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Determinants and Consequences of Key Performance Indicator (KPI) Reporting by UK Non-financial Firms

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Abstract

The study examines the level of the quantity and quality of Key Performance Indicator (KPI) reporting for a sample of FTSE 350 UK listed companies over the period 2006-2010. Furthermore, it identifies the determinants of KPI reporting and investigates its impact upon firm value. Based upon best practice guidance recommended by the Accounting Standard Board (2006), the study develops a measure of disclosure quality by considering the main qualitative attributes of information which, arguably, make KPI information particularly useful to stakeholders. The distinction between disclosure quantity and quality in the study enables the researcher to obtain greater insights into the drivers and implications of KPI reporting quantity and quality. The study finds a variation between UK firms in the number of KPIs disclosed, with a notable low level of reporting quality, especially in the case of non-financial KPIs. It also finds that corporate governance mechanisms play an important role in improving KPI reporting. In particular, it shows that directors' compensation affects the quantity and quality of KPI disclosure. Furthermore, the study provides evidence that the quantity and quality of KPI disclosure are not derived from the same factors, and both have a different impact on firm value. On the other hand, the study finds a negative association between the numbers of KPIs disclosed and firm value, while a non-significant relationship is reported between KPI reporting quality and firm valuation. Overall, this study provides evidence that disclosure quantity is not a good proxy for disclosure quality.

Attestation

I confirm that I have today submitted 2 hard copies of my thesis. I hereby declare that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قُلِ الْحَمْدُ لِلَّهِ وَسَلَامٌ عَلَى عِبَادِهِ الَّذِينَ اصْطَفَى آللَّهُ خَيْرٌ أَمَّا يُشْرِكُونَ (59) أَمَّنْ خَلَقَ السَّمَاوَاتِ وَالْأَرْضَ وَأَنْزَلَ لَكُمْ مِنَ السَّمَاءِ مَاءً فَأَنْبَتْنَا بِهِ حَدَائِقَ ذَاتَ بَهْجَةٍ مَا كَانَ لَكُمْ أَنْ تُنْبِتُوا شَجَرَهَا أَإِلَهٌ مَعَ اللَّهِ بَلْ هُمْ قَوْمٌ يَعْدِلُونَ (60) أَمَّنْ جَعَلَ الْأَرْضَ قَرَارًا وَجَعَلَ خِلَالَهَا أَنْهَارًا وَجَعَلَ لَهَا رَوَاسِيَ وَجَعَلَ بَيْنَ الْبَحْرَيْنِ حَاجِزًا أَإِلَهٌ مَعَ اللَّهِ بَلْ أَكْثَرُهُمْ لَا يَعْلَمُونَ (61) أَمَّنْ يُجِيبُ الْمُضْطَرَّ إِذَا دَعَاهُ وَيَكْشِفُ السُّوءَ وَيَجْعَلُكُمْ خُلَفَاءَ الْأَرْضِ أَإِلَهٌ مَعَ اللَّهِ قَلِيلًا مَا تَذَكَّرُونَ (62) أَمَّنْ يَهْدِيكُمْ فِي ظُلُمَاتِ الْبَرِّ وَالْبَحْرِ وَمَنْ يُرْسِلُ الرِّيَاحَ بُشْرًا بَيْنَ يَدَيْ رَحْمَتِهِ أَإِلَهٌ مَعَ اللَّهِ تَعَالَى اللَّهُ عَمَّا يُشْرِكُونَ (63) أَمَّنْ يَبْدَأُ الْخَلْقَ ثُمَّ يُعِيدُهُ وَمَنْ يَرْزُقُكُمْ مِنَ السَّمَاءِ وَالْأَرْضِ أَإِلَهٌ مَعَ اللَّهِ قُلْ هَاتُوا بُرْهَانَكُمْ إِنْ كُنْتُمْ صَادِقِينَ (64) قُلْ لَا يَعْلَمُ مَنْ فِي السَّمَاوَاتِ وَالْأَرْضِ الْغَيْبَ إِلَّا اللَّهُ وَمَا يَشْعُرُونَ أَيَّانَ يُبْعَثُونَ (65)

In the name of Allah, Most Gracious, Most Merciful.

‘*(59) Say: Praise be to Allah and Peace on his servants whom He has chosen (for his Message). Who is better? - Allah or the false gods they associate with Him? (60) Or, who has created the heavens and the earth, and who sends you down rain from the sky causing the growth of well-planted orchards, full of beauty of delight: it is not in your power to cause the growth of the trees in them. Can there be another god besides Allah? Indeed, they are a people who swerve from justice. (61) Or, who has made the earth firm to live in; made rivers in its midst; set thereon mountains immovable; and made a separating bar between the two bodies of flowing water? Can there be another god besides Allah? No, but most of them do not know. (62) Or, who listens to the (soul) distressed when it calls on Him, and Who relieves its suffering, and makes you (mankind) inheritors of the earth? Can there be another god besides Allah? Little you remember. (63) Or, who guides you through the depths of darkness on land and sea, and who sends the winds as heralds of glad tidings, going before the rain? Can there be another god besides Allah? - High is Allah above what they associate with Him! (64) Or, who originates creation, then repeats it, and who gives you sustenance from heaven and earth? Can there be another god besides Allah? Say, "Bring forth your argument, if*

you are telling the truth!" (65) Say: None in the heavens or on earth, except Allah, knows the unseen nor can they perceive when they shall be raised up for Judgment' (The Holy Qur'an, Chapter 27 , Verses 59-65).

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Chapter 1- Introduction

1.1 Overview

In recent years, a sizeable body of literature indicates a major increase in interest in narrative reporting (e.g. Solomon et al., 2000, Hussainey et al., 2003; Beattie et al., 2004; Linsley and Shrives, 2006; Abraham and Cox, 2007; Hussainey and Walker, 2009; Hussainey and Al-Najjar 2011; Wang and Hussainey, 2013). These studies show that narrative reporting plays an important role in improving communications with shareholders. It explains financial performance and provides a broader analysis of a firm's operating activities, any surrounding risks, objectives, prospects and strategies. Thus, it increases the relevance of corporate reporting by complementing the role of financial statements.

In the United Kingdom (UK), firms have been requested to introduce an Operating and Financial Review (OFR) statement that includes analyses of the firm's business position and development. However, UK firms provide this statement on a voluntary basis in accordance with the financial reporting statement issued by the Accounting Standard Board (ASB) in 2006.

Key Performance Indicators (KPIs) are crucial measures of performance that are disclosed by a firm's directors in order to help the stakeholders to analyse the firm's performance. These KPIs could be financial (e.g. operating profit, cash flow, and earnings per share), or non-financial (e.g. new product launches; emissions; total energy). KPI information is one of the main narrative disclosures that could be useful to the users of annual reports. By analysing KPI information, different users could evaluate the financial performance of the firm and assess the current competitive position, as well as the extent to which progress is being made in accordance with the firm's strategy.

In particular, in the UK, the Companies Act (CA) (2006) in accordance with the European Union (EU) Accounts Modernization Directive (2003) requires that all companies, with the exception of small firms, should review their business using financial KPIs and, *where appropriate*, using other KPI information with regard to environmental and employee aspects. Accordingly, many regulatory bodies (e.g. the ASB) require firms to report this information. Furthermore, the ASB provides guidance for achieving best practice in terms of KPI disclosure in the OFR (ASB, 2006).

In general, most research papers to date have examined the determinants and economic consequences of either overall disclosure or particular types of disclosure. Numerous studies have examined the factors affecting corporate narrative disclosure, suggesting that corporate governance (CG) attributes, as well as firm characteristics, are the key drivers for corporate disclosure, either as a whole (e.g. Ho and Wong, 2001; Wang et al., 2008) or for different types of corporate disclosure such as forward looking statements (e.g. Wang and Hussainey, 2013); risk reporting (e.g. Abraham and Cox, 2007; Elshandidy et al., 2013); online reporting (e.g. Abdelsalam and Street, 2007); and intellectual capital disclosure (e.g. Li et al., 2008). The other stream of research has shown the usefulness of corporate disclosure on stock market participants' decisions. For instance, several studies tested the effect of corporate disclosure on cost of capital (e.g. Welker, 1995; Botosan, 1997; Botosan and Plumlee, 2002); firm value (e.g. Baek et al., 2004; Hassan et al., 2009); share price anticipation of earnings (e.g. Hussainey and Walker, 2009; Wang and Hussainey, 2013) and analysts' following, besides analysts' forecast accuracy (e.g. Lang and Lundholm, 1996; Eng and Teo, 2000; Yu, 2010). Notably, the majority of previous studies have used disclosure quantity as a proxy for disclosure quality, assuming that disclosing larger amounts of information leads to a higher level of information quality. However, these studies - especially those

conducted outside the US - have not provided evidence on the factors determining disclosure quality regardless of quantity. Similarly, there is a lack of evidence on the separate influence of each of them on stock market participants.

