0,061	0,058	1,041	0,298	
Return on Sales	-0,120	0,098	-1,218	0,224	
Return on Capital Employed	0,021	0,021	0,999	0,318	
Cash Ratio	-0,019	0,019	-0,966	0,335	
EBIT Turnover Yield	-0,021	0,027	-0,798	0,425	
Cash Flow Return on Equity	-0,002	0,003	-0,766	0,444	
Cash Flow Return Margin	-0,006	0,009	-0,731	0,465	
Asset Turnover Ratio	-0,221	0,445	-0,497	0,620	
Interest Coverage Ratio	0,001	0,003	0,266	0,790	
Equity to Long-Term Assets	-0,010	0,038	-0,267	0,790	
Asset Growth	0,065	0,335	0,194	0,846	

Source: Data output from SPSS, Layout from Excel

Initially, it can be observed that by eliminating the FLD variable, the multiple R slightly decreases from 0,475 (as shown in section 4.4.1.1) to 0,472. The slight decrease indicates that FLDs have an impact on the KPI & MV relationship. This result strengthens the finding of the correlation analysis of chapter 4.4.1.1.2 that demonstrated a significance of FLDs on MV at level 0,05.

Moreover, Table 29 shows that the P-Value of KPIs changes while excluding the FLD variable from the regression formula. A decrease in "P-Values" can be observed. P-Value should be lower than 0,05 to claim a

variable as significant. However, Table 30 demonstrates that the decrease is minimal and does not affect the number of significant variables compared to the results of section 4.4.1.1.

**Table 30:** Excluding FLDs from regression analysis Years 2010 to 2017

<b>Excluding FLDs</b>	<b>P Value</b>	<b>before</b>	<b>Delta</b>
Asset Growth	0,846	0,897	-0,051
Asset Turnover Ratio	0,620	0,589	0,031
Cash Flow Return Margin	0,465	0,464	0,001
Cash Flow Return on Equity	0,444	0,494	-0,05
Cash Ratio	0,335	0,317	0,018
Current Ratio	0,039	0,043	-0,004
Debt to Equity Ratio	0,002	0,002	0,000
EBIT Turnover Yield	0,425	0,448	-0,023
EBITDA Turnover Yield	0,008	0,009	-0,001
Equity Ratio	0,037	0,035	0,002
Equity to Long-Term Assets	0,790	0,650	0,140
Interest Coverage Ratio	0,790	0,841	-0,051
Profit Growth	0,085	0,086	-0,001
Quick Ratio	0,101	0,121	-0,020
Return on Assets	0,035	0,039	-0,004
Return on Capital Employed	0,318	0,332	-0,014
Return on Equity	0,298	0,307	-0,009
Return on Sales	0,224	0,250	-0,026
Sales Growth	0,002	0,001	0,001

Source: Data output from SPSS

To conclude, the results indicate that FLDs influence the KPI & MV relationship. The hypothesis 4 can be rejected, as the combined changes in KPIs and the number of FLDs have a significant impact on changes in MV. However, the number of significant variables, which are sales growth, EBITDA turnover yield, return on assets, debt to equity ratio, equity ratio, and current ratio remain the same. Moreover, the comparison of the multiple R between this section and section 4.4.1.1 only demonstrates a slight decrease of 0,004. Hence, a significant impact of FLDs on the KPIs and MV relationship is still not proven.

#### 4.4.1.1.4 Sensitivity of Data Amount (2008 to 2017)

In section 4.4.1.1, the study used eight years as the research period. In this section, the research has been increased by two years to determine whether a more extended period increases the overall quality of the

regression. Firstly, a correlation analysis shall unveil the strength between KPIs, FLDs and MV. The correlation results are shown in Table 31.

**Table 31:** Correlation Years 2008 to 2017

Correlation Analysis Years 2008 – 2017		2012 - 2017	
		MV	MV
Asset Growth	Pearson Correlation	,198**	,182**
	Sig. (2-tailed)	0,000	0,000
Asset Turnover Ratio	Pearson Correlation	,103**	,190**
	Sig. (2-tailed)	0,009	0,000
Cash Flow Return Margin	Pearson Correlation	-0,036	-0,009
	Sig. (2-tailed)	0,355	0,835
Cash Ratio	Pearson Correlation	-0,034	0,003
	Sig. (2-tailed)	0,380	0,938
Cash Flow Return on Equity	Pearson Correlation	-0,013	-0,028
	Sig. (2-tailed)	0,748	0,526
Current Ratio	Pearson Correlation	0,010	0,019
	Sig. (2-tailed)	0,798	0,672
Debt to Equity Ratio	Pearson Correlation	-0,049	-0,050
	Sig. (2-tailed)	0,212	0,256
EBIT Turnover Yield	Pearson Correlation	,160**	,119**
	Sig. (2-tailed)	0,000	0,006
EBITDA Turnover Yield	Pearson Correlation	,170**	,152**
	Sig. (2-tailed)	0,000	0,001
Equity Ratio	Pearson Correlation	0,006	0,045
	Sig. (2-tailed)	0,874	0,303
Equity to Long-Term Assets	Pearson Correlation	0,033	0,036
	Sig. (2-tailed)	0,400	0,414
FLDs	Pearson Correlation	0,029	0,075
	Sig. (2-tailed)	0,458	0,086
Interest Coverage Ratio	Pearson Correlation	0,076	0,066
	Sig. (2-tailed)	0,054	0,132
Profit Growth	Pearson Correlation	,273**	,235**
	Sig. (2-tailed)	0,000	0,000
Quick Ratio	Pearson Correlation	0,001	0,014
	Sig. (2-tailed)	0,974	0,755
Return on Assets	Pearson Correlation	,250**	,216**
	Sig. (2-tailed)	0,000	0,000
Return on Capital Employed	Pearson Correlation	,131**	,113*
	Sig. (2-tailed)	0,001	0,012
Return on Equity	Pearson Correlation	,214**	,216**
	Sig. (2-tailed)	0,000	0,000
Return on Sales	Pearson Correlation	,233**	,198**
	Sig. (2-tailed)	0,000	0,000
Sales Growth	Pearson Correlation	,375**	,335**
	Sig. (2-tailed)	0,000	0,000
** Correlation is significant at the 0.01 level (2-tailed).			
* Correlation is significant at the 0.05 level (2-tailed).			

Source: Data output from SPSS

The analysis illustrates that correlation for the years 2008 to 2017 is nearly identical to the results for the years 2010 to 2017. Only the return on capital employed is now significant at the 0,01 level (before 0,05 level). FLDs are again not significantly correlated to MV. A further look at the regression

analysis should show whether a significant change occurs by extending the sample years. The results of the regression analysis with data from the year 2008 to 2017 are presented in Table 32.

**Table 32:** Regression Years 2008 to 2017

Regression Analysis 2008 – 2017					
<b>1.) Model Summary:</b>					
Multiple R	0,508				
R Square	0,258				
Adjusted R Square	0,234				
Standard Error	0,497				
Observations	650,000				
<b>2.) ANOVA Analysis:</b>					
	Degree of Freedoms	Sum of Squares	Mean Square	F	Signif. F
Regression	20,000	53,887	2,694	10,913	0,000
Residual	629,000	155,2994	0,247		
Total	649,000	209,181			
<b>3.) Variable Coefficient Analysis:</b>					
	Unstand. Coefficients	Stand. Error	t Stat.	P-value	
Intercept	0,076	0,024	3,136	0,002	
Sales Growth	1,244	0,214	5,818	0,000	
Debt to Equity Ratio	0,288	0,058	5,013	0,000	
Return on Capital Employed	0,037	0,010	3,585	0,000	
EBITDA Turnover Yield	0,032	0,010	3,119	0,002	
Current Ratio	0,354	0,124	2,849	0,005	
Quick Ratio	-0,254	0,097	-2,629	0,009	
Return on Assets	0,181	0,075	2,413	0,016	
Equity Ratio	0,237	0,110	2,162	0,031	
Return on Sales	-0,081	0,038	-2,104	0,036	
EBIT Turnover Yield	-0,031	0,017	-1,771	0,077	
Cash Flow Return Margin	-0,011	0,008	-1,371	0,171	
Cash Ratio	-0,018	0,014	-1,312	0,190	
Profit Growth	-0,060	0,053	-1,145	0,253	
Asset Turnover Ratio	-0,186	0,195	-0,951	0,342	
FLDs Growth	0,110	0,144	0,765	0,444	
Equity to Long-Term Assets	-0,016	0,031	-0,519	0,604	
Cash Flow Return on Equity	0,001	0,002	0,399	0,690	
Interest Coverage Ratio	0,000	0,002	0,1840	0,854	
Return on Equity	-0,003	0,017	-0,16	0,873	
Asset Growth	0,022	0,198	0,112	0,911	

Source: Data output from SPSS, Layout from Excel

The regression analysis demonstrates that by extending the sample years, the multiple R increases slightly to 0,508 (before 0,475, see section 4.4.1.1). According to the definition of Bühl & Zöfel (2000), the strength of the relationship between KPIs, FLDs and MV changes from a "low" to a "medium" correlation level. While KPIs are found to significantly impacting MV, the regressions analysis demonstrates that the variable FLD is not significant.

Moreover, despite the fact that correlation analysis (Table 31), revealed nearly identical results as those mentioned in section 4.4.1.1, regression analysis in section 4.4.1.1.4 suggests a different amount of KPIs to be significant. According to the results in section 4.4.1.1, the KPIs sales growth, EBITDA turnover yield, return on assets, debt to equity ratio, equity ratio and current ratio are significant. By extending the sample years (results see Table 32), the KPIs return on capital employed, quick ratio and return on sales are additionally found to be significant. This may be because the shift of significant KPIs is due to interrelated dependencies between independent variables, an issue that is addressed in section 4.5.2.

It can be concluded that the extension of the sample adds value to the regression analysis as the multiple R slightly increases. Therefore, the current study gives advice for future research to follow suggestions from Wang and Hussainey (2013), who studied a period of 12 years. Nevertheless, the results shown in Table 29 also question the right mix of KPIs to be included in the regression formula, as a shift of significant variables has shown. This may be the reason for the absence of commonly agreed guidance for the usage of KPIs that are related to the MV of a company as implied by Abarbanell & Bushee (1997), Holthausen & Watts (2001) and Nissim & Penman (2001).

#### **4.4.2 Average Impact of KPIs and FLDs on MV**

The overall outcome of the regression results is still not satisfactory. The regression analysis presented in chapter 5.3.1 merely reveal a significant relationship between KPIs and MV. The multiple R hardly indicates a medium correlation (multiple R = 0,503 see chapter 5.3.1.1.4). It is the assumption and belief that emotional factors are present which leads to irrational market development (Tuckett & Taffler, 2008). Such irrationalities are triggered in particular by psychological influences. There are recurrent exaggerations in an optimistic and pessimistic direction, depending on how investors react to information (Tuckett & Taffler, 2008). "There is a long tradition suggesting that fluctuations in share prices are

partly psychological" (Mankiw & Taylor, 2006, p. 556) These are based on expectations of the market participants. Individuals react differently to information, which is reflected in the valuation of investments (Hachmeister, 1999). To minimise irrationalities, 3-year average values have been used in this study (see section 3.4.3.3).

The results of the regression analysis using average value calculations are tested in section 4.4.2.1. Further, in chapter 4.4.2.1.1, the sensitivity of the disclosure index is analysed in order to evaluate the effect on how one word of the FLD Index might affect the overall regression analysis. In section 4.4.2.1.2, the determination of the MV is changed to the end of April to test the sensitivity of the timeliness. In section 4.4.2.1.3, the sensitivity of the variable FLD is tested to see whether it affects the overall regression. Further, in section 4.4.2.1.4 the sensitivity of the amount of data is examined by adding two more years to the regression and correlation analysis.

#### **4.4.2.1 Results of 3-year AVG 2012 to 2017**

Firstly, a correlation analysis shall determine the strength between selected KPIs, the variable FLD and the dependent variable MV. The MV represents an average of the previous three years. The single annual values were thereby determined at the end of March of the respective year. The KPIs and FLDs are based on a three-year average. The single values were determined at the year-end values of the respective year. The determination of KPI and FLD is always 3 months ahead of the MV determination. The calculation of average values is explained in section 3.4.4.2. The results of the correlation analysis are shown in Table 33.

**Table 33:** Correlation 3-year AVG 2012 to 2017

<b>Correlation 3-year AVG 2012 to 2017</b>		<b>MV</b>
Asset Growth	Pearson Correlation	,426**
	Sig. (2-tailed)	0,000
Asset Turnover Ratio	Pearson Correlation	,118*
	Sig. (2-tailed)	0,020
Cash Flow Return Margin	Pearson Correlation	0,034
	Sig. (2-tailed)	0,500
Cash Ratio	Pearson Correlation	,155**
	Sig. (2-tailed)	0,002
Cash Flow Return on Equity	Pearson Correlation	0,032
	Sig. (2-tailed)	0,525
Current Ratio	Pearson Correlation	,209**
	Sig. (2-tailed)	0,000
Debt to Equity Ratio	Pearson Correlation	-,148**
	Sig. (2-tailed)	0,003
EBIT Turnover Yield	Pearson Correlation	,144**
	Sig. (2-tailed)	0,004
EBITDA Turnover Yield	Pearson Correlation	,233**
	Sig. (2-tailed)	0,000
Equity Ratio	Pearson Correlation	,252**
	Sig. (2-tailed)	0,000
Equity to Long-Term Assets	Pearson Correlation	,240**
	Sig. (2-tailed)	0,000
FLDs Growth	Pearson Correlation	,187**
	Sig. (2-tailed)	0,000
Interest Coverage Ratio	Pearson Correlation	,203**
	Sig. (2-tailed)	0,000
Profit Growth	Pearson Correlation	,218**
	Sig. (2-tailed)	0,000
Quick Ratio	Pearson Correlation	,200**
	Sig. (2-tailed)	0,000
Return on Assets	Pearson Correlation	,203**
	Sig. (2-tailed)	0,000
Return on Capital Employed	Pearson Correlation	,250**
	Sig. (2-tailed)	0,000
Return on Equity	Pearson Correlation	,162**
	Sig. (2-tailed)	0,001
Return on Sales	Pearson Correlation	,185**
	Sig. (2-tailed)	0,000
Sales Growth	Pearson Correlation	,411**
	Sig. (2-tailed)	0,000
** Correlation is significant at the 0.01 level (2-tailed).		
* Correlation is significant at the 0.05 level (2-tailed).		

Source: Data output from SPSS

The correlation reveals that in contrast to the results in section 4.4.1.1, nearly all KPIs, as well as FLDs, are significantly correlated to MV at the 0,01 level. The KPI asset turnover ratio is significantly correlated to MV at



the 0,05 level. Only cash flow return margin and cash flow return on equity are not significant. Most of the correlation values are between 0,2 and 0,5 which indicates at least a "low" correlation between eleven different KPIs and MV, while six KPIs are "very low" correlated to MV. The KPIs asset growth with a value of 0,426 and sales growth of 0,411 seems to be most highly correlated with the MV. The correlation analysis between FLDs and MV gives a value of 0,187, which indicates a "very low" correlation level. A further regression analysis unveils whether the mix of KPIs and FLDs affects the impact on MV. Table 34 presents the results of the 3-year AVG 2012 to 2017 regression analysis.

**Table 34:** Regression 3-year AVG 2012 to 2017

Regression Analysis 3-year AVG 2012 - 2017					
<b>1.) Model Summary:</b>					
Multiple R	0,664				
R Square	0,441				
Adjusted R Square	0,411				
Standard Error	0,166				
Observations	390,000				
<b>2.) ANOVA Analysis:</b>					
	Degree of Freedoms	Sum of Squares	Mean Square	F	Signif. F
Regression	20,000	8,001	0,400	14,579	0,000
Residual	369,000	10,125	0,027		
Total	389,000	18,126			
<b>3.) Variable Coefficient Analysis:</b>					
	Unstand. Coefficients	Stand. Error	t Stat.	P-value	
Intercept	0,083	0,012	7,126	0,000	
Sales Growth	0,948	0,201	4,713	0,000	
Equity Ratio	0,955	0,185	5,163	0,000	
Debt-to-Equity Ratio	0,214	0,047	4,524	0,000	
Return on Capital Employed	0,059	0,019	3,101	0,002	
FLDs Growth	0,405	0,139	2,910	0,004	
Current Ratio	0,536	0,21	2,560	0,011	
Return on Assets	0,020	0,009	2,264	0,024	
Asset Turnover Ratio	-0,558	0,254	-2,196	0,029	
Return on Equity	-0,010	0,005	-2,072	0,039	
Return on Sales	0,003	0,002	2,020	0,044	
Interest-Coverage-Ratio	-0,013	0,007	-1,955	0,051	
Cash Flow Return on Equity	0,000	0,000	1,507	0,133	
Quick Ratio	-0,158	0,174	-0,911	0,363	
Cash Flow Return Margin	0,017	0,020	0,841	0,401	
Cash Ratio	-0,027	0,044	-0,623	0,534	
EBIT Turnover Yield	-0,002	0,004	-0,555	0,579	
Equity to Long-Term Assets	0,019	0,066	0,297	0,767	
Asset Growth	0,033	0,182	0,183	0,855	
Profit Growth	-0,001	0,007	-0,158	0,875	
EBITDA-Turnover Yield	0,000	0,043	0,009	0,992	

Source: Data output from SPSS, Layout from Excel

The regression analysis demonstrates that the multiple R counts to 0,664, which indicates a medium correlation. The value is higher than the multiple R of 0,503 as shown in section 4.4.1.1.4, as well as the multiple R of 0,474 found in section 4.4.1.1.

Further, the Significance F is 0 and hence, lower than F (14,579). This relationship is needed to confirm the quality and significance of the overall regression analysis. The KPIs sales growth, equity ratio, debt to equity ratio, return on capital employed, current ratio, return on assets, return on equity, return on sales, asset turnover ratio are significant according to regression analysis. The P-value of the interest coverage ratio counts to 0,051, which is slightly larger than the significant level of 0,050. Therefore, the ratio is insignificant.

Interdependencies among variables are responsible for the number of significant KPIs indicated by regression analysis that differ from the results of the correlation analysis. This issue is explained in section 4.5.

To conclude, the current section proves the significant impact of several KPIs on MV. Correlation analysis proves the significance of 17 different KPIs, and the regression analysis shows the significance of 9 different KPIs. Therefore, hypothesis 1 of the current research can be rejected. Changes in KPIs do have a significant impact upon the development of MV. Additionally, FLDs are found to significantly affecting MV. Consequently, the hypothesis 3 can also be rejected. Changes in FLDs do have a significant impact upon changes in MV. Lastly, hypothesis 4 can be rejected, as the combined impact of FLDs and KPIs impact MV.

The results of this section differ from those stated in section 4.4.1. In comparison to the regression results of section 4.4.1, the number of significant KPIs increases from 7 to 9, FLDs is found to be significant, and the multiple R increases from a value of 0,503 to a value of 0,665. It can be asserted that the use of average values increases the significance and therefore, the impact of KPIs and FLDs on MV.

#### 4.4.2.1.1 Sensitivity of FLD Index

As explained in section 4.4.1.1.1 the word "may" was removed from the FLD Index. The correlation results for the 3-Year AVG 2012 to 2017 based on the new FLD Index demonstrate that the correlation between FLDs and MV remains with a value of 0,185 (significance at the 0,01 level, 2-tailed) at nearly the same level as mentioned in section 4.4.2.1 (0,187 significance at the 0,01 level, 2-tailed). It indicates that even to take one word out of the FLD Index does not have any impact on the overall relationship strength between FLDs and MV. A further regression analysis should show whether the change in the FLD Index has any impact on the overall regression formula.