Despite the importance of KPI information, it appears that there are a limited number of studies which have looked at KPI reporting (e.g. Hussainey and Walker, 2006; Giunta et al., 2008; Tauringana and Mangena, 2009; Dorestani and Rezaee, 2011a; Dorestani and Rezaee, 2011b). The closest studies to the current research are those of Giunta et al. (2008) and Tauringana and Mangena (2009). Giunta et al. (2008) showed the low level of quality in terms of financial KPI reporting on the part of Italian firms. Tauringana and Mangena (2009) suggested that the introduction of business reviews affects positively the amount of KPIs disclosed by the UK media sector.

To the best of the author's knowledge, there has been no study that has explored KPI reporting quantity and quality and has shown variations among firms in practice. Moreover, previous studies have not examined how KPI reporting quality could influence a firm's value. The regulatory environment in the UK offers an interesting context in which to conduct this study. The regulations enable corporate directors to control KPI reporting. In addition, the stock market in the UK is developed, and there should be enough informed financial statement users able to comprehend KPI disclosures. Overall, this research will contribute to the disclosure literature and could have policy implications for the UK.

This chapter is structured as follows. Section 1.2 illustrates the nature of this study. Section 1.3 outlines the motivations for conducting this study. Research questions are presented in section 1.4. The objectives of this research, in addition to its potential contribution, are discussed in section 1.5. Finally, details of the organisation of this study are provided in section 1.6.

1.2 The nature of the study

In attempting to distinguish between KPI disclosure quantity and disclosure quality, this study will add to the narrative disclosure literature. KPI information should be of a high quality if this information is to be useful for the users of annual reports. Therefore, the starting point of this study has been to assess KPI reporting quality separate from its quantity. Using different proxies to measure disclosure quality, such as disclosure quantity or earnings quality, fails to reflect accurate changes in disclosure quality (Berger, 2011). For instance, stock market liquidity as a proxy of disclosure quality may capture any changes that are related to the market rather than financial reporting quality (Berger, 2011). Thus, it was argued that disclosure quality measures should be comprehensive, and they should consider more than one dimension of disclosure (e.g. Beattie et al., 2004). Thus, researchers have attempted to assess disclosure quality using self-constructed indices (e.g. Beretta and Bozzolan, 2004; Boesso and Kumar, 2007). However, most of the previous attempts have been criticised due to the lack of a convincing theoretical background (Botosan, 2004), which lead to increased subjectivity in terms of measurement.

Beyer et al. (2010) reviewed the previous literature in this area and argued that researchers have to build their disclosure measure based on sensible economic definitions. Therefore, this study identifies disclosure quality in accordance with the principal objective of regulatory bodies' frameworks which is information usefulness. KPI information quality is measured by the extent to which it is of value to stakeholders. Consequently, quality scores are produced based upon firms' alignment with the ASB (2006) guidance with regard to KPI reporting.

A research instrument is then developed to measure the quantity and evaluate the quality of KPI disclosure. The quantity of KPI disclosure is measured by counting the

number of KPIs disclosed in the annual reports of the FTSE 350 non-financial UK companies under consideration. Manual content analysis is employed to quantify KPI disclosures for the sample firms.

The study uses the resultant KPI reporting quantity and quality scores to explore the variation among UK firms with regard to KPI disclosure in practice. Then, these scores are used to examine the determinants and consequences of KPI reporting.

Most published papers on the determinants and consequences of narrative disclosure have not distinguished between both dimensions of disclosure: quantity and quality (e.g. Li et al., 2008; Tauringana and Mangena, 2009; Hassan et al., 2009; Hussainey and Al-Najjar, 2011; Wang and Hussainey, 2013). Instead, accounting research usually employs disclosure quantity as a proxy for disclosure quality (e.g. Hussainey and Mouselli, 2010; Mouselli et al., 2012). According to this approach, it is assumed that the quantity of disclosure is the same as its quality, and both are derived from the same factors and have identical consequences.

The distinction between quantity and quality of disclosure allows the present study to participate actively in the development of empirical disclosure studies. More specifically, it enables the researcher to investigate the factors affecting each dimension. In turn, the study tests the separate influence of KPI reporting quantity and quality on firm value.

1.3 Motivations

Regulators usually ask for an enhancement in the level and quality of information disclosed by companies. Edward Davey, Minister for Employment Relations, Consumer and Postal Affairs in the UK stated that:

'Our goal must be to ensure that our companies are clear-sighted and focused on the issues which matter to their long term success and therefore to their members.

Disclosing good quality and relevant information on these issues in company narrative reporting is necessary if shareholders are to make well informed decisions in their role as company owners' (Department for Business, Innovation and Skills , 2010: p.5).

Therefore, from the policy makers' perspectives, there is a need to be aware of companies' current practices with regard to the extent of the information disclosed, and its quality. In spite of the richness of KPI disclosure content, there is no study that provides a full picture of KPI reporting practices on the part of UK firms. The closest studies to this research either look only at the level of one type of KPI disclosure (i.e. Giunta et al.'s study of financial KPI in Italy (2008)), or focus only on the quantity of KPI disclosure for one sector and its determinants (i.e. Tauringana and Mangena's study of KPI in the UK media sector (2009)). Therefore, the first motivation for conducting this study is to address this research gap by looking at the characteristics of KPI reporting. Rather than studying KPI reporting quantity in one sector (Tauringana and Mangena, 2009), the study shows how UK firms vary in terms of the quantity and quality of KPI reporting and its subcategories (both financial and non-financial KPIs). Arguably, this also highlights some areas that could improve in terms of the communication between companies and information users.

To measure KPI reporting quality, the study has to respond to the call of many scholars to search for a comprehensive and sensible measure of disclosure in accounting studies (e.g. Beattie et al., 2004; Beyer et al., 2010). Previous studies use measures of disclosure quality which have been criticised with regard to their capability to capture disclosure quality accurately.[1] This study addresses this issue by identifying information quality as a function of meeting the main qualitative attributes that should

[1] See section 2.2.2 for more details about measuring disclosure quality in previous literature.

make this information useful to the users, according to the regulators. The measure applied in this study is derived from the ASB's (2006) guidance for best practice in terms of KPI reporting.

The second motivation is that the UK offers an interesting context in which to examine the determinants of corporate KPI reporting. CA (2006) provisions imply that KPI reporting is likely to be voluntary for several reasons: (1) there is no definite set of KPIs to be disclosed by each firm stating what is a financial KPI and what is not, (2) firms' directors can control KPI disclosure by identifying '*the extent necessary*' of financial and non-financial KPIs for understanding a firm's performance and its progress, (3) firms' directors who are deciding what is '*appropriate*', when analysing firm performance and development, may use other KPIs related to environmental and employee aspects, and (4) firms' directors can limit the number KPIs disclosed for competition reasons in accordance with section 417 of CA (2006). Previous research has examined the determinants of voluntary disclosure (e.g. Li et al., 2008; Hussainey and Al-Najjar 2011; Wang and Hussainey, 2013).

A limited number of studies have examined the determinants of KPI reporting. The closest studies to this study have either limited their analyses to KPI disclosure quantity, e.g. Tauringana and Mangena (2009) - a study of KPI reporting in the UK media sector - or have ignored the majority of CG variables, e.g. Boesso and Kumar (2007) - a study for voluntary disclosure practices on the part of US and Italian companies.

This study addresses this gap in the literature by testing the effect of numerous CG mechanisms, as well as other firm characteristics on KPI reporting. In this regard, the UK context would have other effects on the analyses, since firms are not required to apply a specific structure of CG mechanisms in accordance with the '*comply or*

explain' rule. Finally, these analyses would provide evidence on whether the quantity and quality of such narrative reporting are derived from the same factors.

The third motivation for this study arises from the need to examine to what extent KPI reporting quantity and quality could affect stock market participants. More specifically, the study investigates whether reporting quantity and its quality have different effects on firms' value. As mentioned above, KPI information involves different categories of information that might be attractive to annual report users. It incorporates important information that refers to current and future firm performance linked with firm strategy. Consequently, such information could be valuable when it comes to assessing current performance, as well as a firm's ability to pursue its strategic objectives successfully. Although, previous research has shown the impact of different types of narrative reporting in different contexts (e.g. Schleicher et al., 2007; Hussainey and Walker, 2009; Hassan et al., 2009; Sievers et al., 2013; Dorestani and Rezaee, 2011a), these studies have not provided strong evidence on the potential impact. One of the main explanations for the mixed results in previous research is the lack of a comprehensive and objective measure of disclosure quality (Beattie et al., 2004). Given the unique characteristics of the KPI information illustrated above, it is of interest to use the generated quality scores in order to examine the effects of KPI reporting. This would add to the literature, especially in the UK, as there is no study that examines the value relevance of KPI reporting in terms of quantity and quality.

1.4 Research questions

This thesis examines the following research questions:

Q1. What are the main features of KPI reporting in the UK?

To provide an answer to this question, previous literature with regard to disclosure measurement is reviewed. Then, an instrument is developed in order to measure KPI reporting quantity and quality in annual reports. Manual content analysis is employed to code the text and to classify the KPIs disclosed into financial KPIs and non-financial KPIs. Quantity and quality scores for a sample of FTSE 350 non-financial UK firms, is analysed. Descriptive statistics are used to explore the main features of KPI reporting in the case of UK firms in terms of KPI reporting, including its subcategories. In addition, descriptive results are used to show changes in KPI reporting across different industries, and to illustrate these changes across the period (2006-2010).

Q2. What are the factors affecting the level of quantity and quality of KPI reporting in the UK?

To provide an answer to this question, the study reviews relevant theories that explain directors' incentives to control corporate disclosure. Then, drawing on these theories, the determinants of KPI reporting in terms of quantity and quality are proposed. In addition to firm characteristics variables, the proposed explanatory variables are grouped into five subcategories: 1) Directors' compensation, 2) Board characteristics, 3) Audit committee characteristics, 4) Ownership structure variables, and 5) Capital need variables. Panel data regressions are conducted to assess the significance of the association between those variables and KPI reporting in terms of quantity and quality scores.

Q3. What is the impact of KPI reporting in terms of quantity and quality on firm value?

To provide an answer to this question, the relevant literature is reviewed to explain how - in theory - KPI reporting could affect firm value. Following previous studies, the

study controls for firm characteristics as well as growth opportunities. Additionally, the explanatory variables included in the analyses are: 1) KPI reporting in terms of quantity and quality scores, 2) Directors' compensation, 3) Board characteristics, 4) Audit committee characteristics, 5) Ownership structure variables. Tobin's Q ratio is used in the main, and further analyses are used as a measure of firm value. Moreover, tests are re-estimated using market-to-book ratio as a proxy for firm value to check the robustness of the results. Panel data regressions are also conducted to test the hypotheses of this study.

Q4. Can KPI reporting quantity be used as a proxy for KPI reporting quality?

The results of the above three studies are integrated to provide an answer to this question. The distinction between disclosure quantity and its quality is reached through the design of the research instrument. Descriptive statistics are used to obtain an indication of the relationship between KPI reporting in terms of quantity and quality. Regression results in the second study are employed to show whether each of quantity and quality in terms of KPI reporting is identically derived from the same factors. Finally, the findings of the third study are used in order to examine whether quantity and quality in terms of KPI reporting have different effects on firm valuation.

1.5 Research objectives and contributions

This section illustrates the objectives of this research based upon the above research questions. Then, the resulting possible contribution to the literature is presented.

1.5.1 Research objectives

Complementary research objectives are set to provide answers to the above research questions. This research aims to make a contribution to the extant literature.

Accordingly, this research focuses on UK firms' practices with respect to an important type of narrative disclosure (i.e. KPI information). Research findings would inform academics in depth whether or not the quantity and quality of disclosure are derived from the same factors. Moreover, the findings would indicate whether or not KPI reporting has an influence on market participants.

By achieving the following research objectives, the findings of the research would be of interest to regulators, firms and shareholders.

1. To provide a proper measure for KPI reporting in terms of quality and quantity.

2. To explore the main features of KPI reporting in the UK.

3. To identify the determinants of KPI reporting in terms of quantity and quality.

4. To investigate the impact of KPI reporting in terms of quantity and quality upon firm value.

5. To examine the extent to which KPI reporting in terms of quantity can operate as a proxy for KPI reporting in terms of quality.

1.5.2 Research contributions

To the best of the author's knowledge, there is no recent academic study that has looked at the level of quantity or quality in terms of KPI reporting among a sample of UK listed companies. Additionally, there is no study that has examined either the determinants or economic consequences of KPI reporting in the UK, distinguishing between disclosure quantity and quality.

Several novel contributions to the literature are made by this study. The first substantial contribution is that the study attempts to explicitly differentiate between the amount of KPI disclosure and its quality. This provides the opportunity to study each dimension in practice. Subsequently, this distinction helps to obtain greater insights into the drivers and implications of KPI reporting.

Hence, the study develops a valid and reliable measure of disclosure quality. This measure builds on the view that narrative reporting should provide useful information to different users. As mentioned above, the disclosure quality measure is based upon the ASB guidance for best practice.

Arguably, this measure of disclosure quality offers many advantages: (1) the measure is based upon a framework of a well-recognised regulatory body (i.e. ASB, 2006) that aims at information usefulness, (2) the study maintains consistency in evaluating the quality of KPI reporting for UK firms, since it uses the KPI disclosure guidance that is recommended to be followed by UK firms, (3) the measure focuses on the qualitative attributes of the information disclosed, so it would be relevant to measure the quality of any type of narrative disclosure (e.g. risk reporting) which would provide insights into disclosure studies in the future, (4) since the dimensions used as a basis for evaluating disclosure quality are clear, the measure does not require a wide degree of subjective judgment on the part of the coder. Hence, the disclosure quality measure does not suffer from high subjectivity which is a common weakness of self-constructed indices employed in previous research, (5) the ability to ensure the reliability and validity of the measure is due to the use of many procedures, and (6) having distinct disclosure quality and quantity scores helps to examine whether or not the two dimensions can operate as substitutes.

The second major contribution of the study lies in exploring KPI reporting practices for a sample of UK companies. If compared with Tauringana and Mangena (2009), the study presents a holistic view in terms of the overall level of KPI, including financial KPI and non-financial KPI as disclosed by UK listed companies from different sectors over a five year period. Furthermore, it is the first academic study - to the best of the author's knowledge - that examines whether or not UK firms are keen to introduce high quality KPIs in their annual reports. The study also shows to what extent KPI reporting quantity and quality varies across different industries over the sample period (2006-2010). In particular, the results are expected to be of interest to UK regulators. They should offer clear guidance for each industry that identifies a minimum and specific number of KPIs to be issued. The guidance should provide the definitions and the assumptions used to drive each of these KPIs. This avoids the lack of comparability that might exist between firms in the same sector.

The third contribution of this study is that the thesis explores the factors affecting KPI reporting in terms of quantity and quality. Drawing on agency theory, signalling theory, capital need theory, political need theory, stakeholder theory and information cost theory, this study highlights the role played by CG mechanisms in affecting the quantity and quality of KPI reporting. In particular, the study contributes to the literature about the association between directors' compensation and corporate disclosure. Moreover, this study provides evidence that the quantity and quality of KPI disclosures are not identically determined by the same factors. These findings are of interest to regulators who are working on enhancing KPI reporting in particular and narrative disclosure in general.

Another contribution is made to the literature by examining the value relevance of KPI reporting. To the best of the author's knowledge, this is the first study to test whether

or not KPI reporting in terms of quantity and quality have any and different impact on firm value. The study findings show that the quantity and quality of disclosure have different influences on firm value. Because of its potential negative effect on firm value; the results of the study alert firms to the consequences of excessive KPI disclosure. However, the study finds that disclosure quality has no significant association with the value of UK firms. Researchers need to consider this finding if they are going to examine narrative disclosure (or certain types of disclosure) in terms of its impact on stock market participants. On the other hand, the findings indicate that UK investors do not enhance the valuation of firms as a result of most CG mechanisms. This could be of interest to regulators, suggesting that imposing a certain CG structure on UK firms might not be justified with regard to valuation considerations.

Finally, this research explores the question as to whether or not the quantity of disclosure can be used as a measure of its quality. As discussed above, the study makes a distinction between each dimension. The study findings suggest that disclosure quantity and disclosure quality should not be used as substitutes in accounting research. Each of them could be derived from different determinants, and might lead to different consequences. Consequently, researchers should consider this finding with regard to related studies in the future. This could also contribute to the literature by generating more research opportunities that could validate previous research findings in many areas (e.g. factors affecting disclosure levels, the impact of financial reporting).

1.6 Organisation of the study

The structure of this thesis indicates that there are three chapters which deal with three main studies with regard to KPI reporting. Each of these chapters contains a review of

the relevant literature. Hence, there is no need for an additional chapter for a literature review or relating to theory or methodology. Thus the thesis is organised as follows:

Chapter (2) provides an answer to research question 1. It introduces a measure for KPI reporting quality based upon the ASB (2006) framework. Then, quantity and quality scores are analysed in order to explain the main features of KPI reporting practices in the UK. Furthermore, descriptive analyses explain the change in KPI reporting over time and across industries.

Chapter (3) examines the factors affecting the level of quantity and quality of KPI reporting in the UK, and hence provides an answer to research question 2. The chapter includes the theoretical basis for explaining the managerial incentives to control corporate disclosure, as well as identifying factors affecting such disclosure. The findings of the analyses also help to assess the validity of using quantity of disclosure as a proxy for quality in accounting studies, and hence provide an answer to question 4.

Chapter (4) provides an answer to research question 3. It investigates whether or not the quantity and quality of KPI reporting have any or a different influence on firm valuation. Furthermore, analyses show how financial and non-financial KPI reporting could have a different impact on firm value. Finally, this chapter links the findings to question the validity of using quantity of disclosure as a proxy for quality in previous research, and hence provides an answer to research question 4.

Chapter (5) provides the concluding remarks of this thesis. It provides a summary of the research objectives, questions, and the approach followed. In addition, it presents a summary of the key findings of the research and discusses their implications. The

remaining part of the chapter shows a summary of the limitations of this research, and highlights several avenues for future research.

Chapter 2 - KPI reporting in the UK: Descriptive statistics

2.1 Overview

The main objective of this chapter is to provide an answer to the first research question (Q1). It explores the main features of KPI reporting in the UK. The present study is distinguished by exploring the level of quantity as well as of quality in terms of KPI reporting for a sample of UK listed companies from different sectors over a five year period.