The regression analysis illustrates further that multiple R (0,664) remains at the same level as in chapter 4.4.2.1 (multiple R = 0,664). The significant KPIs are also the same. The variables sales growth, equity ratio, debt to equity ratio, return on capital employed, current ratio, return on assets, asset turnover ratio, return on equity and return on sales are still found to be significant. The overall quality, indicated by the value F, is bigger than Signif. F and remains at the same level as in section 4.4.2.1.

It can be concluded that removing the word "may" does not affect the overall regression between KPIs, FLDs and MV. The results of both, the correlation, as well as regression analysis, demonstrate that a change in the FLD Index is not sensitive to minor changes such as removing or adding one word. Therefore, construct validity as stated by Heale and Twycross (2015) is given and critics on subjectivity diminish as the index is not sensitive to a change in the FLD Index.

#### 4.4.2.1.2 Sensitivity of MV Timeliness

As explained in section 4.4.1.1.2, the current research intends to identify how the results of the correlation and regression analysis of the variables KPIs, FLDs and MV change, in the case that MV is determined at the end of April. The correlation results are shown in Table 35.

**Table 35:** Correlation 3-Year Average 2012 to 2017 MV end of April

Correlation 3-Year AVG 2012 to 2017 (Market Date changed)		before	
		MV	MV
Asset Growth	Pearson Correlation	,429**	,426**
	Sig. (2-tailed)	0,000	0,000
Asset Turnover Ratio	Pearson Correlation	,102*	,118*
	Sig. (2-tailed)	0,043	0,020
Cash Flow Return Margin	Pearson Correlation	0,022	0,034
	Sig. (2-tailed)	0,664	0,500
Cash Ratio	Pearson Correlation	,144**	,155**
	Sig. (2-tailed)	0,004	0,002
Cash Flow Return on Equity	Pearson Correlation	0,051	0,032
	Sig. (2-tailed)	0,319	0,525
Current Ratio	Pearson Correlation	,192**	,209**
	Sig. (2-tailed)	0,000	0,000
Debt to Equity Ratio	Pearson Correlation	-,136**	-,148**
	Sig. (2-tailed)	0,007	0,003
EBIT Turnover Yield	Pearson Correlation	,137**	,144**
	Sig. (2-tailed)	0,007	0,004
EBITDA Turnover Yield	Pearson Correlation	,216**	,233**
	Sig. (2-tailed)	0,000	0,000
Equity Ratio	Pearson Correlation	,236**	,252**
	Sig. (2-tailed)	0,000	0,000
Equity to Long-Term Assets	Pearson Correlation	,232**	,240**
	Sig. (2-tailed)	0,000	0,000
FLDs Growth	Pearson Correlation	,172**	,187**
	Sig. (2-tailed)	0,001	0,000
Interest Coverage Ratio	Pearson Correlation	,168**	,203**
	Sig. (2-tailed)	0,001	0,000
Profit Growth	Pearson Correlation	,229**	,218**
	Sig. (2-tailed)	0,000	0,000
Quick Ratio	Pearson Correlation	,181**	,200**
	Sig. (2-tailed)	0,000	0,000
Return on Assets	Pearson Correlation	,216**	,203**
	Sig. (2-tailed)	0,000	0,000
Return on Capital Employed	Pearson Correlation	,224**	,250**
	Sig. (2-tailed)	0,000	0,000
Return on Equity	Pearson Correlation	,175**	,162**
	Sig. (2-tailed)	0,001	0,001
Return on Sales	Pearson Correlation	,138**	,185**
	Sig. (2-tailed)	0,006	0,000
Sales Growth	Pearson Correlation	,405**	,411**
	Sig. (2-tailed)	0,000	0,000
** Correlation is significant at the 0.01 level (2-tailed).			
* Correlation is significant at the 0.05 level (2-tailed).			

Source: Data output from SPSS

The results reveal that 17 out of 20 KPIs as well as FLDs significantly impact the MV. Concerning the number of significant variables, the results are the same when compared to the results in section 4.4.2.1. However, the correlation value from 14 out of 18 significant variables decreases as indicated in Table 35. It can be asserted that choosing the end of March as the point in time to determine MV unveils the most significant impact of KPIs and FLDs on the MV. This assertion can also be confirmed by the results of the regression analysis, which are presented in Table 36.

**Table 36:** Regression 3-year AVG 2012 to 2017 MV end of April

<b>Regression Analysis 3-Year AVG 2012 – 2017 (MV Date end of April)</b>					
<b>1.) Model Summary:</b>					
Multiple R	0,651				
R Square	0,423				
Adjusted R Square	0,392				
Standard Error	0,162				
Observations	390,000				
<b>2.) ANOVA Analysis:</b>					
	Degrees of Freedom	Sum of Square	Mean Square	F	Signif. F
Regression	20,000	7,095	0,355	13,548	0,000
Residual	369,000	9,663	0,026		
Total	389,000	16,758			
<b>3.) Variable Coefficient Analysis:</b>					
	Unstand. Coefficients	Stand. Error	t Stat.	P-value	
Intercept	0,080	0,011	6,973	0,000	
Sales Growth	0,947	0,197	4,818	0,000	
Equity Ratio	0,930	0,181	5,145	0,000	
Debt to Equity Ratio	0,227	0,046	4,900	0,000	
Return on Capital Employed	0,065	0,019	3,469	0,001	
Interest Coverage Ratio	-0,018	0,007	-2,685	0,008	
FLDs Growth	0,337	0,136	2,477	0,014	
Current Ratio	0,474	0,205	2,317	0,021	
Asset Turnover Ratio	-0,543	0,248	-2,186	0,029	
Cash Flow Return on Equity	0,000	0,000	2,031	0,043	
Return on Assets	0,016	0,009	1,848	0,065	
Return on Equity	-0,006	0,005	-1,278	0,202	
Cash Flow Return Margin	0,019	0,020	0,967	0,334	
Quick Ratio	-0,154	0,170	-0,903	0,367	
EBIT Turnover Yield	-0,002	0,004	-0,561	0,575	
Return on Sales	0,001	0,002	0,426	0,671	
Equity to Long-Term Assets	0,026	0,064	0,401	0,689	
Cash Ratio	-0,011	0,043	-0,249	0,803	
Asset Growth	0,022	0,178	0,121	0,904	
EBITDA Turnover Yield	-0,005	0,042	-0,110	0,913	
Profit Growth	0,000	0,007	0,014	0,989	

Source: Data output from SPSS, Layout from Excel

Regression analysis shows a slight decline in multiple R (0,651) when compared to the results of section 4.4.2.1, where multiple R counted to 0,664. The number of significant KPIs have also decreased. In section 4.4.2.1, the regression analysis unveils a significance of 9 KPIs, while this section states the significance of only 8 KPIs. Nevertheless, FLDs are still found to be significant.

Further, the discussed mix of significant KPIs have changed. In section 4.4.2.1 the KPIs sales growth, equity ratio, debt to equity ratio, return on capital employed, current ratio, return on assets, asset turnover ratio, return on equity, return on sales have been found to be significant. The KPIs return on assets, return on equity, as well as return on sales have not been found to be significant by the regression analysis of the current section. In contrast, the regression analysis of this section demonstrates the significance of cash flow return on equity and interest coverage ratio, a variable that is not found to be significant in section 4.4.2.1. This finding is again, an interdependency issue discussed in section 4.5.

To conclude, despite multiple R being nearly at the same level as in section 4.4.2.1, choosing the end of March as the point in time to determine MV enhances the results of the correlation and regression between the variables KPIs, FLDs and MV. Therefore, the ideas of Chambers & Penman (1984) that stock prices react timely around the announcement date of corporate reporting can be approved. Most companies publish the annual report in March (see Appendix A), and the current research proved that the "timely" impact occurs in the same month.

#### 4.4.2.1.3 Sensitivity of Regression Formula

As in section 4.4.1.1.3, it should be analysed, whether FLDs affect the relationship between KPIs and MV. The correlation results are presented in Table 37.

**Table 37:** Regression 3-year AVG 2012 to 2017 – FLD variable excluded

<b>Regression Analysis 3-year AVG 2012 to 2017 – FLD variable excluded</b>					
<i>Regression Statistics</i>					
Multiple R	0,655				
R Square	0,429				
Adjusted R Square	0,399				
Standard Error	0,167				
Observations	390,000				
<b>2.) ANOVA Analysis:</b>					
	Degrees of Freedom	Sum of Square	Mean Square	F	Signif. F
Regression	19,000	7,768	0,409	14,606	0,000
Residual	370,000	10,357	0,028		
Total	389,000	18,126			
<b>3.) Variable Coefficient Analysis:</b>					
	Unstand. Coefficients	Stand. Error	t Stat.	P-value	
Intercept	0,097	0,011	9,027	0,000	
Sales Growth	0,887	0,202	4,389	0,000	
Equity Ratio	0,953	0,187	5,102	0,000	
Debt to Equity Ratio	0,219	0,048	4,589	0,000	
Return on Capital Employed	0,055	0,019	2,863	0,004	
Current Ratio	0,554	0,212	2,618	0,009	
Return on Sales	0,004	0,002	2,131	0,034	
Return on Equity	-0,010	0,005	-2,053	0,041	
Return on Assets	0,018	0,009	2,032	0,043	
Interest Coverage Ratio	-0,014	0,007	-2,030	0,043	
Asset Turnover Ratio	-0,441	0,253	-1,739	0,083	
Cash Flow Return on Equity	0,000	0,000	1,513	0,131	
Quick Ratio	-0,172	0,176	-0,982	0,327	
Asset Growth	0,131	0,181	0,725	0,469	
EBIT Turnover Yield	-0,003	0,004	-0,720	0,472	
Cash Ratio	-0,031	0,044	-0,693	0,489	
Equity to Long-Term Assets	0,043	0,066	0,657	0,512	
Cash Flow Return Margin	0,011	0,02	0,562	0,575	
EBITDA-Turnover Yield	0,012	0,043	0,285	0,776	
Profit Growth	0,000	0,007	-0,021	0,984	

Source: Data output from SPSS, Layout from Excel

As mentioned in section 4.4.1.1.3, it has become evident that by eliminating the FLD variable, the multiple R slightly decreases to 0,655 (before 0,664). The slight decrease indicates that FLDs have an impact on the KPI & MV relationship.

Moreover, Table 37 shows that the P-Value of KPIs changes while excluding the FLD variable from the regression formula. P-Value should be lower than 0,05 to claim a variable as significant. However, Table 38 demonstrates that the changes are minimal and do not affect the number of significant variables compared to the results of section 4.4.2.1. The only change is that the KPI interest coverage ratio is now significant, and the asset turnover ratio is now significant.

**Table 38:** Excluding FLDs from regression formula

<b>Excluding FLDs</b>	<b>P Value</b>	<b>before</b>	<b>Delta</b>
Debt to Equity Ratio	0,000	0,000	0,000
Equity Ratio	0,000	0,000	0,000
Sales Growth	0,000	0,000	0,000
Return on Capital Employed	0,004	0,002	0,002
Current Ratio	0,009	0,011	-0,002
Return on Sales	0,034	0,044	-0,010
Return on Equity	0,041	0,040	0,001
Return on Assets	0,043	0,024	0,019
Interest Coverage Ratio	0,043	0,052	-0,009
Cash Flow Return on Equity	0,083	0,130	-0,047
Asset Turnover Ratio	0,131	0,030	0,101
Asset Growth	0,327	0,841	-0,514
Quick Ratio	0,469	0,358	0,111
EBIT Turnover Yield	0,472	0,580	-0,108
Cash Ratio	0,489	0,541	-0,052
Equity to Long-Term Assets	0,512	0,768	-0,256
Cash Flow Return Margin	0,575	0,412	0,163
EBITDA-Turnover Yield	0,776	0,992	-0,216
Profit Growth	0,984	0,870	0,114

Source: Data output from SPSS

To conclude, the results show that FLDs influence the KPI and MV relationship, as a slight decrease in the value multiple R is proven. The combined changes in KPIs and the number of FLDs have a significant impact on changes in MV. The hypothesis 4 can therefore be rejected. Moreover, according to the regression analysis of the current section the number of significant variables remain the same, as stated in section 4.4.2.1.

#### 4.4.2.1.4 Sensitivity of Data Amount (AVG 2010 to 2017)

As in chapter 4.4.1.1.4 the data period was extended by two years to determine whether a more extended period would increase the overall quality of the regression. A correlation analysis shall unveil the relationship strength between KPIs, FLD and Market Capitalisation. The results are presented in Table 39.



**Table 39:** Correlation 3-year AVG 2010 to 2017

Correlation 3-Year AVG 2010-2017		3-Year AVG 2012-2017	
Asset Growth	Pearson Correlation	,413**	,426**
	Sig. (2-tailed)	0,000	0,000
Asset Turnover Ratio	Pearson Correlation	0,060	,118*
	Sig. (2-tailed)	0,175	0,020
Cash Flow Return Margin	Pearson Correlation	-,116**	0,034
	Sig. (2-tailed)	0,008	0,500
Cash Ratio	Pearson Correlation	0,028	,155**
	Sig. (2-tailed)	0,526	0,002
Cash Flow Return on Equity	Pearson Correlation	0,011	0,032
	Sig. (2-tailed)	0,794	0,525
Current Ratio	Pearson Correlation	,176**	,209**
	Sig. (2-tailed)	0,000	0,000
Debt to Equity Ratio	Pearson Correlation	-,123**	-,148**
	Sig. (2-tailed)	0,005	0,003
EBIT Turnover Yield	Pearson Correlation	,115**	,144**
	Sig. (2-tailed)	0,009	0,004
EBITDA Turnover Yield	Pearson Correlation	,223**	,233**
	Sig. (2-tailed)	0,000	0,000
Equity Ratio	Pearson Correlation	,142**	,252**
	Sig. (2-tailed)	0,001	0,000
Equity to Long-Term Assets	Pearson Correlation	,189**	,240**
	Sig. (2-tailed)	0,000	0,000
FLDs Growth	Pearson Correlation	0,018	,187**
	Sig. (2-tailed)	0,677	0,000
Interest Coverage Ratio	Pearson Correlation	,184**	,203**
	Sig. (2-tailed)	0,000	0,000
Profit Growth	Pearson Correlation	,228**	,218**
	Sig. (2-tailed)	0,000	0,000
Quick Ratio	Pearson Correlation	,162**	,200**
	Sig. (2-tailed)	0,000	0,000
Return on Assets	Pearson Correlation	,170**	,203**
	Sig. (2-tailed)	0,000	0,000
Return on Capital Employed	Pearson Correlation	,184**	,250**
	Sig. (2-tailed)	0,000	0,000
Return on Equity	Pearson Correlation	,150**	,162**
	Sig. (2-tailed)	0,001	0,001
Return on Sales	Pearson Correlation	,171**	,185**
	Sig. (2-tailed)	0,000	0,000
Sales Growth	Pearson Correlation	,422**	,411**
	Sig. (2-tailed)	0,000	0,000
** Correlation is significant at the 0.01 level (2-tailed).			
* Correlation is significant at the 0.05 level (2-tailed).			

Source: Data output from SPSS

The correlation demonstrates that correlation for the 3-Year AVG 2010 to 2017 is nearly identical to the results for the 3-Year AVG 2012 to 2017. It reveals, however, some changes such as the ratio "cash flow return margin" is now significant at level 0,01, yet, the "cash ratio" is now insignificant. Moreover, FLDs becomes insignificant while extending the data period by two years. In order to understand these changes, it is necessary to look

again at the development of the FLDs and the MV as mentioned in section 4.2.

**Table 40:** Sum of FLDs and MV per year

Years	Sum of MV of selected Companies in kEUR	Sum of FLDs of selected Companies
2007	572.890.943	149.656
2008	546.781.114	158.381
2009	317.866.053	171.193
2010	484.307.539	185.501
2011	566.056.667	195.712
2012	572.727.552	201.523
2013	632.378.268	218.260
2014	770.169.120	220.957
2015	966.873.640	228.711
2016	819.333.925	224.715
2017	943.514.665	240.325

As seen in section 3.4.3.3, the AVG 2010 value consists of the average of the single values from 2008 to 2010. As described in section 4.2 the period between 2008 and 2009 is marked by the financial crisis hitting the stock markets severely as explained by Mazumder and Ahmad (2010), Ressas and Hussainey (2014) as well as Altman (2009). With such volatility due to external factors, the current regression formula reaches its limits. The financial crisis in 2008 had a unique character that is not easy to explain, and that has to be investigated in more detail by separate research studies such as the one of Ressas and Hussainey (2014). For the current research, the question of why FLDs are not found to be significant during test period cannot be clarified thoroughly as the why question to answer does not present the central objectives. The aim of this work is only to clarify the impact of KPI and FLD on the MV. Despite the crisis situation, and although FLDs are not found to be significant, other KPIs are proven to be significant, which can also be observed by looking at the following regression results in Table 41.

**Table 41:** Regression 3-year AVG 2010 to 2017

<b>Regression Analysis 3-year AVG 2010 – 2017</b>					
<b>1.) Model Summary:</b>					
Multiple R	0,630				
R Square	0,397				
Adjusted R Square	0,373				
Standard Error	0,184				
Observations	520,000				
<b>2.) ANOVA Analysis:</b>					
	Degrees of Freedom	Sum of Square	Mean Square	F	Signif. F
Regression	20,000	11,063	0,553	16,409	0,000
Residual	499,000	16,821	0,034		
Total	519,000	27,884			
<b>3.) Variable Coefficient Analysis:</b>					
	Unstand. Coefficients	Stand. Error	t Stat.	P-value	
Intercept	0,063	0,012	5,310	0,000	
Sales Growth	0,901	0,187	4,8100	0,000	
Equity Ratio	0,808	0,16	5,048	0,000	
Debt to Equity Ratio	0,209	0,046	4,504	0,000	
Cash Ratio	-0,124	0,036	-3,493	0,001	
Return on Sales	0,004	0,002	2,628	0,009	
Current Ratio	0,544	0,21	2,584	0,010	
EBITDA Turnover Yield	0,099	0,043	2,319	0,021	
Profit Growth	0,013	0,007	1,989	0,047	
EBIT Turnover Yield	-0,007	0,004	-1,935	0,054	
Return on Equity	-0,005	0,003	-1,782	0,075	
Asset Turnover Ratio	-0,398	0,239	-1,669	0,096	
FLDs Growth	-0,179	0,122	-1,467	0,143	
Equity to Long-Term Assets	0,090	0,066	1,367	0,172	
Return on Assets	0,002	0,002	0,964	0,336	
Asset Growth	0,155	0,171	0,908	0,364	
Cash Flow Return on Equity	0,000	0,000	0,554	0,580	
Quick Ratio	-0,077	0,173	-0,446	0,656	
Return on Capital Employed	0,007	0,015	0,458	0,648	
Interest Coverage Ratio	-0,002	0,006	-0,270	0,787	
Cash Flow Return Margin	0,001	0,012	0,047	0,962	

Source: Data output from SPSS, Layout from Excel

The regression analysis unveils that by extending the sample years, the multiple R decreases slightly to 0,630 (before 0,664 see chapter 5.3.2.,1). Although the correlation analysis revealed nearly identical results as those mentioned in section 4.4.2.1, regression analysis suggests a change in significant KPIs. Compared to the results of section 4.4.2.1, the variables return on capital employed, asset turnover ratio, return on assets and return on equity are insignificant. In contrast, the KPIs cash ratio, EBITDA turnover yield and profit growth are now significant. This shift of significant KPIs may be due to interrelated dependencies between independent variables, an issue that is addressed in section 4.5. Moreover, the regression analysis demonstrates that FLDs are not significant. All these changes may be due

to the effect of the financial crisis. This circumstance has not been conclusively clarified and needs to be addressed by future research.

To conclude, the extension of the sample, in contrast to the conclusion of section 4.4.1.1.4, does not add value to correlation and regression analysis, as multiple R slightly decreases and FLDs become insignificant. Moreover, the overall results also question the most appropriate mix of KPIs to be included in the regression formula.

#### **4.4.2.2 SPSS Stepwise Regression 3-year AVG 2012 to 2017**

To test the stability of results, an attribute of reliability (Heale & Twycross, 2015), a stepwise regression analysis with the aid of the software tool has been conducted. The purpose is to triangulate the results of the current research with the help of the stepwise regression tool SPSS, which include and remove variables until the multiple R reaches its peak. The goal is to identify the most fitting regression formula. The stepwise regression is based on the 3-year AVG 2012 to 2017 data. There are two reasons for choosing this data. Firstly, as shown in section 4.4.2.1 "enter" regression analysis demonstrates the highest possible multiple R value as well as the highest number of significant KPIs. Secondly, the regression analysis based on the 3-year AVG 2012 to 2017 data is not affected by the financial crisis as discussed in section 4.4.2.4.1.

In total, SPSS suggests 11 steps, which are presented in Table 42.

**Table 42:** Variables stepwise selection SPSS

Steps	Variables Entered	Variables Removed	Method
1	Asset Growth	.	Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100)
2	Current ratio	.	
3	Asset Turnover Ratio	.	
4	Equity Ratio	.	
5	Return on Sales	.	
6	Debt to Equity Ratio	.	
7	Sales Growth	.	
8	.	Asset Growth	
9	FLDs Growth	.	
10	Return on Capital Employed	.	
11	Interest Coverage Ratio	.	
Dependent Variable: MV			

Source: Data output from SPSS

According to Table 41, SPSS suggests that 9 variables are the best choice for the regression formula. The corresponding regression predictors are listed in Table 43.

**Table 43:** Predictors per model SPSS

Model	Predictors
1	(Constant), Asset Growth
2	(Constant), Asset Growth, Current Ratio
3	(Constant), Asset Growth, Current Ratio, Asset Turnover Ratio
4	(Constant), Asset Growth, Current Ratio, Asset Turnover Ratio, Equity Ratio
5	(Constant), Asset Growth, Current Ratio, Asset Turnover Ratio, Equity Ratio, Return on Sales
6	(Constant), Asset Growth, Current Ratio, Asset Turnover Ratio, Equity Ratio, Return on Sales, Debt to Equity Ratio
7	(Constant), Asset Growth, Current Ratio, Asset Turnover Ratio, Equity Ratio, Return on Sales, Debt to Equity Ratio, Sales Growth
8	(Constant), Current Ratio, Asset Turnover Ratio, Equity Ratio, Return on Sales, Debt to Equity Ratio, Sales Growth
9	(Constant), Current Ratio, Asset Turnover Ratio, Equity Ratio, Return on Sales, Debt to Equity Ratio, Sales Growth, FLDs Growth
10	(Constant, Current Ratio, Asset Turnover Ratio, Equity Ratio, Return on Sales, Debt to Equity Ratio, Sales Growth, FLDs Growth, Return on Capital Employed
11	(Constant), Current Ratio, Asset Turnover Ratio, Equity ratio, Return on Sales, Debt to Equity Ratio, Sales Growth, FLDs Growth, Return on Capital Employed, Interest Coverage Ratio

Source: Data output from SPSS

The variables current ratio, asset turnover ratio, equity ratio, return on sales, debt to equity ratio, sales growth, FLD, return on capital employed and interest coverage ratio are, according the SPSS simulation, the best combination of variables to express the development of MV. The multiple R values for each model are presented in Table 44.

**Table 44:** Regression results per model (1)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,426	0,182	0,180	0,196
2	,514	0,265	0,261	0,186
3	,553	0,306	0,301	0,181
4	,575	0,331	0,324	0,177
5	,590	0,348	0,339	0,175
6	,599	0,359	0,349	0,174
7	,626	0,392	0,381	0,170
8	,625	0,391	0,381	0,170
9	,634	0,402	0,391	0,168
10	,643	0,413	0,401	0,167
11	,651	0,424	0,410	0,166

Source: Data output from SPSS

The final model shows a multiple R of 0,651, which is slightly lower than the results shown by the regression 3-Year AVG 2012 – 2017 in section 4.4.2.1, in which multiple R counted to 0,665. However, the 3-Year AVG 2012 to 2017 included 20 different variables (KPIs and FLDs) that impact MV. This finding implies that the regression formula should not be overloaded with variables as more variables do not necessarily increase the quality of the regression formula.

The following Table 45 shows that all the regression models presented by the software application SPSS are significant as Signif. F is lower than F.

**Table 45:** Regression results per model (2)

ANOVA Analysis						
Model		Degrees of Freedom	Sum of Squares	Mean Square	F	Signif. F
1	Regression	1	3,297	3,297	86,265	,000
	Residual	388	14,829	0,038		
	Total	389	18,126			
2	Regression	2	4,795	2,397	69,593	,000
	Residual	387	13,331	0,034		
	Total	389	18,126			
3	Regression	3	5,549	1,85	56,776	,000
	Residual	386	12,576	0,033		
	Total	389	18,126			
4	Regression	4	6,002	1,501	47,65	,000
	Residual	385	12,124	0,031		
	Total	389	18,126			
5	Regression	5	6,301	1,26	40,926	,000
	Residual	384	11,824	0,031		
	Total	389	18,126			
6	Regression	6	6,506	1,084	35,738	,000
	Residual	383	11,62	0,03		
	Total	389	18,126			
7	Regression	7	7,104	1,015	35,172	,000
	Residual	382	11,022	0,029		
	Total	389	18,126			
8	Regression	6	7,08	1,18	40,912	,000
	Residual	383	11,046	0,029		
	Total	389	18,126			
9	Regression	7	7,282	1,04	36,649	,000i
	Residual	382	10,843	0,028		
	Total	389	18,126			
10	Regression	8	7,488	0,936	33,524	,000
	Residual	381	10,638	0,028		
	Total	389	18,126			
11	Regression	9	7,677	0,853	31,015	,000
	Residual	380	10,450	0,027		
	Total	389	18,126			

Source: Data output from SPSS

The significant variables with their corresponding coefficient per model are:

**Table 46:** Regression results per model (3)

Model	Variable	Unstand. Coefficients	Std. Error	t Stat	P-value
1	(Constant)	0,130	0,012	11,234	0,000
	Asset Growth	0,699	0,075	9,288	0,000
2	(Constant)	0,119	0,011	10,659	0,000
	Asset Growth	0,782	0,073	10,777	0,000
	Current Ratio	0,468	0,071	6,594	0,000
3	(Constant)	0,118	0,011	10,882	0,000
	Asset Growth	0,836	0,071	11,696	0,000
	Current Ratio	0,493	0,069	7,127	0,000
4	Asset Turnover Ratio	0,586	0,122	4,813	0,000
	(Constant)	0,113	0,011	10,535	0,000
	Asset Growth	0,824	0,070	11,713	0,000
	Current Ratio	0,396	0,073	5,444	0,000
5	Asset Turnover Ratio	0,541	0,120	4,496	0,000
	Equity Ratio	0,467	0,123	3,791	0,000
	(Constant)	0,112	0,011	10,500	0,000
	Asset Growth	0,816	0,070	11,726	0,000
	Current Ratio	0,399	0,072	5,543	0,000
6	Asset Turnover Ratio	0,506	0,120	4,232	0,000
	Equity Ratio	0,419	0,123	3,408	0,001
	Return on Sales	0,004	0,001	3,117	0,002
	(Constant)	0,107	0,011	10,057	0,000
	Asset Growth	0,874	0,073	12,038	0,000
	Current Ratio	0,398	0,071	5,578	0,000
7	Asset Turnover Ratio	0,597	0,124	4,825	0,000
	Equity Ratio	0,542	0,131	4,142	0,000
	Return on Sales	0,004	0,001	3,058	0,002
	Debt to Equity Ratio	0,095	0,036	2,596	0,010
	(Constant)	0,095	0,011	8,783	0,000
	Asset Growth	0,158	0,173	0,915	0,361
	Current Ratio	0,334	0,071	4,699	0,000
8	Asset Turnover Ratio	-0,313	0,234	-1,341	0,181
	Equity Ratio	1,005	0,163	6,159	0,000
	Return on Sales	0,004	0,001	2,833	0,005
	Debt to Equity Ratio	0,222	0,045	4,909	0,000
	Sales Growth	0,866	0,190	4,553	0,000
	(Constant)	0,094	0,011	8,765	0,000
	Current Ratio	0,318	0,069	4,619	0,000
9	Asset Turnover Ratio	-0,491	0,130	-3,774	0,000
	Equity Ratio	1,086	0,137	7,932	0,000
	Return on Sales	0,004	0,001	2,798	0,005
	Debt to Equity Ratio	0,242	0,040	6,025	0,000
	Sales Growth	1,025	0,078	13,128	0,000
	(Constant)	0,082	0,012	7,077	0,000
	Current Ratio	0,326	0,068	4,773	0,000
9	Asset Turnover Ratio	-0,466	0,129	-3,600	0,000
	Equity Ratio	1,043	0,137	7,622	0,000
	Return on Sales	0,004	0,001	2,831	0,005
	Debt to Equity Ratio	0,229	0,040	5,714	0,000
	Sales Growth	0,992	0,078	12,644	0,000
	FLDs Growth	0,362	0,136	2,671	0,008



Model	Variable	Unstand. Coefficients	Std. Error	t Stat	P-value
10	(Constant)	0,081	0,012	7,026	0,000
	Current Ratio	0,291	0,069	4,225	0,000
	Asset Turnover Ratio	-0,611	0,139	-4,397	0,000
	Equity Ratio	0,978	0,138	7,094	0,000
	Return on Sales	0,003	0,001	2,463	0,014
	Debt to Equity Ratio	0,219	0,040	5,480	0,000
	Sales Growth	0,973	0,078	12,454	0,000
	FLDs Growth	0,406	0,135	2,996	0,003
	Return on Capital Employed	0,027	0,010	2,716	0,007
	11	(Constant)	0,082	0,011	7,175
Current Ratio		0,318	0,069	4,598	0,000
Asset Turnover Ratio		-0,547	0,140	-3,906	0,000
Equity Ratio		1,025	0,138	7,427	0,000
Return on Sales		0,003	0,001	1,915	0,056
Debt to Equity Ratio		0,238	0,040	5,907	0,000
Sales Growth		1,011	0,079	12,816	0,000
FLDs Growth		0,392	0,135	2,915	0,004
Return on Capital Employed		0,059	0,016	3,753	0,000
Interest Coverage Ratio		-0,016	0,006	-2,614	0,009

Source: Data output from SPSS

It can be concluded that the results of the stepwise analysis are not very different from those presented in chapter 4.4.2.1 and hence, stability (a form of reliability) as described in section 3.6.2 is given. The multiple R is slightly lower, which is due to fewer variables being included in the regression formula. The small difference of multiple R (0,651 compared to 0,664) strengthens the statements of Delen et al. (2013) as well as Wang & Lee (2008) who suggest not to take all available KPIs into account. However, the mix of relevant KPIs is again different. In contrast to the results of section 4.4.2.1, the variable Interest Coverage Ratio is also found to be relevant while the KPIs return on assets and return on equity are not found to be relevant for the regression formula as analysed through stepwise SPSS analysis. This finding implies the endogeneity problem discussed in section 4.6.

#### 4.4.2.3 Combined Impact of KPIs and FLDs on MV

In this section, the combined KPI & FLDs ratio is tested concerning its impact on MV. As explained in section 3.5.1, the combined KPI & FLDs ratio is calculated by multiplying the change in the respective KPI with the change in FLDs. For the analysis, the 3-year average value approach is used, as

explained in section 3.4.3.3. Firstly, a correlation analysis shall determine the strength between the combined KPI & FLDs ratio. The results are shown in Table 47.

**Table 47:** Correlation 3-Year AVG 2012 to 2017

<b>Correlation 3-year AVG 2012 to 2017 (Combined KPI &amp; FLDs Ratio)</b>		<b>MV</b>
Asset Growth*FLDs	Pearson-Korrelation	,194**
	Sig. (2-seitig)	0,000
Asset Turnover Ratio*FLDs	Pearson-Korrelation	-0,076
	Sig. (2-seitig)	0,135
Cash Flow Return Margin*FLDs	Pearson-Korrelation	-0,048
	Sig. (2-seitig)	0,343
Cash Ratio*FLDs	Pearson-Korrelation	,186**
	Sig. (2-seitig)	0,000
Cash Return on Equity*FLDs	Pearson-Korrelation	-0,088
	Sig. (2-seitig)	0,082
Current Ratio*FLDs	Pearson-Korrelation	,206**
	Sig. (2-seitig)	0,000
Debt-to-Equity Ratio*FLDs	Pearson-Korrelation	-,192**
	Sig. (2-seitig)	0,000
EBIT Turnover Yield*FLDs	Pearson-Korrelation	,146**
	Sig. (2-seitig)	0,004
EBITDA-Turnover Yield*FLDs	Pearson-Korrelation	,232**
	Sig. (2-seitig)	0,000
Equity Ratio*FLDs	Pearson-Korrelation	,306**
	Sig. (2-seitig)	0,000
Equity to Long-Term Assets*FLDs	Pearson-Korrelation	,232**
	Sig. (2-seitig)	0,000
Interest-Coverage-Ratio*FLDs	Pearson-Korrelation	,167**
	Sig. (2-seitig)	0,001
Profit Growth*FLDs	Pearson-Korrelation	,178**
	Sig. (2-seitig)	0,00
Quick Ratio*FLDs	Pearson-Korrelation	,209**
	Sig. (2-seitig)	0,000
Return on Assets*FLDs	Pearson-Korrelation	,154**
	Sig. (2-seitig)	0,002
Return on Capital Employed*FLDs	Pearson-Korrelation	,243**
	Sig. (2-seitig)	0,000
Return on Equity*FLDs	Pearson-Korrelation	,155**
	Sig. (2-seitig)	0,002
Return on Sales*FLDs	Pearson-Korrelation	,183**
	Sig. (2-seitig)	0,000
Sales Growth*FLDs	Pearson-Korrelation	,237**
	Sig. (2-seitig)	0,000
** Correlation is significant at the 0.01 level (2-tailed).		
* Correlation is significant at the 0.05 level (2-tailed).		

Source: Data output from SPSS

The correlation reveals that nearly all combined KPI & FLDs ratio is significantly correlated to MV at the 0,01 level. Only the combined asset turnover\*FLDs ratio, cash flow return margin\*FLDs ratio and cash flow

return on equity\*FLDs ratio are not significantly related to MV. Most of the correlation values indicate, however, a "very low" or "low" correlation between the combine KPI & FLDs ratios and MV. The combined impact of the equity ratio and FLDs with a value of 0,306 seems to be most highly correlated with the MV. A further regression analysis unveils the relationship between the combined KPI & FLDs ratios and MV. Table 48 presents the results of the 3-year AVG 2012 to 2017 regression analysis.

**Table 48:** Regression 3-year AVG 2012 to 2017 – Combined impact

<b>Regression Analysis 3-year AVG 2012 - 2017 - Combined KPI &amp; FLDs Ratio</b>					
<b>1.) Model Summary:</b>					
Multiple R	0,524				
R Square	0,275				
Adjusted R Square	0,237				
Standard Error	0,188				
Observations	390,000				
<b>2.) ANOVA Analysis:</b>					
	Degree of Freedoms	Sum of Squares	Mean Square	F	Signif. F
Regression	19,000	4,979	0,262	7,376	0,000
Residual	370,000	13,146	0,036		
Total	389,000	18,126			
<b>3.) Variable Coefficient Analysis:</b>					
	<i>Unstand. Coefficients</i>	<i>Stand. Error</i>	<i>t Stat</i>	<i>P-value</i>	
Intercept	0,158	0,011	14,971	0,000	
Equity Ratio*FLDs	11,837	3,399	3,483	0,001	
Return on Capital Employed*FLDs	0,819	0,237	3,449	0,001	
Current Ratio*FLDs	7,691	3,394	2,266	0,024	
Asset Turnover Ratio*FLDs	-7,412	3,439	-2,155	0,032	
Sales Growth*FLDs	7,241	3,404	2,127	0,034	
EBITDA-Turnover Yield*FLDs	0,735	0,462	1,592	0,112	
Quick Ratio*FLDs	-3,638	2,680	-1,357	0,176	
Cash Return on Equity*FLDs	-0,016	0,012	-1,348	0,178	
Return on Sales*FLDs	0,037	0,030	1,207	0,228	
Debt-to-Equity Ratio*FLDs	1,670	1,508	1,107	0,269	
Equity to Long-Term Assets*FLDs	-0,714	0,708	-1,008	0,314	
EBIT Turnover Yield*FLDs	-0,105	0,104	-1,009	0,314	
Interest-Coverage-Ratio*FLDs	-0,151	0,166	-0,911	0,363	
Asset Growth*FLDs	-1,792	2,417	-0,741	0,459	
Profit Growth*FLDs	-0,041	0,093	-0,438	0,662	
Cash Ratio*FLDs	0,317	0,740	0,429	0,668	
Cash Flow Return Margin*FLDs	0,100	0,243	0,411	0,681	
Return on Equity*FLDs	0,045	0,130	0,347	0,728	
Return on Assets*FLDs	-0,024	0,210	-0,114	0,910	

Source: Data output from SPSS

The regression analysis demonstrates that the multiple R counts to 0,524, which indicates a medium correlation. The value is, however, lower than the multiple R of 0,664, as shown in section 4.4.2.1.

Further, the Significance F is 0 and hence, lower than F (7,376). This relationship is needed to confirm the quality and significance of the overall regression analysis. The combined ratios "Equity Ratio\*FLDs", "Return on Capital Employed\*FLDs", "Current Ratio\*FLDs", "Asset Turnover Ratio\*FLDs" and "Sales Growth\*FLDs" are significant according to regression analysis.

To conclude, the current section proves the significant combined impact of KPIs and FLDs on MV. Therefore, hypothesis 4 of the current research can be rejected.

#### **4.4.3 Analysis of the relationship between KPIs and FLDs**

##### **4.4.3.1 KPIs impact on FLDs**

In this section, the relationship between FLDs as dependent variables and KPIs as independent variables is analysed. Signalling theory suggests that companies need to voluntarily disclose information to state why their company is seen as superior compared to others and worthy to invest in (Watson et al., 2002). In this context it can be expected that changes in profitability will affect the number of FLDs (Watson et al., 2002). According to the signalling theory it can be assumed that companies with better profitability are likely to disclose more information (Watson et al., 2002).

This thesis intends to test the impact of several KPIs that do not only belong to the profitability cluster only (see section 2,6). In total, 19 different KPIs were selected some related to profitability and others to liquidity, solvency, financial structure, efficiency, cash flows and growth ratios. Table 49 is based on the 3-Year AVG 2012 to 2017 data.