The quantity of KPI disclosure is measured by counting the number of KPIs disclosed in the annual reports. On the other hand, the study builds on, and contributes to, the literature that focused on the qualitative attributes of the information disclosed (e.g. Beattie et al., 2004; Beretta and Bozzolan, 2004; Giunta et al., 2008; Beest and Braam, 2011). Thus, the study introduces a measure for KPI reporting in terms of quality, based upon the well-recognised regulatory framework in the UK. Hence, KPI reporting in terms of quality scores for firms are identified, based upon the sample firms' compliance with the ASB (2006) guidance for disclosing high quality KPI information.

It is expected that the soft regulations could lead to reporting of KPIs on a voluntary basis. For instance, directors could take advantage of allowing them to report on KPIs if they consider them as necessary and appropriate to the analysis of the firm's performance. They also could avoid reporting on KPIs when they consider such disclosure harmful or against the competitive position. Thus, one can expect that companies would vary in terms of the quantity of the KPIs disclosed or their quality.

Quantity and quality scores are analysed with the use of descriptive statistics in order to explain the main characteristics of KPI reporting in the UK. Furthermore, descriptive analyses explain the changes in KPI reporting over time and across industries. The

analyses are extended to show the corresponding descriptive results for the quantity and quality of financial and non-financial KPI reporting.

Measuring KPI reporting is essential in order to proceed with answering the remaining research questions. Based upon these measures, the following chapters investigate the determinants and consequences of KPI reporting, distinguishing between disclosure quantity and quality. Consequently, it becomes feasible to examine whether or not reporting quantity can be used as a proxy for its quality.

The remainder of this chapter is organised as follows: section 2.2 discusses the regulatory framework of KPI reporting in the UK, and reviews previous research. Section 2.3 illustrates the methods used in this study. It shows the steps followed to construct a measure for KPI reporting. In addition, it presents a pilot study conducted before starting the main analysis. Pilot study results help to ensure the reliability of the research instrument. Section 2.4 shows the sample selection process, and introduces the variables in the remaining chapters of the study. Section 2.5 displays the results of the study with respect to overall KPI reporting, as well as its subcategories. The findings provide a full picture of KPI reporting on the part of UK firms. They show how quantity and quality of KPI disclosures and its subcategories varies across firms in different industries. In particular, the findings also highlight the low level of quantity and quality of non-financial KPI reporting provided by the sample firms. Finally, the discussion and overall conclusion of this study is provided in section 2.6.

2.2 Regulatory framework & literature review

2.2.1 Regulatory framework & previous studies

Neely et al. (1995) demonstrated that performance measurement is a process that requires measures to quantify the efficiency and effectiveness of actions. Accordingly,

each organisation needs a set of performance indicators to measure and analyse its overall performance. As a result, every company has to identify the primary performance indicators that have a significant impact upon its current and future success. These key performance indicators (KPIs) could increase a firm's performance dramatically, by affecting more than one of the critical success factors as they apply to the firm (Parmenter, 2010).

Section 417 of the Companies Act (CA) defines KPIs as: "…*factors by reference to which the development, performance or position of the business of the company can be measured effectively*" (CA, 2006, p.8). Whereas it was argued that KPIs inclusively represent a set of non-financial measures (Parmenter, 2010), others consider that financial KPIs is the principal category of firms' KPIs (Giunta et al., 2008; CA, 2006).

Broadly speaking, a KPI refers to a critical perspective in terms of business performance (Parmenter, 2010). Based upon the content of each KPI, KPIs can be classified as financial or non-financial, quantitative or qualitative, historical or forward looking, and an indicator which contains either good news or bad news (Hussainey and Walker, 2006; Boesso and Kumar, 2007).

Reporting on KPIs is regarded as the core of the business reporting system (Bray, 2010). It is expected that KPI reporting would be a valuable source of information for user groups. KPI information contains relevant information related to the strategy of the company, board objectives, and value creation activities. Arguably, KPI reporting is an effective means to improving both the transparency and relevance of public financial information (Dorestani and Rezaee, 2011a). Firms might use this type of disclosure to support their communications with stakeholders. Hence, KPI reporting could improve the users' ability to evaluate a firm's performance, to assess its position comparing with that of its competitors, and to offer a broad overview of the firm's ability to achieve a

sustainable competitive advantage.

In its report to the U.S. Securities and Exchange Commission (SEC), the Advisory Committee on Improvements to Financial Reporting (ACIFR, 2008) stated that KPI reporting might lead to an increase in the usefulness of information for investors. This increase is expected because KPI disclosures display important aspects of companies' activities that might not be reflected clearly in the financial statements. Therefore, it is not surprising that sophisticated users show a higher reliance on quantitative forecasts of both financial and non-financial KPIs, in the evaluation of the current and future performance of the business (Pratt and Beattie, 2002).

The importance of KPI reporting encourages many regulatory bodies to require firms to publish this critical information. For example, the Institute of Chartered Accountants of Scotland (ICAS) (1999) proposed that improved business reporting should provide additional information which might be captured by management information system, such as performance indicators and intellectual capital (Beattie, 1999). The EU Accounts Modernisation Directive (2003) required that entity's reporting should include a business review. This review must contain analysis using KPIs. This requirement has been adopted by the UK Companies Act (CA) of 2006 (section 417).

Additionally, the International Accounting Standards Board (IASB) issued the IFRS Practice Statement '*Management Commentary*' (MC) in December 2010 (IASB, 2010). This statement presents a broad framework for the preparation and presentation of a management commentary. The statement stated that such a management commentary should include information that helps to understand the critical performance indicators used by management to evaluate the performance against the objectives of the entity. It seems that this statement responded to the call to make MC matter to the investment

community by illustrating the value creation structures of the company through a set of KPIs (Nielsen, 2010).

Regarding KPI reporting in the UK, the directors of quoted companies were first asked to prepare operating and financial review (OFR). According to Schedule (7ZA) of the CA (1985), the OFR should include a comprehensive analysis of: [2]

(a) The development and performance of the business of the company during the financial year, and the position of the company at the end of the year,

(b) The main trends and factors underlying the development, performance and position of the business of the company during the financial year.

(c) The main trends and factors which are likely to affect the company's future development, performance and position.

As mentioned earlier, reporting on KPIs is restated in section 417 of the CA (2006) asking the directors of all companies - except small ones - to analyse the company performance using KPIs in a business review. The KPIs used in the review should meet the need of stakeholders when it comes to understanding the position and the development of the business.

Furthermore, the Accounting Standard Board (ASB) issued the OFR reporting statement which highlights the role of KPIs as a tool for analysing business performance through the board of directors. KPI information is required to help in assessing the firm's progress in achieving its business strategies (ASB, 2006). Consequently, OFR (2006) contains guidance concerning the content of KPI disclosure in such a way as to achieve the best level of usefulness for the users (ASB, 2006).

It is stated that KPIs could be financial or, if appropriate, non-financial to cover environmental and employee matters (ASB, 2006; CA, 2006). Furthermore, it is

[2] Extracted from Department for Business, Innovation and Skills (2010). Available at: http://www.bis.gov.uk/assets/biscore/business-law/docs/n/10-1057-future-narrative-reporting-consultation.pdf

recommended that KPIs should be widely used within the industry or the sector for comparability purposes.

With respect to professional bodies, many surveys have been conducted in order to explore companies' reporting practices after the introduction of the business review (Deloitte, 2006; PriceWaterHouseCoopers, 2006; Deloitte, 2009. For example, Deloitte (2006) reviewed the annual reports of 100 listed firms which were published in the period from 1 August 2005 to 31 July 2006. It was found that 45% of companies presented KPIs. The average number of KPIs was six, with the average number of non-financial KPIs being two.

In November 2006, PricewaterhouseCoopers (PwC) analysed 128 annual reports. The results showed that companies responded to the OFR guidance regarding KPIs. An increasing number of companies used KPIs as a tool to assess performance (32% at March 2005 year-end compared with 75% of companies as of March 2006 year-end). However, the majority of reported KPIs were financial.

The ASB (2007) conducted a review of companies' narrative reporting practices. The main conclusion of this review was that the lack of non-financial KPIs might be due to the difficulty of disclosure on this category for companies. Tauringana and Mangena (2009) explained that by the companies' tendency to take advantage of exemption provisions 10 and 11 in section 417 under the CA (2006). These provisions allow some UK firms not to disclose this type of information for confidentiality reasons. Hence, these companies considered the release of KPI information to be seriously prejudicial to the company's interests.

In 2009, Deloitte examined the narrative sections contained within the annual reports of 130 listed companies, including 30 investment trusts. It was reported that 84% of companies (77% in 2008) clearly identified their KPIs. The average number of KPIs per

company was eight, of which five were financial in nature and three were non-financial. However, companies' performance in explaining the KPIs selected, and their link with strategy, was relatively poor. Many companies did not provide sufficient information for the reader to understand the reasons for selecting certain KPIs. Finally, the study by Deloitte indicated that the top three most common KPIs disclosed were profitability, shareholder return and employee-related measures.

More recently, the Financial Reporting Council (FRC) reviewed the narrative reporting on the part of UK listed companies in 2008/2009 (ASB, 2009). This review indicated that some companies might not consider KPI disclosure necessary or appropriate for understanding the development and performance of the business. However, companies have started to improve KPI communication by using graphical illustrations and tables.