**Table 49:** Correlation 3-Year AVG 2012 to 2017

		<b>FLDs Growth</b>
Asset Growth	Pearson Correlation	,185**
	Sig. (2-tailed)	0,000
Asset Turnover Ratio	Pearson Correlation	-0,006
	Sig. (2-tailed)	0,910
Cash Flow Return Margin	Pearson Correlation	-0,002
	Sig. (2-tailed)	0,976
Cash Flow Return on equity	Pearson Correlation	0,026
	Sig. (2-tailed)	0,603
Cash Ratio	Pearson Correlation	-0,065
	Sig. (2-tailed)	0,197
Current Ratio	Pearson Correlation	-0,038
	Sig. (2-tailed)	0,451
Debt to Equity Ratio	Pearson Correlation	0,021
	Sig. (2-tailed)	0,685
EBIT Turnover Yield	Pearson Correlation	-0,030
	Sig. (2-tailed)	0,560
EBITDA Turnover Yield	Pearson Correlation	-0,011
	Sig. (2-tailed)	0,823
Equity Ratio	Pearson Correlation	0,037
	Sig. (2-tailed)	0,463
Equity to Long-Term Assets	Pearson Correlation	0,096
	Sig. (2-tailed)	0,058
Interest Coverage Ratio	Pearson Correlation	-0,075
	Sig. (2-tailed)	0,137
MV	Pearson Correlation	,187**
	Sig. (2-tailed)	0,000
Profit Growth	Pearson Correlation	-0,051
	Sig. (2-tailed)	0,313
Quick Ratio	Pearson Correlation	-0,058
	Sig. (2-tailed)	0,250
Return on Assets	Pearson Correlation	-0,077
	Sig. (2-tailed)	0,129
Return on Capital Employed	Pearson Correlation	-0,090
	Sig. (2-tailed)	0,075
Return on Equity	Pearson Correlation	-0,058
	Sig. (2-tailed)	0,257
Return on Sales	Pearson Correlation	0,013
	Sig. (2-tailed)	0,804
Sales Growth	Pearson Correlation	0,092
	Sig. (2-tailed)	0,068
** Correlation is significant at the 0.01 level (2-tailed).		
* Correlation is significant at the 0.05 level (2-tailed).		

Source: Data output from SPSS

According to the correlation results, asset growth (growth indicator) is significantly related to FLDs at level 0,01. An increase in assets is positively related to the number of FLDs. The correlation strength is, however, "very low" according to the definition of Bühl and Zöfel (2000).

Increasing the data by two years (3-year AVG 2010 to 2017) unveils that not only asset growth, but also the equity to long-term assets ratio is

significantly related to FLDs. The equity to long-term assets ratio (financial structure indicator) to FLDs is significant at level 0,05. The asset growth ratio remains significantly related to FLDs at level 0,01.

Besides, no other KPI cluster such as profitability, liquidity, solvency, efficiency, cash flows and growth ratios seems to affect the level of FLDs at the significance level 0.01 or 0.05. The underlying assumption of signalling theory that companies with better profitability are likely to disclose more information (Watson et al., 2002) cannot be confirmed.

Despite the results being contradictory to signalling theory, hypothesis 2a (see section 2.9) can be rejected. A change in KPIs does have an impact on a change in FLDs.

#### **4.4.3.2 FLDs impact on KPIs**

In the previous section the impact of KPIs on FLDs was analysed. In this section the impact of FLDs on KPIs is examined. FLDs concern the company's future developments including information about its strategic and competitive advantage (Samaha et al., 2015), but also uncertainties and risks (Hussainey, 2004). This implies that an increase in voluntary disclosures might lead to better profitability in the near future. Therefore, how changes in FLDs affect changes in one year ahead KPIs should be analysed. The results of the correlation analysis are presented in Table 50.

**Table 50:** Correlation 3-Year AVG 2012/2013 to 2016/2017

		<b>FLDs Growth</b>
Asset Growth	Pearson Correlation	0,070
	Sig. (2-tailed)	0,210
Asset Turnover Ratio	Pearson Correlation	-0,076
	Sig. (2-tailed)	0,172
Cash Flow Return Margin	Pearson Correlation	-0,015
	Sig. (2-tailed)	0,786
Cash Ratio	Pearson Correlation	0,022
	Sig. (2-tailed)	0,692
Cash Flow Return on Equity	Pearson Correlation	-0,020
	Sig. (2-tailed)	0,716
Current Ratio	Pearson Correlation	0,091
	Sig. (2-tailed)	0,103
Debt to Equity Ratio	Pearson Correlation	-0,019
	Sig. (2-tailed)	0,734
EBIT Turnover Yield	Pearson Correlation	-0,028
	Sig. (2-tailed)	0,621
EBITDA Turnover Yield	Pearson Correlation	-0,029
	Sig. (2-tailed)	0,603
Equity Ratio	Pearson Correlation	-0,034
	Sig. (2-tailed)	0,539
Equity to Long-term Assets	Pearson Correlation	,142*
	Sig. (2-tailed)	0,010
Interest Coverage Ratio	Pearson Correlation	-,114*
	Sig. (2-tailed)	0,040
Profit Growth	Pearson Correlation	-0,013
	Sig. (2-tailed)	0,811
Quick Ratio	Pearson Correlation	0,056
	Sig. (2-tailed)	0,315
Return on Assets	Pearson Correlation	-0,062
	Sig. (2-tailed)	0,264
Return on Capital Employed	Pearson Correlation	-,127*
	Sig. (2-tailed)	0,022
Return on Equity	Pearson Correlation	-0,051
	Sig. (2-tailed)	0,360
Return on Sales	Pearson Correlation	-0,036
	Sig. (2-tailed)	0,514
Sales Growth	Pearson Correlation	0,053
	Sig. (2-tailed)	0,337
** Correlation is significant at the 0.01 level (2-tailed).		
* Correlation is significant at the 0.05 level (2-tailed).		

Source: Data output from SPSS

The analysis is based on the assumption that a change in FLDs determined in the year 2012 (see section 3.4.3.3 for calculation) will affect a change in a KPI determined in the year 2013. Therefore, the analysis includes 3-year average values between 2012 and 2016 concerning FLDs determination, and 3-year average values between 2013 and 2017 concerning KPIs determination. Consequently, the number of observations is reduced from n = 390 (see section 4.4.2.1) to n = 325.

Despite the reduction of the number of observations, FLDs impact KPIs by anticipating one year ahead changes in the ratios equity to long-term assets (financial structure), interest coverage ratio (solvency) and return on capital employed (profitability). The ratios are significant at level 0,05. Increasing the data by two years (3-year AVG 2010/2011 to 2016/2017) indicates that the ratio equity to long-term assets is significant at level 0,01. The ratio interest coverage ratio remains significant at level 0,05, while the return on capital employed does not show a significance while increasing the data by two years. The results imply that changes in the number of FLDs impact change in one year ahead KPIs. The hypothesis 2b mentioned in section 2.9 can, therefore, be rejected.

However, the implication mentioned in section 2.9 that an increase of voluntary disclosures might lead to better profitability in the nearby future, is according the results shown in Table 50 questionable. Signalling theory could be interpreted that in the case of increasing FLDs (positive signal), an increase in profitability can be expected (interpretation). However, this interpretation could not be proven by the results of the research as the profitability ratio return on capital employed is negatively related to FLDs (see Table 47).

#### **4.4.4 Changes on the FLD Index and its impact on regression**

Hussainey (2004) states that it is important to be careful with tenses. He provides the example of the word "anticipate". In order to not confuse "anticipated" with past tense forms such as "has/have anticipated" the adverb search should be "is anticipated" and "are anticipated". In this way, Hussainey (2004) reduces the noise in other word forms concerning the tense, for example "has anticipated" is not counted as an FLD indicating word. It is questionable whether such a small inclusion and exclusion of words significantly impacts the results of this research. The analysis about the changes on the FLD Index and its impact on regression results should ensure validity and reliability of the FLD Index used for the current study. Therefore, the FLD Index of the current research, more precisely the list of



adjectives indicating forward looking statements (Table 51), is revised in the following two subsections 4.4.4.1 and 4.4.4.2.

**Table 51:** FLD Index - Adjectives

<b>Adjective</b>	<b>Adjective 2</b>	<b>Adjective 3</b>	<b>Adjective 4</b>
able			
additional			
aimless			
ambitious			
approximate			
aspiring	aspirational	aspirant	
assumptive	is assumed	are assumed	assumable
capable			
carriable			
certain	ascertainable		
changeable			
committed			
confident			
conjectural	is conjectured	are conjectured	
contemplative			
contingent			
continuous	continual	is continued	are continued
deeming			
designed for	designed to		
desirable			
different			
following			
forecastable			
foreknown			
foretellable			
forward			
goalless			
grown			
guessable			
hinder			
hopeless	hopeful		
imaginative	imaginable	imaginary	
imminent			
impending			
improvable	improving		
increasable	increasing		
innovative	innovational	innovatory	
insightful			
intent	intentional	is intended	
is accelerated	are accelerated	accelerative	
is anticipated	are anticipated	anticipatory	anticipatable
is challenged	are challenged	challenging	
is divined	are divined		
is envisaged	are envisaged		
is envisioned	are envisioned		
is estimated	are estimated		
is expected	are expected		
is extended	are extended		
is maintained	are maintained		
judgemental	is judged	are judged	
keepable			
larger	enlargeable		
later			

Adjective	Adjective 2	Adjective 3	Adjective 4
likelihood			
long-term			
medium-term			
near-term			
new			
next			
novel	novelistic		
offerable			
opportunistic			
optimistic			
perspectival			
pessimistic			
planned			
possible			
potential			
precautionary			
presumptive	presumed	presumable	
presuppositional			
preventive	preventable	preventative	preventible
probable			
prolonged			
promising	promised		
prophetic			
propositional	proposed	proposing	
realising			
reflective	reflecting		
remaining			
renewable			
retentive			
revitalisable			
revitalizable			
risky	riskless		
seeking			
short-term			
speculative	speculating	speculated	
strategic	strategical		
striven			
subsequent			
suggestive	suggested		
supposed			
surmisable	is surmised	are surmised	
unforeseen			
unlike			
upcoming			
variational			
visionary			
waitable	is awaited	are awaited	
well placed			
well positioned			

#### 4.4.4.1 Revised FLD Index - adding "is" and "are"

Initially, the current research has added to all possible adjectives the words "is" and "are", for example "is" or "are" anticipated. The numbers presented in Table 50 are based on the sample of 65 companies and the corresponding annual reports analysed between 2007 and 2017. The following Table 52 presents the list of words that have been revised:

**Table 52:** 2007 to 2017 revised words (1)

	Number of excluded words	Excluded Words	Included Words	Number of included words
	9.092	planned	is planned	604
			are planned	408
	78	presumed	is presumed	25
			are presumed	0
	408	prolonged	is prolonged	10
			are prolonged	7
	3.381	committed	is committed	677
			are committed	669
	153	suggested	is suggested	3
			are suggested	3
	105	supposed	is supposed	26
			are supposed	14
	512	designed for	is designed for	98
			are designed for	14
	2.440	designed to	is designed to	777
			are designed to	336
	484	promised	is promised	17
			are promised	21
	3.145	proposed	is proposed	69
			are proposed	36
	1	speculated	is speculated	0
			are speculated	0
			are intended	518
			is reflected	852
			are reflected	389
<b>Sum</b>	<b>19.799</b>			<b>5.573</b>

In the second step, the words presented in Table 49 are removed/added to the FLD Index used throughout the research (see section 3.5.4.1). The results are shown in Table 53.

**Table 53: 2007 to 2017 Number of FLDs comparison (1)**

	<b>A</b>	<b>B</b>	<b>A+B</b>	<b>C</b>
<b>Co.</b>	<b>Total Words After Exclusion</b>	<b>Included Words</b>	<b>Sum</b>	<b>Previous Results</b>
1	14.807	10	14.817	14.874
7	20.070	41	20.111	20.249
13	29.572	59	29.631	29.848
14	51.443	123	51.566	52.062
15	50.067	326	50.393	50.672
16	41.091	111	41.202	41.456
17	30.792	60	30.852	30.989
18	20.245	87	20.332	20.438
21	36.105	107	36.212	36.478
22	24.220	61	24.281	24.519
25	22.472	50	22.522	22.636
28	27.088	78	27.166	27.331
31	42.883	69	42.952	43.198
33	21.654	38	21.692	21.769
34	67.999	174	68.173	68.595
42	38.896	75	38.971	39.275
43	63.260	108	63.368	63.711
44	23.730	78	23.808	23.926
49	32.362	72	32.434	32.653
50	30.364	74	30.438	30.728
51	35.133	73	35.206	35.456
52	46.148	133	46.281	46.700
53	31.088	139	31.227	31.445
56	33.042	72	33.114	33.217
57	11.809	50	11.859	11.993
58	40.021	105	40.126	40.586
60	49.845	121	49.966	50.192
61	45.045	128	45.173	45.429
62	22.150	57	22.207	22.327
63	33.802	87	33.889	34.069
65	29.646	87	29.733	29.915
71	41.355	94	41.449	41.679
74	34.121	111	34.232	34.380
75	48.475	96	48.571	48.859
79	24.607	49	24.656	24.784
83	37.010	73	37.083	37.304
85	20.908	101	21.009	21.095
86	38.964	78	39.042	39.291
90	19.403	43	19.446	19.533
92	44.101	199	44.300	44.504
94	31.735	40	31.775	32.006
95	51.094	150	51.244	51.598
97	37.375	112	37.487	37.729
100	42.173	105	42.278	42.564
103	23.747	62	23.809	24.013
106	19.108	38	19.146	19.304
107	17.166	12	17.178	17.261
109	24.572	87	24.659	24.815
111	18.222	74	18.296	18.427
112	27.524	130	27.654	27.883
113	30.303	86	30.389	30.711
117	37.905	68	37.973	38.306
120	28.670	49	28.719	28.875
121	65.204	194	65.398	65.933
122	24.019	65	24.084	24.290
128	23.413	17	23.430	23.552
133	39.656	33	39.689	40.002
136	31.131	43	31.174	31.310

	<b>A</b>	<b>B</b>	<b>A+B</b>	<b>C</b>
<b>Co.</b>	<b>Total Words After Exclusion</b>	<b>Included Words</b>	<b>Sum</b>	<b>Previous Results</b>
138	28.343	57	28.400	28.514
145	33.730	69	33.799	33.962
146	61.363	173	61.536	61.874
148	18.214	52	18.266	18.488
150	39.389	62	39.451	39.764
152	22.962	64	23.026	23.104
155	22.324	34	22.358	22.484
<b>Sum</b>	<b>2.175.135</b>	<b>5.573</b>	<b>2.180.708</b>	<b>2.194.934</b>

In a further step, the results of the "new" index with the "old" index has been analysed. In the case of a high correlation, changes to the index do not have any significant impact on the regression and correlation analysis conducted in section 4.4. The SPSS results show a perfect positive correlation (1,000), hence, it can be expected that changes to the FLD Index does not affect the results of section 4.4. Convergent validity (a type of construct validity) as described by Heale and Twycross (2015) is present because the "revised" FLD Index as well as the disclosure scores of the "originally used" FLD Index are highly correlated.

Nevertheless, this thesis intends to clarify whether the revised index affects the correlation and regression results on the impact of FLDs on MV as well as the impact of KPIs on MV. The basis for this comparison is the 3-year average period 2012 to 2017 (see section 4.4.2.1). The correlation results are shown in Table 54.

**Table 54:** Correlation results revised FLD Index (1)

<b>Correlation 3-year AVG 2012 - 2017 (revised FLD Index)</b>		<b>FLDs Growth</b>	<b>before FLDs Growth</b>
Asset Growth	Pearson Correlation	,184**	,185**
	Sig. (2-tailed)	0	0
Asset Turnover Ratio	Pearson Correlation	-0,004	-0,006
	Sig. (2-tailed)	0,931	0,91
Cash Flow Return Margin	Pearson Correlation	-0,001	-0,002
	Sig. (2-tailed)	0,988	0,976
Cash Flow Return on Equity	Pearson Correlation	0,026	0,026
	Sig. (2-tailed)	0,613	0,603
Cash Ratio	Pearson Correlation	-0,066	-0,065
	Sig. (2-tailed)	0,191	0,197
Current Ratio	Pearson Correlation	-0,039	-0,038
	Sig. (2-tailed)	0,44	0,451
Debt to Equity Ratio	Pearson Correlation	0,021	0,021
	Sig. (2-tailed)	0,681	0,685
EBIT Turnover Yield	Pearson Correlation	-0,029	-0,03
	Sig. (2-tailed)	0,566	0,56
EBITDA Turnover Yield	Pearson Correlation	-0,01	-0,011
	Sig. (2-tailed)	0,84	0,823
Equity Ratio	Pearson Correlation	0,037	0,037
	Sig. (2-tailed)	0,471	0,463
Equity to Long-Term Assets	Pearson Correlation	0,096	0,096
	Sig. (2-tailed)	0,057	0,058
Interest Coverage Ratio	Pearson Correlation	-0,072	-0,075
	Sig. (2-tailed)	0,155	0,137
MV	Pearson Correlation	,186**	,187**
	Sig. (2-tailed)	0	0
Profit Growth	Pearson Correlation	-0,053	-0,051
	Sig. (2-tailed)	0,301	0,313
Quick Ratio	Pearson Correlation	-0,059	-0,058
	Sig. (2-tailed)	0,248	0,25
Return on Assets	Pearson Correlation	-0,078	-0,077
	Sig. (2-tailed)	0,122	0,129
Return on Capital Employed	Pearson Correlation	-0,088	-0,090
	Sig. (2-tailed)	0,039	0,035
Return on Equity	Pearson Correlation	-0,059	-0,058
	Sig. (2-tailed)	0,246	0,257
Return on Sales	Pearson Correlation	0,013	0,013
	Sig. (2-tailed)	0,801	0,804
Sales Growth	Pearson Correlation	0,092	0,092
	Sig. (2-tailed)	0,068	0,068
** Correlation is significant at the 0.01 level (2-tailed).			
* Correlation is significant at the 0.05 level (2-tailed).			

Source: Data output from SPSS

The results reveal that one KPI as well as MV are significantly related to MV. Concerning the number of significant variables, the results are the same when compared to the results in section 4.4.3.1 (results without adjusting the list of forward looking adjectives). Further, the multiple R of the regression model (impact of KPIs and FLDs on MV) remains at 0,664 (see Table 53), the unstandardised coefficient of the FLD variable changes

slightly from 0,405 (see in section 4.4.2.1 Table 34) to 0,407, while the P value remains at 0,004 (compared to section 4.4.2.1 Table 34).

These mentioned changes can be neglected and hence, changes to the FLD Index concerning the adding of "is" and "are" in front of an adjective does not affect the results of the research conducted in the current thesis. These results strengthen the construct validity as the results remain the same. Criticisms such as the subjectivity in judgement by constructing an index as mentioned by Marston & Shrives (1991) are certainly diminished.