On the other hand, there are a limited number of academic studies that have investigated KPI reporting in annual reports. Hussainey and Walker (2006) explored analysts' reports to investigate whether or not they rely on KPI disclosure. While their study gave a good indication of analysts' usage of different KPIs among high and low growth companies, it did not investigate the characteristics of KPI reporting in the UK. In addition, the study used a small sample of analysts' reports that were concerned with two types of UK companies (high and low growth companies).

Tauringana and Mangena (2009) examined the extent of KPI reporting and the factors affecting its level, before and after the introduction of the business review. They employed content analysis on the annual reports of 32 media sector companies listed on the London Stock Exchange over a four year period (2004-2007). Their findings suggested that the introduction of the business review had a significant impact upon KPI reporting in the media sector. In addition, the authors showed that as late as 2007, 25% of companies were still not reporting any KPIs. Besides that, they highlighted the

association between the extent of KPI reporting in media companies and the proportion of Non-Executive Directors (NED), company size, profitability and gearing.

Tauringana and Mangena (2009) provided evidence on the change in KPI practices in UK media sector firms. It also indicated several factors that might affect the level of KPIs disclosed. However, the study focused on media companies exclusively, with a small sample size, which makes generalisation of their findings difficult. Furthermore, the study did not investigate the quality of KPI disclosure.

Looking at KPI reporting studies outside the UK, Giunta et al. (2008) explored the quantity and quality of KPI reporting in the Italian context. Their study focused on Italian companies' practices regarding financial KPIs published in the annual reports over the period 2004-2006. While they measured KPI quantity based upon the number of financial KPIs published, disclosure quality was measured based on the presence/ absence of 10 qualitative aspects. Then, these aspects were grouped according to the four general dimensions introduced by the IASB (2005); relevance, understandability, reliability and comparability. Then, quality scores were derived by calculating the mean among the four dimensions. The study results showed the low level of financial KPIs in terms of extent and quality in Italy, supporting their call for a regulation with regard to narrative disclosure in MC in general, and in KPI reporting in particular.

While Giunta et al.'s (2008) study was the first to look at the quality dimension of KPI disclosure, the study relies on a relatively small sample comprising medium size companies in the Italian setting. Moreover, the analyses are limited to one type of KPI reporting in the form of financial KPI reporting.

Finally, other studies raised questions about the impact of KPI reporting. Dorestani and Rezaee (2011a) examined the association between non-financial KPI disclosure and the accuracy of analysts' forecasts for a sample of US firms for the two-year period

between 2006 and 2007. Their results suggested that the change in KPI quantity (measured by the ratio of the total number of KPI keywords disclosed to total words included in the management discussion and analysis) does not have strong impact on the accuracy of analysts' forecasts.

Using the same definition of the extent of KPI reporting, Dorestani and Rezaee (2011b) examined whether or not investors' perceptions about the quality of earnings are associated with the quantity of non-financial KPIs disclosed by US firms across the period 2006-2007. They found a positive relationship between the extent of non-financial KPIs disclosed and earning quality (measured by a factor that captures the association between current accruals and cash flows). Yet, Dorestani and Rezaee's studies laid stress on investigating the impact of non-financial KPI reporting. They neither included time series analyses of KPI reporting nor explored the practices with regard to KPI reporting in terms of quantity and quality. Moreover, Dorestani and Rezaee (2011a; 2011b) did not consider financial KPI reporting in their analyses.

On the other hand, Booker et al. (2011) highlighted the impact of non-financial performance indicator narratives upon users' perceptions. The results provided evidence that non-financial KPI information could influence individuals' actions, and could increase their perceptions of the predictive content of these KPIs. However, their experimental study is one which has limited power to enable generalisation if compared with empirical studies.

To conclude, despite reporting on KPIs is required in the UK in accordance with the CA (2006), it is not clear what should be presented as a KPI, or how to distinguish between KPIs and other performance results. Additionally, there is no identical set of KPIs to be reported on for all companies.

Arguably, the nature of the requirements implies that company directors have a wide

area of discretion when it comes to controlling KPI reporting in several ways:

a) They can determine the '*the extent necessary*' with regard to financial and non-financial KPIs when it comes to understanding the development, performance or position of the business of the company.

b) They can determine what is '*appropriate*' when undertaking analysis using other financial key performance indicators, including those related to environmental and employee aspects, and

c) They can take the advantage of exemption provisions 10 and 11 in section 417 of CA (2006) to control the extent of KPI information for confidentiality reasons.

In addition to this interesting setting, it is apparent that previous surveys placed particular stress on exploring the quantity of KPI reporting for small samples of UK companies, and covered a short period of time. They did not explore KPI reporting in terms of quality, or provide a systematic guidance to measuring it.

In summary, only a small number of studies have examined the characteristics of KPI disclosures in general, and in the UK in particular. The current study investigates KPI reporting on the part of UK firms across different sectors. In addition, this study addresses not only the quantity but also the quality dimension of KPI reporting. However, measuring KPI reporting quality is one of the key challenges in the current study. Before introducing the measure adopted by the study to evaluate KPI reporting quality in annual reports, the next section will start by reviewing the disclosure literature that has focused on measuring reporting quality. Consequently, section 2.3 shows all procedures followed to develop a reliable and valid instrument used to measure KPI reporting quality.

2.2.2 Measuring KPI reporting quality

In the first phase of their recent joint framework, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) in the U.S. emphasised that the main objective of financial reporting is to provide existing and potential users with useful accounting information (IASB, 2010). Thus, providing information of a high quality is important for those users to help them in decision making. However, there is a great debate about the definition and measurement of disclosure quality (Beretta and Bozzolan, 2004; Botosan, 1997; Beest and Braam, 2011; Anis et al., 2012).

Beyer et al. (2010) reviewed the disclosure literature and concluded that the authors have missed the economic definition of disclosure quality. Hence, there is a lack of a measure that is directly derived from this definition. Botosan (2004) stated that the conceptual frameworks of accounting bodies provide the guidance to set out generally accepted notions of information quality. In line with this suggestion, the current study uses the main qualitative characteristics of the information disclosed as the foundation for the concept of disclosure quality.[3]

Thus, KPI disclosure quality represents the extent to which KPI information can provide useful information to different stakeholders. This information should be relevant, comparable, reliable and understandable so as to help them in making decisions. Accordingly, KPI information that is characterised with such attributes would lead to a better understanding of the development and performance of the business during the financial year, an evaluation of the current position of the company with

[3] It is worth mentioning that Giunta et al. (2008) used the ASB (2006) framework - the same as is used in the current study - to develop their disclosure quality measure. However, they added two other attributes suggested in the OFR (2006). However, adding these attributes is not justified as they are not based upon ASB guidance or even on the IASB framework. One can argue that this could affect the validity of their disclosure measure.

regard to its competitors, and an assessment of the progress of the board in achieving business strategies. This the definition of KPI reporting quality explicitly reflects the principal objective of the major accountancy and regulatory bodies such as the American Institute of Certified Public Accountants (AICPA) and the ASB (AICPA, 2006; ASB, 2006).[4] Furthermore, the above definition highlights the characteristics that are essential, when it comes to developing a measure to assess the quality of KPI disclosure in particular.

With respect to difficulty in measuring disclosure quality, there are many approaches that have been followed in previous studies (see Healy and Palepu, 2001; Hussainey, 2004; Hassan and Marston, 2010; Beyer et al., 2010). Numerous studies used the quantity of disclosure as a proxy for its quality (Hail, 2002). For instance, Hussainey and Mouselli (2010) used the number of future-oriented earning statements as a proxy for disclosure quality. However, providing more disclosure is not an indication of the quality of the information disclosed. In addition, high reporting quantity that belongs to a specific type of disclosure (e.g. forward looking earning statements) might not necessarily indicate high or low reporting quality for the other types of information disclosed (Anis et al., 2012).

Some studies have considered earnings or accruals quality as measures of disclosure quality. For example, Dechow and Dichev (2002) modelled the relationship between working capital accruals and operating cash flows in order to evaluate earning quality. Hence, financial reporting quality should include the quality of both financial information and non-financial information (Beest and Braam, 2011). In their review of the literature, Beyer et al. (2010) illustrated that future studies should take into account that earning or accruals quality might not be a valid measure that captures the variation

[4] It is argued that the OFR issued draws upon the Jenkins framework issued by the AICPA in 1994 (Beattie et al., 2004).

in accounting information quality.

Assuming that auditors usually ask for higher fees from firms with lower reporting quality, Hirbar et al. (2010) found that unexplained audit fees could work as a proxy for disclosure quality. They found that this proxy is more powerful in predicting fraud and restatement, and hence offers a better measure of the quality of earnings or accruals. Since it could capture the extent of auditor's independence rather than earnings' quality (Berger, 2011), this proxy is still imprecise when it comes to explaining the variation in disclosure quality.

Rogers (2008) presented a different proxy for disclosure quality. He depended on the underlying positive association between disclosure quality and market liquidity, to justify using the change in market liquidity as a proxy for disclosure quality. However, this proxy - like other proxies that follow the same approach - suffers from a limitation: changes in market liquidity (or any proxy that relies on market measures) might be influenced by other factors rather than by disclosure quality (Berger, 2011).