#### **4.4.4.2 Revised FLD Index - removing "is" and "are"**

The problem is that adjectives can also be used without "is" and "are". For example "...the planned event..." is a typical constructed sentence, where the word "planned" does not represent the tense form, but acts as an adjective or condition. The current research intends to identify whether being this precise in constructing a FLD Index affects the results, as in the previous section. Again the basis is the list of adjectives mentioned in Table 51. These adjective keywords, which have added either "is" or "are" as a word addition, are removed. Table 55 presents the words that have been removed or added:

**Table 55: 2007 to 2017 revised words (2)**

	<b>Number of Excluded Words</b>	<b>Excluded Words</b>	<b>Included Words</b>	<b>Number of Included Words</b>
	19	is accelerated	accelerated	852
	4	are accelerated		
	434	is anticipated	anticipated	4.933
	155	are anticipated		
	1.013	is assumed	assumed	5.565
	166	are assumed		
	1	is awaited	awaited	21
	0	are awaited		
	0	is challenged	challenged	101
	7	are challenged		
	0	is conjectured	conjectured	0
	0	are conjectured		
	24	is continued	continued	13.566
	23	are continued		
	0	is divined	divined	0
	0	are divined		
	41	is envisaged	envisaged	303
	9	are envisaged		
	3	is envisioned	envisioned	31
	3	are envisioned		
	541	is estimated	estimated	8.064
	284	are estimated		
	5.494	is expected	expected	37.150
	3.447	are expected		
	28	is extended	extended	3.746
	48	are extended		
	900	is intended	intended	3.281
	20	is judged	judged	103
	6	are judged		
	131	is maintained	maintained	1.737
	179	are maintained		
	0	is surmised	surmised	3
	0	are surmised		
<b>Sum</b>	<b>12.980</b>			<b>79.456</b>

In the second step, the words presented in Table 52 are removed/added to the FLD Index used throughout the research (see section 3.5.4.1). The results are shown in Table 56.



**Table 56: 2007 to 2017 FLDs amount comparison (2)**

	<b>A</b>	<b>B</b>	<b>A+B</b>	<b>C</b>
<b>Co.</b>	<b>Total words after exclusion</b>	<b>Included words</b>	<b>Sum</b>	<b>Previous Results</b>
1	14.801	487	15.288	14.874
7	20.091	951	21.042	20.249
13	29.655	1.218	30.873	29.848
14	51.839	1.607	53.446	52.062
15	50.419	1.797	52.216	50.672
16	41.222	1.359	42.581	41.456
17	30.804	791	31.595	30.989
18	20.316	897	21.213	20.438
21	36.367	986	37.353	36.478
22	24.349	959	25.308	24.519
25	22.476	850	23.326	22.636
28	27.185	1.066	28.251	27.331
31	42.913	1.832	44.745	43.198
33	21.622	813	22.435	21.769
34	68.337	2.079	70.416	68.595
42	39.017	1.474	40.491	39.275
43	63.323	2.393	65.716	63.711
44	23.777	632	24.409	23.926
49	32.430	1.205	33.635	32.653
50	30.523	1.136	31.659	30.728
51	35.217	1.627	36.844	35.456
52	46.473	1.181	47.654	46.700
53	31.187	1.389	32.576	31.445
56	32.901	1.585	34.486	33.217
57	11.898	468	12.366	11.993
58	40.229	1.503	41.732	40.586
60	49.952	1.804	51.756	50.192
61	45.129	1.818	46.947	45.429
62	22.272	619	22.891	22.327
63	33.801	1.521	35.322	34.069
65	29.741	1.100	30.841	29.915
71	41.334	1.395	42.729	41.679
74	34.267	1.067	35.334	34.380
75	48.560	1.350	49.910	48.859
79	24.644	710	25.354	24.784
83	37.011	1.458	38.469	37.304
85	20.988	811	21.799	21.095
86	39.060	2.047	41.107	39.291
90	19.359	785	20.144	19.533
92	44.244	1.603	45.847	44.504
94	31.842	1.046	32.888	32.006
95	51.283	1.622	52.905	51.598
97	37.488	1.449	38.937	37.729
100	42.310	1.511	43.821	42.564
103	23.847	835	24.682	24.013
106	19.125	920	20.045	19.304
107	17.190	656	17.846	17.261
109	24.666	988	25.654	24.815
111	18.376	613	18.989	18.427
112	27.710	1.118	28.828	27.883
113	30.578	778	31.356	30.711
117	38.077	1.292	39.369	38.306
120	28.701	1.094	29.795	28.875
121	65.645	2.372	68.017	65.933
122	24.095	1.043	25.138	24.290
128	23.446	1.071	24.517	23.552
133	39.745	1.557	41.302	40.002
136	31.141	982	32.123	31.310

	<b>A</b>	<b>B</b>	<b>A+B</b>	<b>C</b>
<b>Co.</b>	<b>Total words after exclusion</b>	<b>Included words</b>	<b>Sum</b>	<b>Previous Results</b>
138	28.374	873	29.247	28.514
145	33.719	1.238	34.957	33.962
146	61.589	2.307	63.896	61.874
148	18.342	791	19.133	18.488
150	39.635	1.332	40.967	39.764
152	22.894	885	23.779	23.104
155	22.403	710	23.113	22.484
<b>Sum</b>	<b>2.181.954</b>	<b>79.456</b>	<b>2.261.410</b>	<b>2.194.934</b>

In a further step, the results of the new index with the old index are analysed. In the case where a high correlation is found, changes to the index do not have any significant impact on the regression and correlation analysis conducted in section 4.4. The SPSS results prove a perfect positive correlation (1,000), hence, it can be expected, that changes to the FLD Index does not affect the results detailed in section 4.4. Convergent validity (a type of construct validity) as described by Heale and Twycross (2015) is present because the "revised" FLD Index as well as the disclosure scores of the "originally used" FLD Index are highly correlated.

Nevertheless, this research intends to clarify whether the revised index affects the correlation and regression results on the impact of FLDs on MV as well as the impact of KPIs on MV. The basis for this comparison is the 3-year average period 2012 to 2017 (see section 4.4.2.1). The correlation results are shown in Table 57.

**Table 57:** Correlation results revised FLD Index (2)

<b>Correlation 3-year AVG 2012 - 2017 (revised FLD Index)</b>		<b>FLDs Growth</b>	<b>before FLDs Growth</b>
Asset Growth	Pearson Correlation	,184**	,185**
	Sig. (2-tailed)	0,000	0,000
Asset Turnover Ratio	Pearson Correlation	-0,007	-0,006
	Sig. (2-tailed)	0,892	0,91
Cash Flow Return Margin	Pearson Correlation	-0,002	-0,002
	Sig. (2-tailed)	0,970	0,976
Cash Flow Return on Equity	Pearson Correlation	0,026	0,026
	Sig. (2-tailed)	0,606	0,603
Cash Ratio	Pearson Correlation	-0,070	-0,065
	Sig. (2-tailed)	0,168	0,197
Current Ratio	Pearson Correlation	-0,041	-0,038
	Sig. (2-tailed)	0,420	0,451
Debt to Equity Ratio	Pearson Correlation	0,021	0,021
	Sig. (2-tailed)	0,675	0,685
EBIT Turnover Yield	Pearson Correlation	-0,030	-0,030
	Sig. (2-tailed)	0,561	0,560
EBITDA Turnover Yield	Pearson Correlation	-0,011	-0,011
	Sig. (2-tailed)	0,827	0,823
Equity Ratio	Pearson Correlation	0,036	0,037
	Sig. (2-tailed)	0,481	0,463
Equity to Long-Term Assets	Pearson Correlation	0,095	0,096
	Sig. (2-tailed)	0,062	0,058
Interest Coverage Ratio	Pearson Correlation	-0,079	-0,075
	Sig. (2-tailed)	0,118	0,137
MV	Pearson Correlation	,185**	,187**
	Sig. (2-tailed)	0,000	0,000
Profit Growth	Pearson Correlation	-0,050	-0,051
	Sig. (2-tailed)	0,325	0,313
Quick Ratio	Pearson Correlation	-0,061	-0,058
	Sig. (2-tailed)	0,229	0,250
Return on Assets	Pearson Correlation	-0,075	-0,077
	Sig. (2-tailed)	0,141	0,129
Return on Capital Employed	Pearson Correlation	-0,092	-0,090
	Sig. (2-tailed)	0,033	0,035
Return on Equity	Pearson Correlation	-0,055	-0,058
	Sig. (2-tailed)	0,279	0,257
Return on Sales	Pearson Correlation	0,013	0,013
	Sig. (2-tailed)	0,797	0,804
Sales Growth	Pearson Correlation	0,092	0,092
	Sig. (2-tailed)	0,071	0,068
** Correlation is significant at the 0.01 level (2-tailed)			
* Correlation is significant at the 0.05 level (2-tailed)			

Source: Data output from SPSS

The results reveal that one KPI as well as MV are significantly related to FLDs. Concerning the number of significant variables, the results are the same when compared to the results in section 4.4.3.1 (results without adjusting the list of forward looking adjectives). Further, multiple R of the regression model (impact of KPIs and FLDs on MV) remains at 0,664 (compared to section 4.4.2.1 Table 34), the unstandardised coefficient of

the FLD variable remains at 0,405 (compared to section 4.4.2.1 Table 34), and the P value remains at 0,004 (compared to section 4.4.2.1 Table 34).

These mentioned changes can be neglected and hence, changes to the FLD Index concerning the removal of "is" and "are" in front of an adjective, does not affect the results of the research conducted in the current thesis. These results strengthen the construct validity as the results remain the same. Critics such as the subjectivity in judgement by constructing an index as mentioned by Marston & Shrives (1991) are certainly diminished.

## **4.5 Critical Discussion**

### **4.5.1 Discussion of the correlation analysis results**

Looking back at the results of the correlation analysis, several findings need to be summarised and discussed in the light of existing literature. Firstly, the correlation results for both analysis methods single and average values indicate that the relationship between FLDs and MV is not influenced by removing one word such as "may" from the index. Such a finding is new to existing literature. This finding strengthens the construct validity of the FLD Index, even if some words of the index are questionable.

Secondly, the current study needed to consider the time effect, in other words the time investors take to react to annual report publications (Abarbanell & Bushee, 1997). The results indicate that the end of March is the appropriate choice for evaluating the relationship between KPIs, FLDs and MV. The sensitivity analysis of the date did not provide evidence that choosing the end of April as the point in time strengthens the relationship between KPIs, FLDs and MV. This finding adds value to previous research, which was mixed in choosing the determination date. For example, Hussainey (2004) used the end of April as the determination date, while Ou & Penman (1989) used the first of April as the determination date.

Thirdly, increasing the sample years from 8 to 10 years does not add further value to the present study. Previous research varies regarding the

sample years. For example, Wang & Hussainey (2013) used a period of 12 years, Hassanein & Hussainey (2015) used 7 years and Aly et al. (2013) used 3 years. For this thesis the choice of a period of 8 years seemed to be best suited to answer the research objectives and is still in the range of other studies in this particular field of knowledge. The extension of the data period may not add value due to the effects of the financial crisis.

Fourthly, the use of 3-year average values is new to this particular research area, which tests the impact of KPIs and FLDs on MV. The comparison of the correlation results between the use of single against average values reveals in Table 55 that overall correlation is strengthened between KPIs and market value as well as between FLDs and the MV while using a 3-year average evaluation method. Table 58 is based on the results of section 4.4.1.1 and 4.4.2.1, whereas the dependent variable is MV.

**Table 58:** Correlation Single versus Average Values – sorted by value

Independent Variables	Pearson Correlation 3-Year AVG 2012-2017		Pearson Correlation 2010-2017	
Asset Growth	0,426	**	0,182	**
Sales Growth	0,411	**	0,335	**
Equity Ratio	0,252	**	0,045	
Return on Capital Employed	0,250	**	0,113	*
Equity to Long-Term Assets	0,240	**	0,036	
EBITDA Turnover Yield	0,233	**	0,152	**
Profit Growth	0,218	**	0,235	**
Current Ratio	0,209	**	0,019	
Interest Coverage Ratio	0,203	**	0,066	
Return on Assets	0,203	**	0,216	**
Quick Ratio	0,200	**	0,014	
FLDs Growth	0,187	**	0,075	
Return on Sales	0,185	**	0,198	**
Return on Equity	0,162	**	0,216	**
Cash Ratio	0,155	**	0,003	
Debt to Equity Ratio	-0,148	**	-0,050	
EBIT Turnover Yield	0,144	**	0,119	**
Asset Turnover Ratio	0,118	*	0,190	**
Cash Flow Return Margin	0,034		-0,009	
Cash Flow Return on Equity	0,032		-0,028	
** Correlation is significant at the 0.01 level (2-tailed).				
* Correlation is significant at the 0.05 level (2-tailed).				

Source: Data output from SPSS

The number of significant variables increases from 10 to 18. It appears that using 3-year average values is the best solution to analyse the impact of KPIs and FLIDs on MV.

Fifthly, the overall results of correlation confirm the existing studies mentioned in section 2.5.1; that is KPIs impact MV. Hypothesis 1 can, therefore, be rejected. Only cash flow return margin and cash flow return on equity are not significant. Lau et al. (2002) were also not able to prove any significance between a cash flow ratio expressed by cash flow to price ratio and MV expressed by stock return. Only the cash flow ratio, EBITDA turnover yield is found to be significantly related to MV. However, as Delen et al. (2013) mentioned, this ratio belongs rather to the profitability category. Therefore, according to the present results it is questionable if cash flow ratios are truly value relevant.

Sixthly, the correlation analysis has unveiled a significant impact of FLDs on MV, but only when using a 3-year average evaluation method. In contrast to previous studies, where profit relevant FLDs (Hussainey, 2004) or FLDs of well-governed firms (Wang & Hussainey, 2013) are found to significantly affect MV, the current research claims that there is a significant impact of FLDs in general on MV. In general means that the current research has not distinguished between distinct types of FLDs. Moreover, MV is determined by the market capitalisation ratio and not as a "mixed ratio" such as the TobinsQ ratio that consists of fundamental as well as market value components. Consequently, hypothesis 3 as mentioned in section 2.9 can be rejected.

Seventhly, an association between FLDs and KPIs has been identified through correlation. This is in line with previous research such as that of Hassanein & Hussainey (2015) or Al-Najjar and Abed (2014). Despite both examples of research studies using a KPI as merely a control variable, they nevertheless, indicated the significant relationship between profitability measures and FLDs. The question is at that point about the direction of the relationship. Do KPIs impact FLDs or FLDs impact KPIs? The research conducted two different correlations. The first was to identify the impact of KPIs on FLDs. According to the correlation results, asset growth (growth/performance ratio) is significantly positively related to FLDs at level 0,01 and return on capital employed (profitability) is significantly negatively

related to FLDs at level 0,05. Therefore, a change in KPIs does have an impact on a change in FLDs. However, it could have been expected to find more significantly related KPIs, not only profitability measures such as return on capital employed and asset growth. For example, Al-AI-Akra (2012) proved the significant relation between leverage ratios as a control variable and voluntary disclosures in general (not FLDs in particular). Al-Najjar and Abed (2014) found a significant association between FLDs and the control variable operating cash flow to asset ratio. Unfortunately, such findings could not be confirmed. Moreover, the basic assumption of signalling theory that companies with better profitability are more likely to disclose more information (Watson et al., 2002), cannot be confirmed as the profitability ratio return on capital employed was significant but negatively related to FLDs.

The second correlation concerning the relation between FLDs and KPIs was on the impact of a change in FLDs on a one year ahead change in KPIs. This thesis has shown that FLDs anticipate the direction of one year ahead KPI changes. Those ratios anticipated by FLDs are: return on capital employed (profitability), interest coverage ratio (solvency) and equity to long-term assets (financial structure). However, the implication mentioned in section 2.9 that an increase of voluntary disclosures might lead to better profitability in the nearby future, is according the results of section 4.4.3.2 questionable as the profitability ratio return on capital employed is negatively related to FLDs.

Nevertheless, results shown in section 4.4.3 imply that KPIs impact FLDs as well as FLDs impact one year ahead KPIs and both hypotheses 2a and 2b as mentioned in section 2.9 can be rejected.

#### 4.5.2 Discussion of regression results

Before starting with the discussion, an overview of the results of the current research should be presented. It should demonstrate which variable has been found significant, and in which regression analysis the significance has been uncovered. It is assumed that in the case where a variable is found to be significant in various regression analyses, reliability for the proof of significance is strengthened.

**Table 59:** Synthesis of significant variables

Variable	Regression Analysis
Asset-Turnover Ratio	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Sensitivity of MV Timeliness)
	3-Year AVG 2012 - 2017 (Combined KPI*FLDs ratio)
Cash Ratio	3-Year AVG 2010 - 2017
Cash Flow Return on Equity	3-Year AVG 2012 - 2017 (Sensitivity of MV Timeliness)
Current Ratio	3-Year AVG 2010 - 2017
	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Sensitivity of MV Timeliness)
	Year 2008 - 2017
	Year 2010 - 2017
	Year 2010 - 2017 (Sensitivity of Regression Formula)
	Year 2010 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Combined KPI*FLDs ratio)
Debt to Equity Ratio	3-Year AVG 2010 - 2017
	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Sensitivity of MV Timeliness)
	Year 2008 - 2017
	Year 2010 - 2017
	Year 2010 - 2017 (Sensitivity of Regression Formula)
	Year 2010 - 2017 (Sensitivity of FLD Index)
	Year 2010 - 2017 (Sensitivity of MV Timeliness)
EBITDA Turnover Yield	3-Year AVG 2010 - 2017
	Year 2008 - 2017
	Year 2010 - 2017
	Year 2010 - 2017 (Sensitivity of Regression Formula)
	Year 2010 - 2017 (Sensitivity of FLD Index)
Equity Ratio	3-Year AVG 2010 - 2017
	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Sensitivity of MV Timeliness)
	Year 2008 - 2017
	Year 2010 - 2017
	Year 2010 - 2017 (Sensitivity of Regression Formula)
	Year 2010 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Combined KPI*FLDs ratio)



Variable	Regression Analysis
FLDs Growth	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Sensitivity of MV Timeliness)
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
Interest Coverage Ratio	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	Years 2010 - 2017 (Sensitivity of MV Timeliness)
Profit Growth	3-Year AVG 2010 - 2017 (Sensitivity of Data Amount)
	Years 2010 - 2017 (Sensitivity of MV Timeliness)
Quick Ratio	Years 2008 - 2017 (Sensitivity of Data Amount)
Return on Assets	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	Years 2008 - 2017 (Sensitivity of Data Amount)
	Years 2010 - 2017
	Years 2010 - 2017 (Sensitivity of Regression Formula)
	Years 2010 - 2017 (Sensitivity of FLD Index)
Years 2010 - 2017 (Sensitivity of MV Timeliness)	
Return on Capital Employed	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Sensitivity of MV Timeliness)
	Years 2008 - 2017 (Sensitivity of Data Amount)
	3-Year AVG 2012 - 2017 (Combined KPI*FLDs ratio)
Return on Equity	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
Return on Sales	3-Year AVG 2010 - 2017 (Sensitivity of Data Amount)
	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	Years 2008 - 2017 (Sensitivity of Data Amount)
Sales Growth	3-Year AVG 2010 - 2017 (Sensitivity of Data Amount)
	3-Year AVG 2012 - 2017
	3-Year AVG 2012 - 2017 (Sensitivity of Regression Formula)
	3-Year AVG 2012 - 2017 (Sensitivity of FLD Index)
	3-Year AVG 2012 - 2017 (Sensitivity of MV Timeliness)
	Years 2008 - 2017 (Sensitivity of Data Amount)
	Years 2010 - 2017
	Years 2010 - 2017 (Sensitivity of Regression Formula)
	Years 2010 - 2017 (Sensitivity of FLD Index)
Years 2010 - 2017 (Sensitivity of MV Timeliness)	
3-Year AVG 2012 - 2017 (Combined KPI*FLDs ratio)	

The regression analysis results show a significance of 16 variables, including FLDs. Hence, KPIs and FLDs impact the MV of a company, which leads to the rejection of hypothesis 1 and 3 (see section 2.9). Besides, regression analysis unveils that five combined ratios impact the MV as well. The result indicates the rejection of hypothesis 4 (see section 2.9). However, the number of significant KPIs is lower when comparing the regression with correlation analysis. Correlation analysis has uncovered a significance of 18 variables (of which one is significant at level 0,05). The variables of asset growth, cash flow return margin and EBIT turnover yield

and equity to long-term assets have not been found to be significant according to the regression analysis even though correlation analysis indicates a significance at level 0,01. Furthermore, the variable asset turnover ratio has not been found significant within the regression formula, although correlation analysis indicates a significance at level 0,05. Cash flow return on equity, in contrast, has been found significant within the regression analysis, despite the fact that correlation does not indicate any significance. The difficulty is due to interdependencies among variables; that is KPIs and FLDs do not only impact MV, but also each other. As discussed in chapter 4.4.4, the regression results imply that KPIs impact FLDs and FLDs impact one year ahead KPIs, which leads to a rejection of hypotheses 2a and 2b (section 2.9).