Healy and Palepu (2001) referred to three other common proxies used to measure disclosure quality in previous studies: management forecasts, subjective ratings, and self-constructed indices.

Management forecasts consist of forward-looking information voluntarily provided by management. Management forecasts are usually used by U.S. researchers thanks to their availability in the First Call database and in the Dow Jones News Retrieval Service (Hassan and Marston, 2010). Management earnings forecasts can be verified through actual earnings realisations (Hassan and Marston, 2010). However, these forecasts are only one component of managers' voluntary disclosure package, and hence, it is not sensible to use this type of information only as a proxy for the overall level of corporate disclosure quality (Hussainey, 2004).

As far as subjective ratings are concerned, these ratings are comprehensive measures of the overall level of corporate disclosure quality.[5] The most common example are the surveys conducted by the Financial Analysts Federation (FAF) / the Association for Investment Management and Research (AIMR) which have been used as proxies for disclosure quantity and quality in several previous studies (e.g. Lang and Lundholm, 1996; Botosan and Plumlee, 2002).

The FAF and AIMR reflect the ratings given by leading financial analysts for mandatory and voluntary disclosure made by companies. Although disclosure quality is assessed comprehensively through the use of experienced experts, the ratings could suffer from some limitations (Healy and Palepu, 2001; Hussainey, 2004). In particular, analysts show - to some extent - subjectivity and bias by just including large US firms in the ratings (Healy and Palepu, 2001), or by giving higher ratings to firms with better current and expected operating results (Lang and Lundholm, 1993). In addition, AIMR-FAF ratings cannot be used any longer as they were discontinued in 1997, with the last year of the disclosure scores being 1995.

Hussainey (2004) showed some other subjective ratings that have been used in previous studies as proxies for the quality of corporate disclosures. These ratings include Financial Post ratings; Australian Stock Exchange ratings; SEC ratings; Society of Management Accountants of Canada (SMAC) ratings and the Center for International Financial Analysis and Research (CIFAR) ratings. However, these ratings basically depend on analysts' and accountants' opinions with regard to firm's disclosures (Hussainey, 2004). Therefore, the inherent subjectivity in these ratings does not allow using them widely in accounting studies.

[5] For more detail see: Healy and Palepu (2001); Hussainey (2004); Hassan and Marston (2010); and Beyer et al. (2010).

As indicated above, using a proxy that indirectly reflects reporting quality levels is problematic. Therefore, self-constructed disclosure indices have been introduced by researchers to measure disclosure quality. In particular, their attempts have been aimed at developing a measure that captures the qualitative characteristics of information which could improve its usefulness. This multi-dimension approach - to assess disclosure quality – has been adopted in several studies (e.g. Beattie et al., 2004; Beretta and Bozzolan, 2004; Beest and Braam, 2011; Anis et al., 2012). For example, Beattie et al. (2004) take into account three types of information attributes: financial/non-financial, quantitative/ qualitative, and historical/forward looking. According to this approach, the researcher searches the text and produces a disclosure score determined by the presence or absence of qualitative attributes in the disclosed information. Finally, total scores are derived as a result of aggregating the individual score for each piece of information. In some cases, weighted scores are produced to highlight the importance of some dimensions.

However, the studies which have adopted this approach exhibit different problemsBeattie et al. (2004), as well as Beretta and Bozzolan (2004), used measures of quality that relied – to some extent - on disclosure quantity. Additionally, the measures introduced did not define disclosure quality or its dimensions in accordance with any of the regulatory frameworks. Regulatory frameworks present the qualitative characteristics needed to make financial reporting more useful (Botosan, 2004). Thus, it could be argued that it is better to assess firms' reporting qualities in accordance with the frameworks of regulatory bodies.

On the other hand, other studies which have considered the regulators' perspective with regard to quality definition have revealed different limitations. For example, when Beest and Braam (2011) constructed their index, they considered the qualitative

attributes of information illustrated in the IASB (2008) exposure draft. Their comprehensive measure gave the opportunity to make subjective interpretations on the part of the coders which affected the reliability of the measure. Moreover, the authors acknowledged that they could not ensure the validity of the measure. Anis et al. (2012) defined and developed their measure of reporting quality in accordance with the OFR guidance (2006) framework. Despite using software to code the text over a relatively large sample[6], Anis et al.'s (2012) measure is unclear, and might suffer from double counting. For instance, they used the quantity of forward-looking information to reflect on three of the eight dimensions that are aggregated to measure disclosure quality (i.e. the forward-looking orientation, verifiability, and relevance dimensions). Moreover, their measure is too general to reflect reporting quality over the whole annual report. For example, they used the presence of the quantitative KPI section to assign a comparability dimension score. Whereas it might be considered as an indication of KPI reporting quality in the report, it cannot be generalised to the whole report. A firm can provide a quantitative KPI section and ignore the comparability dimension in all other types of disclosure throughout the report.

Despite the limited number of studies that analysed KPI reporting, two studies used a self-constructed index to measure the quality of KPI disclosures (i.e. Boesso and Kumar, 2007; Giunta et al., 2008). Boesso and Kumar (2007) compared the drivers of voluntary disclosure in terms of KPI information in the US and in Italy. Based on the previous literature, they employed an aggregated index in which KPI reporting in terms of quality is a function of the following dimensions: the outlook of the KPIs disclosed (historical or forward-looking); the type of KPIs reported (quantitative or qualitative);

[6] It is worth mentioning that using automated analysis has many limitations if compared with manual content analysis.

and the nature of the KPIs (financial or non financial). They gave double weight to forward-looking, quantitative, and non-financial KPIs in contrast to historical, qualitative and financial ones. However, Boesso and Kumar (2007) measure implicitly mixed between the quantity of disclosure and its quality. Therefore, it can not be used to assess disclosure quality regardless of its quantity. Furthermore, this quality measure lacks a clear theoretical foundation that explains the definition of disclosure quality, and hence does not justify either the different dimensions used or the weights allocated to different types of KPI disclosure. Nevertheless, it can be argued that other dimensions should be included in order to assess the reliability and understandability of the KPIs disclosed. The weights are to a great extent subjective; it will be problematic if a researcher seeks to compare quality scores for different KPI categories (e.g. financial KPIs and non- financial KPIs).

Giunta et al. (2008) addressed these issues when they used a self-constructed index to assess the quality of financial KPIs for a sample of Italian firms. They constructed their measure in accordance with the common objectives of the main regulatory bodies (i.e. IASB, Canadian Institute of Chartered Accountants (CICA) and the ASB). They identified ten qualitative attributes to be included in their index. Then, these attributes were grouped following the four general dimensions presented by IASB (2005), which include relevance, understandability, reliability and comparability. Finally, quality scores were derived by calculating the mean among the four dimensions. Giunta et al.'s (2008) measure of quality showed a better linkage between the dimensions they used to assess disclosure quality, and the key qualitative attributes of information. However, it is implied that Giunta et al. (2008) used the ASB (2006) - as with the current study - but added two other attributes. First, there was the presence of graphs and tables. This could create confusion for the coder because it is too close to another attribute (i.e. data

trend). Consequently, the authors did not justify the reason behind using binary calculation for all the attributes except for the data trend. Second, they added a benchmarking dimension which refers to the presence of comparable peer data or sector data. Thus, adding this attribute was not based on ASB guidance or even on the IASB framework. As a result, the validity of their disclosure measures could be affected.

The present study uses a disclosure quality measure which is based upon ASB (2006) guidance for best practice with regard to KPI reporting. Hence, the measure employed evaluates the reporting quality taking into consideration the qualitative attributes that make this information useful. Arguably, using the same attributes as indicated in the ASB (2006) guidance to generate quality scores is more objective. The measure avoids any subjectivity that may be caused by adding more attributes and, in turn, increasing coder bias when it comes to scoring.

Overall, the present study contributes to the literature by being the first to investigate the characteristics of KPI reporting in a UK setting. Unlike Tauringana and Mangena (2009) who focused on one sector, the current study investigates KPI reporting by considering non-financial firms from different sectors. This enables the researcher to observe the variation among firms in different industries with regard to KPI reporting. Furthermore, compared with the Giunta et al. (2008) study in an Italian setting, the present study is the first to explore the quality levels of KPI reporting including financial and non-financial KPI disclosures. The size of the study sample is relatively large compared with the most similar studies with a longer time series.[7] Therefore, the study results could be generalised, which could have different implications for users and interested regulatory bodies. The study also provides many research opportunities

[7] However, one common limitation of labour intensive studies is the relatively small sample size. Given that manual content analysis is employed to code the text, and the majority of CG variables data is hand-collected by the researcher, sample size is - to some extent - restricted due to time and effort considerations.

based upon that distinction between the quantity and quality in terms of KPI reporting. For example, researchers could empirically investigate whether or not reporting quantity and quality are derived from the same factors.