The fact that not only FLDs and KPIs, but also that KPIs affects KPIs as well, is however, not a problem as is discussed in section 4.5. Nevertheless, it shows that only the mix of variables affects and explains MV. The challenge is not only to prove the impact of FLDs on MV, but also to find the right mix of significant KPIs that impact MV.

To do this a closer look at the multiple R value of each regression analysis was taken. The highest multiple R (0,664) was achieved through 3-Year AVG 2012 to 2017 "enter" regression analysis (all values are included). This is in line with the argument in section 4.4.1, where the 3-year average method was claimed as superior in comparison to single value evaluation. In a second step, the findings are triangulated with the help of the stepwise regression tool SPSS in order to prove construct validity. The stepwise regression was applied to the 3-year AVG 2012 to 2017 data as well. The comparison of both regression analyses provide evidence for the essential variables even though they differ slightly in their results as shown in Table 60.

**Table 60:** Occurrence of significant variables

Variable	Total Times found to be significant	Significance of combined KPI*FLDs ratio	3- Year AVG 2012 to 2017	SPSS stepwise regression 3-Year AVG 2012 to 2017
Debt to Equity Ratio	10		Significant	Included
Sales Growth	10	Yes	Significant	Included
Current Ratio	9	Yes	Significant	Included
Equity Ratio	9	Yes	Significant	Included
Return on Assets	8		Significant	
EBITDA Turnover Yield	5			
Return on Capital Employed	5	Yes	Significant	Included
Return on Sales	5		Significant	Included
FLDs Growth	3		Significant	Included
Return on Equity	3		Significant	
Asset Turnover Ratio	3	Yes	Significant	Included
Interest Coverage Ratio	2			Included
Profit Growth	2			
Cash Ratio	1			
Quick Ratio	1			
Cash Flow Return on Equity	1			
Asset Growth	0			
Equity to Long-Term Assets	0			
EBIT Turnover Yield	0			
Cash Flow Return Margin	0			

The matching KPIs of the 3-year AVG 2012 to 2017 regression analysis (see section 4.4.2) and the stepwise regression analysis (see section 4.4.2.2) are return on capital employed and return on sales (profitability indicator), current ratio (liquidity indicator), debt to equity ratio (solvency indicator), equity ratio (financial structure), asset turnover ratio (efficiency indicator), sales growth (growth indicator) and FLDs growth (FLDs indicator). The research implies that these eight values should at least be part of the regression formula that determines the impact of KPIs and FLDs on MV. Among these matching KPIs, the combined ratios "Equity Ratio\*FLDs", "Return on Capital Employed\*FLDs", "Current Ratio\*FLDs", "Asset Turnover Ratio\*FLDs" and "Sales Growth\*FLDs" are significant according to regression analysis.

The KPIs debt to equity ratio (solvency indicator) and sales growth (growth indicator) stand out as they have been found significant within all regression

analysis conducted within this research paper. Even the combined sales growth\*FLDs ratio is found to be significant.

Additionally, the current research suggests including the two variables, return on assets (profitability indicator) and return on equity (profitability indicator). Their significance is proved through 3-year AVG 2012 to 2017 regression analysis. Despite it has not been proven significant through stepwise regression analysis, the significance of these KPIs has, however, been proved by previous research. For example, Hassanein & Hussainey (2015) proved the significance of the KPI return on equity while Al-Najjar and Abed (2014) showed the significance for the KPI return on assets, yet both used these KPIs as control variables. Further, the interest coverage ratio shall also be included as important KPI, also only the stepwise regression unveiled their significance.

#### **4.6 Addressing the Endogeneity Problem**

The use of the regression formula, used in section 4.4, might lead to the endogeneity problem. The current research tries to provide explanations in this section about how the problem has been carefully addressed:

First of all, there is the possibility that necessary variables are omitted (Gippel et al., 2015). This is not the case for the current research. The current regression formula includes 21 variables (19 KPIs and FLDs as independent variables and MV as the dependent variable). The stepwise regression analysis (section 4.4.2.2) shows a multiple R of 0,651, which is almost the same as shown by the 3-Year AVG 2012 – 2017 regression analysis (section 4.4.2.1), which states a multiple R of 0,664. Despite the fact that the 3-Year AVG 2012 to 2017 regression analysis included all of the variables mentioned above, multiple R does not differ. This fact implies that the regression formula should not be overloaded with variables.

The second problem that might arise is either due to errors in measurement or due to incorrect proxies (Gippel et al., 2015). Concerning the current regression formula, the mathematical unit of MV is EUR, that of

KPI is in percentage, and the one of FLD is in number. Previous researchers mention this problem and have different approaches to solve it. The mathematical issue is addressed by using growth rates (change in percentage) in order to solve the problem of the mathematical unit. The mathematical unit "growth" can be either negative or positive. The use of growth rates is based on ideas from Hassanein & Hussainey (2015).

Thirdly, interdependencies between variables can occur (Gippel et al., 2015). Besides the interrelationships between FLDs and KPIs mentioned in section 4.4.3, there are interdependencies between KPIs. In section 4.5.2 correlation results between KPIs based on the 3-Year AVG 2012 to 2017 Data are presented. The results are necessary for the current research to understand that each KPI and FLDs not only impact MV, but also KPIs affect KPIs as well. Using single KPIs or the variable FLD alone, multiple R would be lower than 0,664. Only asset growth with a correlation value of 0,426 and sales growth with a correlation value of 0,4111 would matter using single value regression analysis, but results would offer only a "low" efficient capital market. It is, according to the results, necessary to include different KPIs and, for that purpose, interdependencies have to be accepted. This fact is not a problem, yet it shows that only the mix of variables affects and explains MV. To provide evidence that endogeneity does not cause problems, the following section 4.5.1 presents the Durbin Watson Test.

#### **4.6.1 Durbin Watson Test**

To test whether endogeneity causes any problems as described in section 4.5, the Durbin Watson ratio has been applied. The ratio can vary between 0 and 4 for large samples (Savin & White, 1977). The Durbin Watson ratio is calculated only for the 3-year AVG 2012 to 2017 analysis using SPSS as the software tool. This regression analysis unveils the highest multiple R (0,664) and seems to provide, among all mentioned regression analyses, the most reliable results. For one reason, it is more reliable than the results of the single value regression analysis 2010 to 2017, as average values flatten emotional and psychological factors.

Moreover, extreme market reactions (like the financial crisis 2008/2009) were not present between 2010 and to 2017.

The Durbin Watson ratio for regression analysis 3-year AVG 2012 to 2017 (covering years 2010 to 2017 as described in section 3.4.3.2) counts to 1,754, which is close to the value of 2. If the value is two, no autocorrelation is present (Poddig et al., 2008). According to the ideas and statements of Poddig et al. (2008), the value of 1,753 is within range, where autocorrelation can be claimed to be non-existent. Hence, there is evidence that the regression analysis does not inherit any endogeneity problem.

#### **4.7 Summary**

Due to the results of section 4.3 the 3-year average method could be claimed as superior in comparison to single value evaluation. In particular, the correlation and regression results based on the 3-year AVG 2012 to 2017 data proved not only the highest number of significant variables but also the highest value multiple R (0,665) among all conducted regression analysis. Moreover, choosing the end of March as the point in time to determine MV enhances the results of the correlation and regression between the variables KPIs, FLDs and MV. Triangulation of the results is reached through the help of the stepwise regression analysis tool of SPSS. Comparing the results of the 3-year AVG 2012 to 2017 regression as well as the SPSS stepwise regression analysis reveals a matching of eight values. The matching KPIs of both regression analysis, the 3-year AVG 2012 to 2017 (see section 4.4.2) and the stepwise regression analysis (see section 4.4.2.2) are return on capital employed and return on sales (profitability indicator), current ratio (liquidity indicator), debt to equity ratio (solvency indicator), equity ratio (financial structure), asset turnover ratio (efficiency), sales growth (growth indicator) and FLDs (FLD indicator). The research implies that these eight values should at least be part of the regression formula in order to determine the impact of KPIs and FLDs on MV most accurately. Additionally, the study suggests including the two

variables, return on assets (profitability Indicator) and return on equity (profitability Indicator), despite the fact that their significance is proved through 3-year AVG 2012 to 2017 regression analysis, but not through stepwise regression analysis. Looking into previous research significance of these KPIs has, however, been proved. For example, Hassanein & Hussainey (2015) proved the significance of the KPI return on equity while Al-Najjar and Abed (2014) stated the significance for the KPI return on assets using both ratios as controlling variables. The KPI interest coverage ratio has only found to be significant by the stepwise regression analysis, nevertheless should be labelled as important KPI as well. The significance of the KPIs asset growth (growth indicator), equity to long-term assets (financial structure) as well as EBIT turnover yield (profitability indicator) could not be found during any regression analysis. The variables cash flow return on equity and cash flow return margin (cash flow indicator), as well as quick ratio and cash ratio (liquidity), have been found to be significant, but only one time (ten regression analyses conducted in total). Table 61 summarises these findings.

**Table 61:** Summary of Results

	Significant related to			Ten regression analysis' conducted in total (except stepwise regression)	Most significant regression analysis according to multiple R	Triangulation of results concerning the most significant regression analysis	Signif. proved by previous research
	KPIs	FLDs	MV	Times found to be significant	3- Year AVG 2012 to 2017	SPSS stepwise regression	Various regression analysis
Debt to Equity Ratio	8		1	10	x	x	Elshandidy (2015)
Sales Growth	12		1	10	x	x	Hassanein & Hussainey (2015)
Current Ratio	9		1	9	x	x	
Equity Ratio	13		1	9	x	x	
Return on Assets	11		1	8	x		Al-Najjar & Abed (2014)
EBITDA Turnover Yield	15		1	5			

	Significant related to			Ten regression analysis' conducted in total (except stepwise regression)	Most significant regression analysis according to multiple R	Triangulation of results concerning the most significant regression analysis	Signif. proved by previous research
	KPIs	FLDs	MV	Times found to be significant	3- Year AVG 2012 to 2017	SPSS stepwise regression	Various regression analysis
Return on Capital Employed	16	1	1	5	x	x	
Return on Sales	7		1	5	x	x	
FLDs Growth	2		1	3	x	x	
Asset-Turnover Ratio	11		1	3	x	x	
Return on Equity	9		1	3	x		Hassanein & Hussainey (2015) and Elshandidy (2015)
Interest Coverage Ratio	11		1	2		x	
Profit Growth	11		1	2			
Cash Flow Return on Equity	1			1			
Cash Ratio	9		1	1			
Quick Ratio	9		1	1			
Cash Flow Return Margin	5			0			
Asset Growth	5	1	1	0			Moumen et al. (2016) and Hussainey (2004)
EBIT Turnover Yield	8		1	0			
Equity to Long-Term Assets	8		1	0			
<b>MV</b>	<b>17</b>	<b>1</b>					
<b>x = significant variables</b>							

As well as discussing the significance of KPIs and FLDs it has to be stated that correlation results are not sensitive to minor changes such as removing the word "may" from the FLD Index. In addition, changes to the FLD Index concerning the adding or removal of "is" and "are" in front of an



adjective, does not affect the results of the research conducted in the current thesis. These results strengthen validity and reliability, as the conclusions remain the same, and criticisms, for example, the subjectivity in judgement by constructing an index (Marston & Shrives, 1991) are certainly diminished.

## **Chapter 5: Conclusion**

### **5.1 Overview**

The purpose of this chapter is to conclude the present research project. In section 5.2 the contribution of knowledge of the current research is discussed. In addition to addressing the research objectives, several additional and valuable insights are mentioned. Next, in section 5.3, the implications of the findings are presented. Section 5.4 addresses the limitation of the research, while in section 5.5, possible future studies are discussed.

### **5.2 Contribution to knowledge**

The objectives of this thesis have been to examine the impact of KPIs (accounting indicators) on MV, to examine the interdependencies between FLDs and KPIs, and to assess the impact of FLD on MV. Based on these objectives the first null hypothesis of the current research has been that changes in KPIs do not have any significant impact upon the development of MV. The second null hypothesis has been that (a) changes in KPIs do not have any impact on changes in FLDs and (b) changes in FLDs do not have any significant impact upon one year ahead changes in KPIs. The third and hypothesis was that changes in FLDs do not have any significant impact on changes in MV. The fourth hypothesis was that the combined changes in KPIs and FLDs do not impact significantly MV. All null hypotheses are rejected, and therefore, the current research indicates an efficient and thus functioning German stock market covering the indices DAX, MDAX, SDAX and TecDAX. It proves thereby the assumption of Fama, who according to Campbell (2014) believes that economic models can predict market prices. The analysis of the present study demonstrates the impact of KPIs and FLDs on MV as well as the impact of KPIs on FLDs and FLDs on year ahead KPIs. Regression analysis proves that KPIs and FLDs are medium correlated with MV as multiple R counts to 0,664 (3-year AVG 2012 to 2017

regression analysis – see section 4.4.2.1). In the context of capital market efficiency theory, there is evidence of semi-strong efficiency. This means that MV reflects not only historically based information such as KPIs, but also reflects current, publicly accessible information such as FLDs.

In addition to addressing the research objectives of the current research, several additional findings are suggested in the following. First, the use of three-year average values is best suited as the significance of the relationship between KPIs, FLDs and MV increases. The use of average values diminishes influential external factors such as emotional reactions of market participants. Correlation analysis in section 4.4.2.1 indicates not only that the number of significant KPIs increases from 10 to 17, but FLDs are also found to be significant using average value calculation method. Moreover, FLDs does have a positive impact on overall regression, as, without this variable, the multiple R of the regression analysis would decrease to 0,655. This decrease might not be seen as a substantial impact, but still, it influences the quality of regression.

Furthermore, it has to be mentioned that removing the word "may" does not affect the overall regression between KPIs, FLDs and MV. The results of both, the correlation as well as regression analysis unveil that a change in the FLD Index is not sensitive to minor changes such as removing or adding one word. Moreover, changes on the FLD Index concerning the adding or removal of "is" and "are" in front of an adjective does not affect results of the research conducted in the current thesis. Rather, the results strengthen construct validity as the results remain the same. Criticism about the subjectivity in judgement, while constructing an index (Marston & Shrives, 1991) are certainly diminished.

As a further finding and contribution to knowledge, it has to be stated that the MV needs to be determined at the end of March of each year. This date is based upon the publication dates of the annual reports (see Appendix A). Determining the MV at the end of March leads to higher correlation values and a higher multiple R. For example, multiple R counts to 0,664 (regression analysis 3-year AVG 2012 to 2017) when used for MV

determination values at the end of March. Multiple R is down to 0,651 while using values at the end of April to determine MV. In addition, changing the MV determination date from March to April leads to a decrease of significant variables. Regression analysis unveils a significance of 9 KPIs in the case where MV is determined at the end of March, while in the case where MV is determined at the end of April, regression analysis unveils the significance of only 7 KPIs. Therefore, the ideas of Chambers & Penman (1984) that stock prices react timely around the announcement date of corporate reporting can be confirmed. Most companies publish their annual report in March (see Appendix A), and the current research proves that the value impact of information from the annual report occurs within the same month around the same time as the announcement.

Moreover, a single variable, neither a KPI nor the indicator FLD is medium correlated with MV. The present research shows that only the mix of variables affects and explains MV. Using single KPIs or FLDs alone, multiple R would be lower than 0,664. Only the KPIs asset growth with a correlation value of 0,426 and sales growth with a correlation value of 0,411 indicate at least a "low" correlation to MV. Therefore, it requires the inclusion of several KPIs as well as the variable "FLDs" to achieve a multiple R higher than 0,5, which in turn implies a medium correlation. The problem is to find the "perfect" mix of KPIs and FLDs that not only impact MV but give the highest possible multiple R results.

In order to find the perfect mix several correlation and regression analyses have been conducted throughout the research. As mentioned in section 4.6 and in section 4.4.2.2, the "enter" regression analysis based on the 3-year AVG 2012 to 2017 data, in which MV is determined at the end of March, proves the highest possible multiple R value (0,664) as well as the highest number of significant KPIs – in total nine different KPIs. An extension of the data period by 2 years does not add further value to correlation and regression analysis, as multiple R slightly decreases and FLDs become insignificant (see section 4.4.2.1.4). It is assumed that regression analysis based on the 3-year AVG 2010 to 2017 data has been

affected by the financial crisis, however, this circumstance is not conclusively clarified and needs to be addressed by future research.

According to the regression analysis based on data of the 3-year AVG 2012 to 2017, not only changes in FLDs, but also changes of the KPIs return on capital employed (profitability indicator), return on assets (profitability indicator), return on equity (profitability indicator), return on sales (profitability indicator), current ratio (liquidity indicator), debt to equity ratio (solvency indicator), equity ratio (financial structure indicator), asset turnover ratio (efficiency indicator), sales growth (growth indicator), impact changes in MV (see section 4.4.2.1).

However, it is still problematic to claim these KPIs in addition to FLDs as the "perfect mix" to determine the MV development. It is clear that the number of significant KPIs according the regression analysis is different compared to the results of the correlation analysis (see section 4.4.2.1). Correlation analysis proves the significance of 17 different KPIs, while the regression analysis shows the significance of 9 different KPIs. Interdependencies among variables are responsible for the fact that the number of significant KPIs indicated by regression analysis differs from the results of the correlation analysis. The fact that not only FLDs and KPIs affect each other, but also KPIs affect other KPIs, is however, not a problem as implied by the Durbin Watson Test, which was conducted for the 3-year AVG 2012 to 2017 regression analysis. Nevertheless, due to these interdependencies it is still difficult to find and confirm the perfect mix of KPIs and FLDs that impact MV.

Therefore, in order to test the stability of results and to approve the mix of variables suggested by the 3-year AVG 2012 to 2017 regression analysis, a stepwise regression analysis with the aid of the software tool SPSS has been conducted. The stepwise regression is naturally based on the 3-year AVG 2012 to 2017 data as this period, as well as the use of average values, has been proven to provide the highest multiple R and the highest number of KPIs. The matching KPIs of regression analysis, the 3-year AVG 2012 to 2017 (see chapter 4.4.2) and the stepwise regression analysis (see chapter

4.4.2.2) are return on capital employed and return on sales (profitability indicator), current ratio (liquidity indicator), debt to equity ratio (solvency indicator), equity ratio (financial structure), asset turnover ratio (efficiency indicator), sales growth (growth indicator) and FLDs (FLD indicator). The current study implies that these eight values shall at least be part of the regression formula that determines the impact of KPIs and FLDs on MV. Nevertheless, the inclusion of the two variables, return on assets (profitability indicator) and return on equity (profitability indicator) are also suggested by the present research. The significance of these two KPIs is proved through 3-year AVG 2012 to 2017 regression analysis, but not through stepwise regression analysis. Looking into previous research, the significance of these KPIs has, however, been proved. Hassanein & Hussainey (2015) proved the significance of the KPI return on equity while Al-Najjar and Abed (2014) proved the significance of the KPI return on assets. Further, the KPI interest coverage ratio can be labelled as essential as well. This ratio has been identified as significant by the stepwise regression analysis (see section 4.4.2.2).