2.3 Methods

There is neither a general definition for KPIs nor a certain set of KPIs to be disclosed by all UK firms. Therefore it is suggested that manual content analysis could be a more relevant approach to quantifying KPI disclosures for each firm. This traditional technique has been used in previous studies (e.g. Beretta and Bozzolan, 2004; Beretta and Bozzolan, 2008; Linsley and Shrives, 2006; Abraham and Cox, 2007). It helps to avoid many of the drawbacks of automated content analysis. These drawbacks include misleading results due to using inappropriate/insufficient key words or using the words in isolation of the whole meaning of the sentence, in addition to the limitations related to the software used to perform the analysis (Hassan and Marston, 2010).

KPI reporting in terms of quantity refers to the amount of KPI information in the annual report. It is measured by the number of KPIs that are published by a firm. KPI information in the current study is classified into financial and non-financial KPIs. Financial KPI disclosure includes all information about the key factors that affect the financial performance of the firm and its development. These KPI could usually be driven using financial statement items such as cash flow, operating profit, return on capital employed, research and development expenditure, earnings per share…etc. Financial KPIs could be helpful to annual report users in terms of evaluating the firm's financial performance, and assessing its current competitive position. On the other hand, non-financial KPI disclosures include all non-financial information about the key factors that affect the performance of the firm and its development. These KPIs could cover operational, environmental or employee aspects. Non-financial KPIs are not

driven directly by financial statements such as new product launches, emissions, number of employees, staff attrition rate….etc. Rather than financial KPIs, non-financial KPIs are concerned with other perspectives of a firm's performance. Arguably, financial, together with non-financial KPI information, could enable different stakeholders to have a full picture about the critical factors that affect the current and future performance of the firm.

Having distinct disclosure quality and quantity scores helps to examine whether or not the two dimensions can operate as substitutes. Thus, to measure KPI reporting in terms of quantity in the study, an un-weighted approach is employed to code and measure KPI disclosures throughout the annual reports. Therefore, '1' is given for each KPI disclosed in the annual report. Ahmed and Courtis (1999) claimed that un-weighted scores are to be preferred due to subjectivity concerns. The current study follows an un-weighted approach to measure KPI reporting in terms of quantity since there is no theoretical basis for weighting either financial or non-financial KPIs. Marston and Shrives (1991) acknowledged the fact that weightings are usually achieved by conducting surveys among relevant user groups. However, they questioned the rationale behind supposing that rating an item as a four indicates that this item is four times as important as an item rated as a one. Moreover, this study is not focusing on one particular user group. Cooke (1989) argued that weighting would be useless when research is not focused on a particular user group. He claimed that each group would attach different weightings, which would result in them eliminating each other's effects. In consistency with this view, Firth (1980) observed that weighted and un-weighted scores lead to similar results.

Overall, each company has been given a score in terms of quantity, which represents the total number of reported KPIs. These KPIs include both financial KPIs and non-

financial ones. For example, looking at Greggs Plc. with regard to its annual reports and accounts 2010, the company disclosed the following KPIs - financial KPIs: like for like sales growth, total sales growth, capital expenditure, diluted earnings per share, operating profit, operating margin. In addition, growth in net shop numbers was reported as a non-financial KPI. Thus, the quantity of financial (non-financial) KPIs reporting is six (one). Subsequently, KPI reporting in terms of a quantity score for this company in 2010 was seven (the total number of KPIs disclosed).

In accordance with the definition of KPI reporting in terms of quality introduced earlier, the presence of qualitative attributes for each KPI disclosure would enhance the usefulness of KPI reporting in general. The main advantage of this approach is that of evaluating reporting quality in a straightforward way by looking at the qualitative attributes in the disclosed information, rather than inferring disclosure quality by using a proxy that may not capture changes in quality. Therefore, the study draws upon the OFR (2006) best practice guidance regarding each KPI's content. For each KPI, the guidance states that the following qualitative characteristics need to be considered (ASB, 2006, p.23, and pp. 29-38):

1- Provision of the definition of the KPI and explanation of its calculation method (e.g. the average revenue per user ARPU; the number of subscribers, the percentage of revenue from new products, products in the development pipeline, and customer churn).

2- Explanation of the purpose of adopting a particular KPI (e.g. to assess how the company is performing in its market; because it is one of the key drivers for future revenue growth in the industry; to measure and manage the company's objectives to increase shareholder value; to reduce churn rate in order to improve revenue).

3- Disclosure of the source of the data (e.g. GAAP financial statements figures; internal estimates; internal company data).

4- Quantify the targets for each KPI (e.g. to achieve a market share of % within X number of years; to have an economic profit target of £X million).

5- Quantify the data (e.g. disclosure of the corresponding amount for the previous year; five year trend data; a table of the number and the percentage increase in a KPI from year to year; a graph showing comparatives and the percentage change year by year).

6- Provision of a commentary on future targets (e.g. the company plans to achieve X market share in Y segment by the introduction of SS which is a new product or sale channel).

7- Disclosure of the adjustment for any financial statement information used (e.g. operating results used for calculating return on capital employed = operating results as in the financial statements + interest from sales financing).

8- Explanation and disclosure of any changes or of no changes to KPIs (e.g. changes have been made to the data or calculation methods used).

Arguably, considering these dimensions could result in producing KPIs that possess the main qualitative characteristics of information as recommended by ASB (2006). It was recommended that the information provided should be comprehensive and understandable. Given that KPI information covers many aspects of firm performance, it should be presented in a way that enables users - with a minimum knowledge of accounting as well as business activities - to understand this information. Arguably, this could be achieved if the management presents the definition of each KPI, mentions how the KPI is calculated, and discloses any changes made to KPIs, explains the purpose of adopting the KPI by the management, show the trends with regard to each KPI, and provides a management commentary on the targeted KPI. Furthermore, ASB (2006) recommended that KPI information should be verifiable. This might be achieved by disclosing the source of the data used to calculate each KPI, and explaining the

assumptions used in calculations, showing any adjustments for any of the financial statement information used. Moreover, ASB (2006) recommended that the information disclosed should have forward-looking orientation, so as to assist the user in evaluating the prospects of the business, as well as management's plans for achieving its business strategies. With respect to KPI information, the managers could provide the targets in for KPIs, and comment on these targets by informing the users how these targets could be achieved within the stated time frame.

Relevance is an important characteristic of information recommended by the ASB (2006). Thus, KPI information should be relevant to the users in order to help them to evaluate a firm's performance. This could be retained by explaining the purpose of adopting such a KPI, and indicating that these KPIs could measure the firm's performance relative to the firm's objectives. In addition, a management commentary on the KPI targets could illustrate to which extent these targets are relevant to managing future performance. KPI information should also be balanced and neutral. This could be achieved by quantifying KPI data in such a way as to avoid any bias in the information disclosed. Hence, users would be informed with regard to the trend in KPI results showing the change in these results - year by year - regardless of what this change could mean to the business (i.e. good or bad news). In this regard, comparability is another important characteristic of information. Users should be enabled to compare KPI information across different firms, year by year. This could be considered by quantifying KPI data, explaining the assumptions used in calculating each KPI, and showing any adjustments for any financial statement information used. Finally, ASB (2006) stated that disclosed information should be complementary and supplementary to the financial statements. In accordance with ASB (2006) guidance, KPI information could provide the user with additional information or explanations of the information

included in the financial statements. Thus, one might argue that firms' intent to explain or complement information already reported in the financial statement, could lead to the use of this information to calculate different KPIs. Hence, disclosing whether or not any adjustments made for financial statement items in order to provide KPI information would signal the action to complement and supplement financial statement information.

To conclude, firm's directors should provide KPI information that is relevant, has a forward-looking orientation, is comprehensive and understandable, is balanced and neutral, contains complementary and supplementary financial statement, and is verifiable and comparable over time. In short, it is argued that applying ASB's would result in providing KPI information of a high quality.[8]

Table 1 links the proposed dimensions of KPI reporting in terms of quality with the main principles introduced by ASB (2006).

Table 1 Overview of the dimensions used to measure KPI reporting quality in relation to the qualitative characteristics of information

OFR (2006) guidance	**Linkage to the main qualitative characteristics of information recommended by ASB (2006)**
1- Provision of the definition of the KPI and explanation of its calculation method.	-*Comprehensiveness and understandability* - *Verifiability*
2- Explanation of the purpose of adopting the KPI	-*Comprehensiveness and understandability* - *Relevance*
3- Disclosure of the source of the data	-*Verifiability*
4- Quantify the targets for each KPI	-*Forward looking*

[8] One might argue that the current study avoids disclosure in terms of quantity to be reflected in evaluating disclosure quality. Therefore, KPI reporting quality measure looks at the extent to which the mentioned dimensions are maintained by each company. In other words, the study aims at ranking companies in terms of their compliance with the ASB (2006) guidance. It is observed that companies vary with respect to the number of KPIs provided. Therefore, using the absolute quality scores would allow KPI quantity scores to affect quality scores. Thus, the study employs simple averages in order to produce quality scores. Arguably, this procedure would eliminate the influence of quantity score differences, and hence, quality scores will not be affected by these differences. Furthermore, the quality measure does not consider the extent of information with regard to each dimension. This also would avoid any effect of the quantity of information provided in terms of having an impact on quality scores. However, it can be claimed that the resultant quality scores might suffer from a limitation. In particular, quality scores will not take into account the depth of KPI information provided.

	orientation. *-Relevance*
5- Quantify the data	*-Balance and neutrality* *-Comprehensiveness and understandability* *--Comparability*
6- Provision of a commentary on future targets	*Forward looking orientation.* *Relevance* *Comprehensiveness and understandability*
7- Disclosure of the adjustment for any financial statement information used	*-Comparability* *-Complementary and supplementary to financial statements.* *- Verifiability*
8- Explanation and disclosure of any changes or no changes to KPI	*-Comparability* *-Comprehensiveness and understandability*

It can be argued that the approach used in this study to measure KPI reporting quality has many advantages. First, the index is based upon a framework of a well recognised regulatory body (ASB, 2006) that aims at ensuring information usefulness. Second, the study maintains consistency in designing, coding and measurement processes. The index employed uses the KPI disclosure guidance which is recommended to be followed by UK firms. Consequently, this index is specifically used to assess KPI reporting quality, and hence, it is more convenient when it comes to this type of information. The index focus is on assessing the quality of information unit, which makes it valid for being applied to different types of narrative disclosure. For instance, the index can be applied to measure the quality of risk information disclosed in the annual report. Finally, the index covers the qualitative attributes of information without requiring a great deal of subjective judgment. These qualitative attributes are clear enough to be tracked. Moreover, the binary scoring helps to obtain reporting scores without the need to make substantial judgments on the part of the coder. This adds to the reliability of the measure, which has been additionally been assured by other

techniques.