The vehicle to present the findings of the current research to the academic world is primarily through publication in distinct journals that are relevant to the knowledge field of interest. For example, for the current research, the International Review of Financial Analysis Journal might be appropriate, as this journal published amongst other researches the work from Hassanein & Hussainey (2015), which can be regarded as closely related to the present study. While most academics use available research journals, the knowledge transfer between academia and practitioners is, however, more challenging. One appropriate way is to publish an article not in an academic relevant science journal, but within a practitioner-based journal, as recommended among others by Hughes et al. (2008). In such journals, the academic needs to find a way "...in which to translate relevant academic articles into practitioners language" (Hughes et al., 2008, p. 230). Concerning the current research, the list of KPIs capable of determining the fundamental value of a company needs to be presented to practitioners. It

is vital to know, which KPIs is used for the present study and to unveil the corresponding calculation method of each indicator. Besides, the importance of FLDs must be appropriately addressed to challenge and motivate managers to write more about the future development and future performance of a company, as FLDs represent another critical variable to determine the fundamental value of the firm that in turn impacts the MV.

### **5.3 Implications of the study**

Investors and companies require an efficient capital market where financial resources are allocated at a fair price (Malkiel & Fama, 1970). The challenge is not only to define measures able to calculate the fundamental value of a company, but to compare it with actual market prices to test market efficiency. Disclosure studies have tried to enhance traditional evaluation methods by adding FLDs to the valuation formula. Based on this practical implication, the purpose of this research was to analyse the impact of financial KPIs and FLDs on MV. The results of the present study have several implications, not only for future researchers, but also for regulatory bodies, companies, and investors.

Firstly, the analysis of the present study demonstrates that KPIs and FLDs impact the MV. It approves thereby studies such as those from Uyar and Kılıç (2012) that show that as well as KPIs, voluntary disclosures impact MV. Regression results imply thereby that the German stock market, comprising the stock indices DAX, MDAX, SDAX and TecDAX, are efficient. This is beneficial for both investors and companies, as ownership is allocated at fair prices. As mentioned, an efficient market lowers the cost of capital and will ease the resource allocation process as prices reflect the real value (Beattie, 2014; Malkiel & Fama, 1970).

Secondly, the results do not show a "perfect" correlation and hence, a "perfect" market efficiency. It is the assumption that emotional factors are present, which leads to irrational market development (Tuckett & Taffler, 2008). Exaggerations in an optimistic and pessimistic direction depending

on how investors react to information are present (Tuckett & Taffler, 2008). Due to such psychological effects as one primary reason, the use of a 3-year average method was required to minimise irrationalities. Through using the 3-year average method the current study unveils a multiple R of 0,664 (see section 4.4.2.1), which indicates a "medium multiple correlations" between KPIs, FLDs and MV.

Thirdly, to date, previous research has not provided an agreed list of which ratio or calculation method to use (Omair Alotaibi & Hussainey, 2016). Past research indicates little guidance on which mix of ratios is best able to forecast a company's future value development (Nissim & Penman, 2001). In addition, studies that aim to combine traditional fundamental value analysis and disclosure research have been limited concerning the number of defined KPIs. For example, Hassanein & Hussainey (2015) used in total seven different KPIs in their two different regression formulas.

This thesis adds value to existing knowledge by not only providing a sophisticated guidance on which KPIs are available and how to calculate them, but also by uncovering the significance of each KPI on MV. In total 19 KPIs covering profitability, liquidity, test of solvency, financial structure, efficiency, cash flow and growth ratios have been tested. The most significant KPIs are return on capital employed and return on sales as well as return on assets and return on equity (profitability indicators), current ratio (liquidity indicator), debt to equity ratio and interest coverage ratio (solvency indicators), equity ratio (financial structure) and sales growth ratio (growth indicator).

The list of KPIs can be used as guidance for future studies that investigate the impact of KPIs on MV. Moreover, it should enable investors to determine the fundamental value of the firm and analyse the impact on MV more accurately. Eventually, managers should draw attention to and revise the list of KPIs disclosed in annual reports. Elzahar et al. (2015) mentioned that the most important KPIs disclosed in annual reports are earnings per share, cash flow, revenue, operating profit, sales, operating margin, return on capital employed, dividends, return on sales and capital



expenditure. The current research demonstrates the necessity to disclose ratios such as the return on capital employed as well as return on sales (profitability indicators). It also proves the significance of the KPI sales growth. However, what stands out is that other KPIs such as current ratio (liquidity indicator), debt to equity ratio and interest coverage ratio (solvency indicators), equity ratio (financial structure) or even asset turnover ratio (efficiency indicator) are clearly not so often disclosed in an annual report, despite its significance for investors to draw a conclusion about MV development.

Fourthly, the results of this thesis imply that not only KPIs but also FLDs are essential for determining the fundamental value of a company. Concerning the evaluation of the variable FLD, the disclosure indices of Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) as well as Abed et al. (2016) are synthesised and extended to a list of 690 words through utilising grammatical terms as suggested by Hussainey (2004). Next, a computerised content analysis of annual reports uncovered how often each keyword had been used. It was the purpose to unveil those words that are mostly used in annual reports to indicate FLDs. The current research identifies the top 200 keywords indicating FLDs and counts how many times each keyword has been used. The top 100 keywords cover 85% of the total number of FLDs indicating words, while the top 101 to 200 keywords count to 11,06%. Reasonable doubt of inclusion and exclusion of words are addressed by sensitivity analysis in order to ensure construct validity of the index.

The findings will be beneficial for future research, as this study can be used as guidance and a starting point. The top 200 words identified in this current study should at least be part of future research, by anyone interested in this particular field of knowledge. Moreover, the significance of FLDs in determining the fundamental value challenge regulatory bodies to set not only mandatory standards, but also clear guidance on how to enhance forward-looking disclosures as well as offering incentives to follow their guidance. The current research is a step forward to unveil the problematic

relationship between KPIs, FLDs and MV and provide thereby, not only a list of significant KPIs that impact MV but also the proof of the inclusion of FLDs as a variable to determine the fundamental value of a firm that conversely impacts the MV.

#### **5.4 Limitations**

Despite the relevance of the research, there are naturally some limitations. The first limitation is that out of 160 companies belonging to any German stock indices (either DAX, MDAX, SDAX or TecDAX) 65 have been selected as stated in section 3.4.1.1. Companies could not be used for the current research due to the following reasons: market entry of the company is later than 2007, technical problems (for example, with the format of annual reports), financial service companies (comparability issues), the difference between fiscal and calendar year (comparability issues) as well as simple reasons such as missing data. The process to evaluate and select the final sample was a manual and time-consuming process.

Another limitation is that the data quality itself must be addressed. There are ongoing alterations of data. Either financial data is altered due to changes in accounting rules or stock data is altered due to (as one example) stock splitting. For example, stock data was downloaded for the current research from Osiris in May 2018. Company No. 95 has had, according to Osiris, a market value in March 2017 of 159,50 EUR per share. This value has been used for the current research. If a researcher, however, downloads data from Osiris in January 2020, data implies a market value of 158,80 EUR for March 2017. The present study has disregarded such minor changes.

It has also been challenging to provide the exact definition of KPI formulas. As described in chapter 3.2.5.4, there might be several ways to calculate a KPI. Further, the expression of the nominator and denominator used in theory might differ from practical terms. The researcher needs here to be very clear and less subjective as possible in the decision to calculate

the ratios in order to ensure validity and reliability. The limitation here is not to take all calculation possibilities into account.

A further limitation of this study is, of course, the choice of the geographical area. The current research has taken into consideration only those companies that are listed explicitly on a German stock market, either DAX, MDAX, SDAX or TecDAX. Other studies might extend this research to other geographical areas.

The next limitation is a critical point of debate. It concerns the construction of the FLD Index. The research unveils through a profound literature review the currently existing status of words that have been included within the FLD Index (see chapter 2.7.3). The FLD indices of Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) as well as Abed et al. (2016) have been synthesised and extended to a list of 690 words through utilising grammatical terms with the help of online tools such as [konjugator.reverso.net](http://konjugator.reverso.net), [dict.leo.org](http://dict.leo.org), [wordhippo.com](http://wordhippo.com) and [dictionary.cambridge.org](http://dictionary.cambridge.org). In other words, if a grammatical form of a FLD indicating keyword was missing in previous research, the current research added it to the FLD Index. Such construction of an index is a complicated matter as it involves subjective judgement and cannot be a precise scientific method (Marston & Shrives, 1991).

Concerning FLDs, another point of debate is whether the number of FLDs is an adequate representative figure for FLD quality. This issue continues to be a critical point discussed among researchers today (Beretta & Bozzolan, 2008). Only a manual check could prove the future intention of those FLDs. That is virtually impossible, due to the enormous amount of data to be analysed. Neuronal and artificial intelligence would be needed to enhance the overall measurement process.

As a final limitation, the described psychological and recurrent exaggerations in an optimistic and pessimistic direction, which depend on how investors react to information needs to be addressed. It is the assumption and belief that emotional factors such as those mentioned among others by Tuckett & Taffler (2008) are present, which in turn leads

to irrational market development. Such irrationalities are triggered in particular by psychological influences. The current research uses 3-year average values to minimize irrationalities. However, having tremendous effects as in the financial crisis in 2008 and 2009, the model of this study reaches its limits. Nevertheless, over- or underreactions of price development, often referred to as anomalies, do not mean the absence of an efficient market (Fama, 1998).

## **5.5 Future Implications**

The current research paper offers several directions for future research. First of all, the current research uses companies that are listed explicitly on a German stock market, either DAX, MDAX, SDAX or TecDAX. Past research has its geographical focus mainly on stock markets in the Middle East (Moumen et al., 2016), in the UK (Al-Najjar & Abed, 2014) or in the US (Laksmana et al., 2012). Elshandidy et al. (2015) as another example focussed on the UK and Germany. Nevertheless, there are still geographical areas such as the Australian stock market as just one example, which has not been used as a case so far.

Secondly, this thesis excludes financial companies because of comparability issues (see section 3.4.1). Further research could take a closer look at financial companies only. As the number of those companies listed on any German index is limited, possible future research needs to take financial companies of other stock markets into account as well, in order to increase the sample size.

Thirdly, possible future research could compare the different levels of efficiency between stock markets, for example, the efficiency of the New York Stock Exchange against the efficiency of the German Stock Indices. A sophisticated analysis between different stock markets would be of great interest.

Fourthly, external factors such as the described psychological and recurrent exaggerations in an optimistic and pessimistic direction, which

depend on how investors react to information have not been evaluated further in the current research, which offers possibilities for future studies.

Fifthly, the current research tries to demonstrate a sophisticated list of KPIs that can explain the development of MV. To select KPIs and to determine the calculation procedure is not easy as an agreed list was not provided by previous research. This thesis has followed suggestions from Krause & Arora (2010). Krause & Arora (2010) provide a sophisticated and holistic overview of KPIs as well as a proper cluster. To ensure validity, suggestions made by Delen et al. (2013) were also included. Delen et al. (2013) provide a similar overview and calculation approach to that of Krause & Arora (2010). However, different calculation possibilities of a specific KPI exist, as becomes evident in section 3.5.3. Moreover, there might be additional KPIs which have not been used for the current study. Future analyses should, therefore, take this work as a basis and extend it further so that an agreed list of KPIs that is acceptable to all users of annual reports can be established.

Sixthly, the challenge of interrelationships between KPIs and FLDs must be addressed further. For example, in section 4.4.1.1, the results demonstrate that the KPI return on capital employed (profitability indicator) is negatively related to FLDs. The underlying assumption of signalling theory is, however, that companies with better profitability are likely to disclose more information (Watson et al., 2002), which cannot be confirmed by the current thesis. Questionable is the algebraic sign, which is, however, not part of the current research objectives and needs, therefore, to be addressed by future research.

The final point to be mentioned concerns the measurement of FLDs. The current study suggests that a further study should include the variable readability of disclosures into the overall regression formula. This future implication is based upon the ideas of Laksmana et al. (2012), who used a readability score to determine the quality of compensation disclosures. The idea to use a readability score is not part of intensive research concerning the analysis of the impact of FLDs on MV. Furthermore, other qualitative

scores need to be developed, and eventually, the disclosure index needs to be enhanced further. Of great help could be sophisticated linguistic studies that determine the value impact of forward-looking words to potential readers of annual reports.

## Reflection on my DBA Journey

The DBA program covered several functions not only in management but also in philosophy and general academic skills, providing me with the opportunity to gain knowledge about several aspects. When looking back to these doctoral courses, I can observe a substantial development in academic research through the taught courses, the RD1 process, as well as during the conduct of the thesis. Moreover, I notice an increase in my ability to write and speak in a language that is not my mother tongue and more importantly, the development in social skills as well as the ability to reflect. And eventually, I needed to find a way to deal with pressure and stress during the whole program. "Getting the thing done" was a saying of the professors and I embodied this phrase to keep me on track.

The course DBA 8001 (reflective learning) helped me, on the one hand, to reflect on my work development. I started to think in "loops", which means that I continuously try to enhance the way to solve all kinds of problems or even daily tasks. On the other hand, the lecturer taught us how extensive knowledge, but also social trust could be created through "active listening". I became aware of the fact that in conversations or discussions with other people, I need to listen more carefully and question a person's meaning and understanding. I tried to implement "active listening" into my usual behaviour of social communication, to find the strengths, values, and motivation factors of other people. More importantly, after the taught course DBA 8001, I started to reflect on my own. Due to this, I learned a lot about myself, such as my intrinsic motivation. I enjoyed being in charge of a significant project, which I realized through the DBA program. I like to be self-employed with a high degree of freedom for action, thereby acting responsibly and working persistently to achieve ambitious and challenging goals set by myself in an individual working schedule.

The course DBA 8002 (literature review) fostered my academic strength in conducting academic research in a structured, effective, and efficient way. Besides improving my academic writing, conducting a literature review

as well as analysing a phenomenon from different perspectives, I had the chance to focus more on capital market research. This subject is one of my favourite topics as it combines the knowledge of business studies as a whole. I was able to identify and describe a research gap and formulate my research questions. This development was a huge step and increased my skills by far as I am now capable of identifying problems in general and describe them profoundly.

The course DBA 8003 (methodological fundamentals) changed my way of thinking, as I am now able to evaluate a specific phenomenon from different philosophical perspectives. Because of studying philosophical approaches, I acknowledge now that each research paradigm influences the research differently - it merely "depends". This knowledge from course DBA 8003 enhanced, even more, the learning outcome from session DBA 8001. The combination of the knowledge I gained through both taught courses fostered my ability to observe and analyse meaning and behaviour. I realised that by evaluating the meaning and understanding of people, I can find deep and usually hidden insights of motivation and tendencies, and thereby getting an own knowledge about a complex (social) phenomena.

The course DBA 8004 (Research Methods and Analysis) eventually provided me with the tools to conduct my research project. This session was a necessity to be able to set up a research paradigm that can answer research objectives. This final course helped me to think more profoundly about how to approach research gaps, not only from a philosophical point of view but also practically, by using appropriate research tools. Eventually, I was not only able to identify and describe a problem (or phenomenon) from different perspectives as taught in session DBA 8002 and DBA 8003, but to suggest necessary steps to solve them. I believe that this ability has helped me to strengthen my entire working profile and ensure that I meet future professional as well as personal requirements.

Besides the extensive knowledge I gained through the course, I needed to deal with the downside of any individual project, which is about "social isolation". In a typical working environment, people share thoughts and



knowledge and also discuss worries. Concerning any individual assignments, researchers are mostly alone with their doubts. For example, I often agonised over whether I am capable of fulfilling the requirements for the doctoral program. I realised that anxieties are barriers that hinder the positive development of the overall research. To overcome these constraints, I learned that reflection is helpful to create "intrinsic" motivation. For example, by reflecting on my past achievements, I was able to present to myself the challenges I had already managed to overcome successfully and realise that I am capable of coping with any issues that lie ahead. However, not only is reflection necessary to overcome anxiety and uncertainty, but I also needed to communicate my concerns with friends, fellow students, and family. They listened to me whenever I faced doubts and worries. Sometimes I needed to have someone to talk with, to discuss my concerns, to stay motivated, to get my thoughts straight and refresh my mind. Besides friends and family, I needed, of course, the discussion rounds with my supervisors, with whom a supportive and communicative environment was set up. They guided and pointed me in the right directions to find my path necessary to fulfil the DBA program requirements.

As well as uncertainty and anxiety, I had to learn how to handle time pressure as this research project lifted the stress factor to a new level. Time constraints were intense while working and studying at the same time. To solve this issue, I needed to set up a schedule and prioritise my tasks. By doing so, I found a way to balance my daily work as well as my university obligations. Nevertheless, I needed a lot of self-discipline and endurance to face moments in which I was "beaten down" by the heavy workload. At such times I remembered a simple phrase, which was said by the lecturers during the DBA taught courses: "Get it done"! I appreciate this sentence very much. It was always around in my head and somehow I motivated myself to fulfil the requirements of the doctoral program.

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## Appendix A: List of companies

**Table 62:** List of Companies

Company	Commentary	Month of release	Annual Report 2017 Press Release*
3	Data Missing		
4	Data Missing		
20	Data Missing		
27	Data Missing		
30	Data Missing		
39	Data Missing		
47	Data Missing		
59	Data Missing		
77	Data Missing		
96	Data Missing		
99	Data Missing		
137	Data Missing		
153	Data Missing		
2	Financial Service Company		
8	Financial Service Company		
29	Financial Service Company		
36	Financial Service Company		
38	Financial Service Company		
41	Financial Service Company		
67	Financial Service Company		
69	Financial Service Company		
101	Financial Service Company		
139	Financial Service Company		
154	Financial Service Company		
12	Fiscal Year is not Business Year		
19	Fiscal Year is not Business Year		
26	Fiscal Year is not Business Year		
37	Fiscal Year is not Business Year		
72	Fiscal Year is not Business Year		
76	Fiscal Year is not Business Year		
80	Fiscal Year is not Business Year		
82	Fiscal Year is not Business Year		
91	Fiscal Year is not Business Year		
126	Fiscal Year is not Business Year		
135	Fiscal Year is not Business Year		
142	Fiscal Year is not Business Year		
48	Fiscal Year is not Business Year		
5	Less Data due to Later Market Entry		
9	Less Data due to Later Market Entry		
10	Less Data due to Later Market Entry		
11	Less Data due to Later Market Entry		
24	Less Data due to Later Market Entry		
32	Less Data due to Later Market Entry		
35	Less Data due to Later Market Entry		
55	Less Data due to Later Market Entry		
64	Less Data due to Later Market Entry		
66	Less Data due to Later Market Entry		
70	Less Data due to Later Market Entry		

<b>Company</b>	<b>Commentary</b>	<b>Month of release</b>	<b>Annual Report 2017 Press Release*</b>
73	Less Data due to Later Market Entry		
78	Less Data due to Later Market Entry		
81	Less Data due to Later Market Entry		
84	Less Data due to Later Market Entry		
87	Less Data due to Later Market Entry		
93	Less Data due to Later Market Entry		
98	Less Data due to Later Market Entry		
104	Less Data due to Later Market Entry		
105	Less Data due to Later Market Entry		
108	Less Data due to Later Market Entry		
114	Less Data due to Later Market Entry		
115	Less Data due to Later Market Entry		
119	Less Data due to Later Market Entry		
123	Less Data due to Later Market Entry		
124	Less Data due to Later Market Entry		
125	Less Data due to Later Market Entry		
127	Less Data due to Later Market Entry		
129	Less Data due to Later Market Entry		
130	Less Data due to Later Market Entry		
131	Less Data due to Later Market Entry		
132	Less Data due to Later Market Entry		
134	Less Data due to Later Market Entry		
140	Less Data due to Later Market Entry		
141	Less Data due to Later Market Entry		
143	Less Data due to Later Market Entry		
144	Less Data due to Later Market Entry		
147	Less Data due to Later Market Entry		
149	Less Data due to Later Market Entry		
151	Less Data due to Later Market Entry		
156	Less Data due to Later Market Entry		
157	Less Data due to Later Market Entry		
158	Less Data due to Later Market Entry		
159	Less Data due to Later Market Entry		
160	Less Data due to Later Market Entry		
6	Technical Problems		
23	Technical Problems		
40	Technical Problems		
45	Technical Problems		
46	Technical Problems		
54	Technical Problems		
68	Technical Problems		
88	Technical Problems		
89	Technical Problems		
102	Technical Problems		
110	Technical Problems		
116	Technical Problems		
118	Technical Problems		
7	Used for Research	February	27.02.18
14	Used for Research	February	27.02.18
15	Used for Research	February	28.02.18
34	Used for Research	February	10.02.18
43	Used for Research	February	22.02.18

<b>Company</b>	<b>Commentary</b>	<b>Month of release</b>	<b>Annual Report 2017 Press Release*</b>
74	Used for Research	February	22.02.18
75	Used for Research	February	21.02.18
100	Used for Research	February	28.02.18
109	Used for Research	February	09.02.18
121	Used for Research	February	22.02.18
122	Used for Research	February	23.02.18
1	Used for Research	March	22.03.18
13	Used for Research	March	08.03.18
16	Used for Research	March	21.03.18
17	Used for Research	March	16.03.18
18	Used for Research	March	01.03.18
21	Used for Research	March	13.03.18
22	Used for Research	March	14.03.18
25	Used for Research	March	24.03.18
28	Used for Research	March	16.03.18
31	Used for Research	March	08.03.18
33	Used for Research	March	17.03.18
42	Used for Research	March	07.03.18
44	Used for Research	March	23.03.18
49	Used for Research	March	13.03.18
50	Used for Research	March	08.03.18
51	Used for Research	March	22.03.18
52	Used for Research	March	14.03.18
53	Used for Research	March	27.03.18
56	Used for Research	March	28.03.18
57	Used for Research	March	17.03.18
58	Used for Research	March	16.03.18
60	Used for Research	March	23.03.18
61	Used for Research	March	17.03.18
62	Used for Research	March	21.03.18
63	Used for Research	March	09.03.18
65	Used for Research	March	21.03.18
71	Used for Research	March	22.03.18
79	Used for Research	March	27.03.18
83	Used for Research	March	22.03.18
85	Used for Research	March	07.03.18
86	Used for Research	March	15.03.18
90	Used for Research	March	13.03.18
92	Used for Research	March	15.03.18
94	Used for Research	March	16.03.18
95	Used for Research	March	08.03.18
97	Used for Research	March	08.03.18
103	Used for Research	March	27.03.18
106	Used for Research	March	15.03.18
107	Used for Research	March	21.03.18
120	Used for Research	March	16.03.18
128	Used for Research	March	15.03.18
133	Used for Research	March	09.03.18
136	Used for Research	March	14.03.18
138	Used for Research	March	21.03.18
145	Used for Research	March	22.03.18
146	Used for Research	March	13.03.18

<b>Company</b>	<b>Commentary</b>	<b>Month of release</b>	<b>Annual Report 2017 Press Release*</b>
148	Used for Research	March	08.03.18
150	Used for Research	March	07.03.18
152	Used for Research	March	21.03.18
155	Used for Research	March	23.03.18
111	Used for Research	March	15.03.18
112	Used for Research	March	15.03.18
113	Used for Research	March	29.03.18
117	Used for Research	March	13.03.18
<p>* Dates mentioned in:</p> <ul style="list-style-type: none"> <li>- Financial Calendar within annual report</li> <li>- Annual Report</li> <li>- Corporate Website</li> <li>- if no Date mentioned, signature date of supervisory board or auditor signature + 1 day is used as assumption</li> </ul>			

## Appendix B: Accounting Positions

The balance sheet provides information on a company's assets (see Table 63) and its liabilities (see Table 64) (Brealey et al., 2007):

**Table 63:** Balance Sheet - Assets Accounts

<b>Assets Accounts</b>
<b>Total Current Assets</b>
Net Stated Inventory
Raw Materials
Work in Progress
Finished Goods
Inventory Prepayment and other Inv. Adj.
Net Accounts Receivable
Accounts Receivable
Doubtful Accounts
Others
Other Current Assets
Prepaid Expenses & Advances
Deferred Charges
Total Cash & Short Term Investment
Cash or Equivalent
Short Term Investment
<b>Fixed Assets</b>
Net Property, Plant & Equipment
Land
Total Land Depreciation
Net Stated land
Buildings
Total Buildings Depreciation
Net Buildings
Plant & Machinery
Plant & Machinery Depreciation
Net Stated Plant & Machinery
Transportation Equipment
Transportation Equipment Depreciation
Net Transportation Equipment
Leased Assets
Leased Assets Depreciation
Net Leased Assets
Other Property Plant & Equipment
Other Property Plant & Equip. Deprec.
Net Other Property Plant & Equipment
Accumulated Deprec.
Intangibles
Goodwill
Other Intangibles
Other fixed assets
Exploration
Long Term Receivables
Investments
Long Term Associated Companies
Investment Properties
Other Long Term Assets
<b>Total Assets</b>

Source: Osiris



**Table 64:** Balance Sheet - Liabilities Accounts

<b>Liabilities Accounts</b>
<b>Total Current Liabilities</b>
Loans
Current Portion of LT Debt
Current loans & overdrafts
Trade Creditors
Other
Other Short-Term Debt
Other Creditors
Income Tax Payable
Social Expenditure Payable
Dividends Payable
Other Current Liabilities
<b>Non-Current Liabilities</b>
Total LT Interest Bearing Debt
Bank Loans
Debentures & Convertible Debt
Lease Liabilities
Other Long-Term Interest-Bearing Debt
Other non-current liabilities
Pension Fund Provisions
Deferred Taxes
Provisions
Deferred Revenue
Other LT Non-Interest-Bearing Debt
Minority Interest
<b>Total Liabilities and Debt</b>
<b>Total Shareholders Equity</b>
Share Capital
Common Stock/Shares
Participation Shares
Preferred Shares
Redeemable Preferred Shares
<b>Other</b>
Share Premiums
Treasury Shares
Revaluation Reserves
Retained Earnings
Other Shareholders Reserves
<b>Total Liabilities and Equity</b>

Source: Osiris

The income statement illustrates information about the company's financial revenues and costs/expenses over a period of time (Robinson et al., 2015). Table 69 presents an overview of the positions of an income statement:

**Table 65:** Income Statement

<b>Income statement</b>
<b>Total revenues</b>
Gross sales
Adjustments/excise tax
Net sales
Other revenues
Cost of Goods Sold
Research & Development expenses
Other Operating Items
EBITDA
Total Depreciation, Amort. & Depl.
Depreciation
Amortization & Depletion
<b>Operating Income After Deprec. &amp; Amort.</b>
Unusual/Exceptional Items
Earnings Before Interest & Tax
Financial Revenue
Financial Expenses
Financial PL
Other non Operating/Financial Increase/Expenses
<b>Earnings before tax</b>
Income taxes
Earnings after tax
Minority interest
Other
Extraordinary items after tax
Preferred dividends
<b>Net Profit</b>
Ordinary dividends
Dividend share capital other

Source: Osiris

The cash flow statement illustrates information about a company's "...cash receipts and cash payments..." over a period of time (Brealey et al., 2007, p. 57). Table 66 presents an overview of the positions of a cash flow statement:

**Table 66:** Cash flow Statement

<b>Cash Flow Position</b>
<b>Net Income / Starting Line</b>
Depreciation, Depletion, Amortization & Impairment
Depreciation and Depletion
Amortization of Intangible Assets
Def. Inc. Taxes & Invest. Tax Credit
Other Cash Flow
Funds from Operations before WC Changes
Dec/Inc in Receivables
Dec/Inc in Inventories
Inc/Dec in Accounts Payable
Inc/Dec in Other Accruals
Dec/Inc in Other Assets/Liabilities
Extraordinary Items
Funds from Other Op. Activities
<b>Net Cash from Operating Activities</b>
Additions to Fixed Assets
Increase/Decrease Other Long Term Assets
Increase/Decrease in Investments
<b>Net Cash used by Investing Activities</b>
Inc/Dec in ST Borrowing
Inc/Dec in Long Term Borrowing
Net Proceeds from Sale/Issue Com. & Pref. Stock
Shareholders' Equity Reserve
Common Dividends (Cash)
Preferred Dividends (Cash)
Cash Dividends Paid – Total
Other Source/Use – Financing Activities
<b>Net Cash provided by/used in Financing Activities</b>

Source: Osiris

## Appendix C: Extension of the FLD Index

Concerning the evaluation of variable FLD, the disclosure indices of Hussainey (2004), Wang & Hussainey (2013), Hassanein & Hussainey (2015) and Abed et al. (2016) are synthesised and extended to a list of 690 words through utilising grammatical terms. The results are presented in Table 67 to 72.

**Table 67:** Preposition/ Modal Auxiliary/ Future Tense

Preposition	Modal Auxiliary	Modal Auxiliary 2	Future Tense
afterwards	may	might	going to
ahead	can	could	will
scope for	shall	should	
subject to			
unlike			

**Table 68:** Word Combination

Word Combination				
1	2	3	4	5
coming financial year	coming financial years	coming months	coming year	coming years
go faster	goes faster	going faster		
presurmise				
scope to				
well-placed				
well-positioned				
year ahead				

**Table 69: Verb Conjugation**

<b>Verb</b>	<b>3rd Person</b>	<b>-ing form</b>	<b>Verb</b>	<b>3rd Person</b>	<b>-ing form</b>
able			hope	hopes	hoping
accelerate	accelerates	accelerating	imagine	imagines	imagining
advance	advances	advancing	impend	impends	impending
aim	aims	aiming	improve	improves	improving
allow	allows	allowing	increase	increases	increasing
anticipate	anticipates	anticipating	innovate	innovates	innovating
approach	approaches	approaching	intend	intends	intending
approximate	approximates	approximating	judge	judges	judging
ascertain	ascertains	ascertaining	keep	keeps	keeping
aspire	aspires	aspiring	long for	longs for	longing
assume	assumes	assuming	look	looks	looking
await	awaits	awaiting	maintain	maintains	maintaining
become	becomes	becoming	make	makes	making
believe	believes	believing	model	models	modelling
carry	carries	carrying	novelize	novelizes	novelizing
challenge	challenges	challenging	offer	offers	offering
change	changes	changing	plan	plans	planning
conject	conjectures	conjecturing	point toward	points toward	pointing toward
consider	considers	considering	presume	presumes	presuming
contemplate	contemplates	contemplating	presuppose	presupposes	presupposing
continue	continues	continuing	prevent	prevents	preventing
convert	converts	converting	proceed	proceeds	proceeding
convince	convinces	convincing	prolong	prolongs	prolonging
decrease	decreases	decreasing	promise	promises	promising
deem	deems	deeming	prophecy	prophecies	prophesying
desire	desires	desiring	propose	proposes	proposing
differ	differs	differing	realise	realises	realising
divine	divines	divining	reflect	reflects	reflecting
enlarge	enlarges	enlarging	remain	remains	remaining
envisage	envisages	envisaging	renew	renews	renewing
envision	envisions	envisioning	retain	retains	retaining
estimate	estimates	estimating	revitalise	revitalises	revitalising
expand	expands	expanding	revitalize	revitalizes	revitalizing
expect	expects	expecting	risk	risks	risking
extend	extends	extending	seek	seeks	seeking
forecast	forecasts	forecasting	speculate	speculates	speculating
forejudge	forejudges	forejudging	strategise	strategises	strategising
foreknow	foreknows	foreknowing	stretch	stretches	stretching
foresee	foresees	foreseeing	strive	strives	striving
foretell	foretells	fortelling	suggest	suggests	suggesting
forethink	forethinks	forethinking	suppose	supposes	supposing
go on	goes on	going on	surmise	surmise	surmising
grow	grows	growing	vary	varies	varying
guess	guesses	guessing	wait	waits	waiting
hinder	hinders	hindering			coming

**Table 70: Noun & Plural**

<b>Noun</b>	<b>Plural</b>	<b>Noun</b>	<b>Plural</b>	<b>Noun</b>	<b>Plural</b>
ability	abilities	forecast	forecasts	precaution	precautions
acceleration	acceleration	fore-knowledge	fore-knowledges	presumption	presumptions
addition	addition	foresight	foresight	pre-supposition	pre-suppositions
advancement	advancement	foretell	foretell	prevention	prevention
afterwardness	afterwardness	forethought	forethoughts	probability	probabilities
aheadness	aheadness	future	future	program	programs
aim	aim	goal	goals	project	projects
allowance	allowance	growth	growth	prolongation	prolongations
ambition	ambition	guess	guesses	promise	promise
anticipation	anticipation	hindrance	hindrances	prophecy	prophecies
approach	approach	hope	hope	proposal	proposals
approximation	approximation	imagination	imagination	prospect	prospects
aspiration	aspiration	imminence	imminences	purpose	purpose
assumption	assumptions	improvement	improvement	realisation	realisation
belief	belief	incoming	incoming	reflection	reflections
capability	capabilities	increase	increase	remain	remains
certainty	certainty	innovation	innovation	renewal	renewals
challenge	challenges	insight	insights	revitalisation	revitalisations
chance	chances	intention	intention	risk	risks
change	changes	judgement	judgements	scenario	scenarios
commitment	commitments	late	late	seeking	seeking
confidence	confidence	likeliness	likeliness	short term	short term
conjecture	conjectures	long term	long term	speculation	speculations
consideration	considerations	medium term	medium term	strategy	strategies
contemplation	contemplation	model	model	strive	strives
contingency	contingencies	near term	near term	suggestion	suggestions
continuation	continuation	nextness	nextnesses	supposition	suppositions
contract	contracts	novelty	novelty	surmise	surmises
conversion	conversions	objective	objectives	target	target
desire	desire	offer	offer	turn	turn
difference	differences	opinion	opinions	unlikelihood	unlikelihood
divination	divinations	opportunity	opportunities	upcome	upcome
enlargement	enlargement	optimism	optimism	variation	variations
envisionment	envision-ments	outlook	outlooks	view	views
estimation	estimations	perspective	perspective	vision	vision
expansion	expansion	pessimism	pessimism	wait	wait
expectation	expectation	plan	plans	year ahead	years ahead
extension	extension	possibility	possibilities		
financial year	financial year	potential	potential		

**Table 71: Adjectives**

<b>Adjective</b>	<b>Adjective 2</b>	<b>Adjective 3</b>	<b>Adjective 4</b>
able			
additional			
aimless			
ambitious			
approximate			
aspiring	aspirational	aspirant	
assumptive	is assumed	are assumed	assumable
capable			
carriable			
certain	ascertainable		
changeable			
committed			
confident			
conjectural	is conjectured	are conjectured	
contemplative			
contingent			
continuous	continual	is continued	are continued
deeming			
designed for	designed to		
desirable			
different			
following			
forecastable			
foreknown			
foretellable			
forward			
goalless			
grown			
guessable			
hinder			
hopeless	hopeful		
imaginative	imaginable	imaginary	
imminent			
impending			
improvable	improving		
increasable	increasing		
innovative	innovational	innovatory	
insightful			
intent	intentional	is intended	
is accelerated	are accelerated	accelerative	
is anticipated	are anticipated	anticipatory	anticipatable
is challenged	are challenged	challenging	
is divined	are divined		
is envisaged	are envisaged		
is envisioned	are envisioned		
is estimated	are estimated		
is expected	are expected		
is extended	are extended		
is maintained	are maintained		
judgemental	is judged	are judged	
keepable			
larger	enlargeable		
later			
likelihood			
long-term			
medium-term			
near-term			
new			
next			

Adjective	Adjective 2	Adjective 3	Adjective 4
novel	novelistic		
offerable			
opportunistic			
optimistic			
perspectival			
pessimistic			
planned			
possible			
potential			
precautionary			
presumptive	presumed	presumable	
presuppositional			
preventive	preventable	preventative	preventible
probable			
prolonged			
promising	promised		
prophetic			
propositional	proposed	proposing	
realising			
reflective	reflecting		
remaining			
renewable			
retentive			
revitalisable			
revitalizable			
risky	riskless		
seeking			
short-term			
speculative	speculating	speculated	
strategic	strategical		
striven			
subsequent			
suggestive	suggested		
supposed			
surmisable	is surmised	are surmised	
unforeseen			
unlike			
upcoming			
variational			
visionary			
waitable	is awaited	are awaited	
well placed			
well positioned			



**Table 72: Adverbs**

<b>Adverb</b>	<b>Adverb 2</b>	<b>Adverb 3</b>	<b>Adverb 4</b>
ably			
acceleratively	acceleratingly		
additionally			
advancingly			
aimlessly			
ambitiously			
anticipatedly	anticipatorily	anticipatingly	
approximately			
aspirationally	aspiringly		
assumptively	assumedly	assumingly	
beforehand			
capably			
certainly	ascertainably		
challengingly			
changeably			
conjecturally			
considerably			
contemplatively			
contingently			
continually	continuedly	continuingly	continuously
desirably			
differentially			
enlargedly			
eventually			
expectedly	expectingly	expectantly	
extensively			
foreknowingly			
forwardly			
goallessly			
growingly			
guessingly			
hinderingly			
hopefully	hopingly		
imaginatively	imaginably	imaginarily	
imminently			
impendingly			
improvably	improvingly		
increasingly			
innovatively			
insightfully			
intently	intentionally	intendedly	
judgmentally			
likely			
long-termly			
medium-termly			
near-termly			
newly			
nextly			
no later than	at the latest		
novelly	novelistically		
opportunely			
optimistically			
perspectively			
pessimistically			
planlessly			
pointed toward			
possibly			
potentially			
precautionarily			

<b>Adverb</b>	<b>Adverb 2</b>	<b>Adverb 3</b>	<b>Adverb 4</b>
presumptively	presumedly	presumably	
presuppositionally			
preventatively	preventively	preventingly	
probably			
prolongedly			
promisingly			
prophetically			
propositionally	proposedly		
realisingly			
reflectively	reflectingly		
renewably			
retentively			
revitalisably			
revitalizably			
riskily			
seekingly			
short-termly			
soon			
speculatively			
strategically			
strivingly			
subsequently			
suggestively	suggestingly		
supposedly			
surmisably			
unforeseeably			
unlikely			
variationally			
visionarily			
waitingly			