To obtain the score of KPI reporting in terms of quality for each company, an approach to scoring has to be determined in terms of either weighted or un-weighted approaches. According to the weighted disclosure approach, the researcher has to allocate weights to the disclosure items based on each item's importance. For example, Botosan (1997) gave more weight to quantitative disclosures as she considered that quantitative information is more important than qualitative information. Similarly, Boesso and Kumar (2007) assigned more weight to forward-looking, quantitative, and non-financial KPIs.

The main drawback of this approach is the subjective judgement involved in allocating weights to the disclosed items in that it is likely that different coders may give different assessments in terms of the items' perceived importance.

The un-weighted approach avoids this key drawback of the weighted approach. Hence, equal weights are attached to all disclosed items within the checklist. Therefore, if the item is disclosed in the annual report, it is allocated "1" and "0" otherwise. Although this approach is known as the 'dichotomous' method, Cooke (1991) demonstrates that it is not strictly 'dichotomous' because some items may not be applicable to a firm. If this is the case, these items are scored as 'not applicable' (NA).

The suggested ASB dimensions to capture the quality of KPI reporting are considered to be integrated. Thus, there is no need to use the weighting approach with respect to the proposed dimensions or the type of KPI information (i.e. financial or non-financial). Hence, the qualitative characteristics of information are treated as equivalent with regard to their importance. As discussed earlier when measuring KPI reporting quantity, it is shown that there is no theoretical basis to weight either financial or non-financial KPIs. Therefore, an un-weighted approach is also preferred to avoid subjectivity and

bias in measuring disclosure quality. Moreover, the current study is not focusing on one particular user group. Finally, the current study agrees with the argument of Cooke (1989) that weighting would be useless when research – such as the current research - is not focusing on a particular user group. The approach adopted in the current study is also supported by similar results reported for weighted and un-weighted scores in previous studies (e.g. Firth, 1980).

On the other hand, the dichotomous scoring approach is applied to measure KPI reporting quality. Therefore, '1' was given if an item meets the quality dimension and '0' otherwise. The quality score for each KPI is calculated as a ratio of the total items disclosed to '8' (the maximum score for each KPI). However, for non-financial KPIs, it is noted that it might not be applicable to show any adjustments to any financial statement information used. Following previous disclosure studies (e.g. Cooke, 1992; Tauringana and Mangena, 2009; Tsalavoutas et al., 2010), this issue has been taken into consideration. Hence, the quality score for a non-financial KPI is produced as a ratio of the total items disclosed to '7' instead of '8' (the maximum number of applicable disclosure items for each KPI). Then, the quality score for each company has been derived as an average of its KPI quality score.

Table 2 An example of using the research instrument to assign quantity and quality to KPI reporting

Unilever PLC	KPIs disclosed	Quantity s	The definition	The purpose	Source of data	Quantified targe	Commentary	Quantified da	showing adjustments	Disclose changes	Quality score for each KPI
	Financial KPIs										
2009	sales growth	1	1	1	1	0	0	1	1	0	0.625
	Underlying volume growth	1	1	1	1	0	0	1	1	0	0.625
	operating margin	1	1	0	0	0	0	1	0	0	0.250
	Operating margin before	1	1	1	1	0	0	1	1	0	0.625
	free cash flow	1	1	1	1	0	0	1	1	0	0.625
	Return on invested capital	1	1	1	1	0	0	1	1	0	0.625
	Total shareholder return	1	1	1	0	0	0	1	0	0	0.375
	Financial KPIs reporting quantity	7							**Financial KPIs reporting quality**		0.536
	Non financial KPIs										
	Total accident frequency rate	1	1	1	0	0	0	1	N/A	1	0.571
	CO2 from energy per tonne of product	1	1	1	0	1	1	1	N/A	0	0.714
	Water per tonne of production (m3)	1	1	1	0	0	0	1	N/A	0	0.429
	Total waste per tonne of production	1	1	1	0	0	0	1	N/A	0	0.429
	Non-financial KPIs reporting quantity	4							**Non-financial KPIs reporting quality**		0.536
	Total KPIs reporting quantity score	11							**Total KPIs reporting**	**quality score**	0.536

Definitions of financial KPIs as provided in the annual report of Unilever PLC are: Sales growth: the percentage increase in turnover, adjusted for the impact of acquisitions and disposals and exchange rate fluctuations. **Underlying volume growth**: underlying sales growth after eliminating the impact of price changes. **Operating margins:** operating margin before the impact of restructuring costs, business disposals and other one-off items. **Free cash flow**: the cash flow from operating activities**. Return on invested capital (ROIC):** The profit after tax (excluding finance and net impairment charges) divided by the average invested capital. **Total shareholder return**: the returns received by a shareholder, capturing both the increase in share price and the value of dividend income (assuming dividends are re-invested).
Note: Non-financial KPIs are defined in the table.

2.3.1 Designing the research instrument & ensuring its validity

To design the initial research instrument, many considerations were taken into account. First, the research instrument should be relevant to measuring both types of KPI reporting in terms of quality and quantity for each company. Second, the eight KPI reporting quality dimensions should be included within the initial checklist. Third, each KPI coded is categorised into financial and non-financial in order to serve the purposes of the analysis.

Validity is defined as the extent to which any instrument measures what it is intended to measure (Marston and Shrives, 1991). Following previous disclosure studies (Hope, 2003; Tsalavoutas et al., 2010; Hassan and Marston, 2010), validity is ensured through the assessment of content validity. Hence, it is achieved by relying on the literature while constructing the instrument, so as to make sure that the instrument contains relevant and adequate items with regard to measuring KPI disclosures.

Following previous studies (e.g. Tsalavoutas et al., 2010), after designing the initial checklist, it was reviewed independently by both the principal and the second supervisor in order to achieve instrument validity. All suggestions and comments were discussed and considered in order to improve the validity of the instrument. Table 2 shows an example of using the research instrument to drive quantity and quality scores of KPI reporting for Unilever Plc. in 2009.

2.3.2 Assessing the reliability of the research instrument: pilot study

Reliability is the extent to which the instrument produces the same results on repeated trials (Hassan and Marston, 2010). Thus, the disclosure measure has to be subjected to reliability tests in order to obtain useful inferences with regard to using the instrument in a research situation (Beattie et al., 2004). Inter-rater reliability is the most frequently reported measure when it comes to assessing reliability (Beattie et al., 2004). By

comparing the results produced by more than one coder, the greater the extent to which the results are related, the more the reliable is the instrument. For instance, Linsley and Shrives (2006) achieved reliability through coding an initial sample of seven annual reports. The authors - in addition to the researcher who coded the whole sample of 79 annual reports - independently coded the initial sample. As the agreement level exceeded 0.75, they considered this as a satisfactory level of inter-rater reliability.

To assess the reliability of the research instrument, a pilot study was conducted. It also aimed to check the variation between firms in terms of KPI reporting using the research instrument. The pilot study was conducted on a sample of ten annual reports for the years 2009-2010. This sample was randomly selected from different sectors to measure the quality and quantity of KPI reporting. Thus, the researcher was able to get an initial idea about the variation between firms in different industries with respect to KPI reporting.

Following the previous literature (e.g. Linsley and Shrives, 2006), decision rules were produced and used as a coding reference to improve the reliability. Then, each of the researcher and the two supervisors coded the annual reports of the pilot study sample independently. This procedure aimed to ensure consistency in applying the decision rules. Finally, the results obtained were checked, and found to be close.

Furthermore, parametric and non-parametric tests were performed to compare quality and quantity scores given by the researchers who coded the same text[9]. Table 3 indicates that both the ANOVA and Kruskal-Wallis tests gave additional evidence of the reliability of the research instrument[10]. The results in Table 3 show that there is no

[9] At this point, it is difficult to decide whether the sample data came from a population with a Gaussian (normal) distribution. In practice, the size of the sample was relatively small.

[10] As having one independent variable with three groups (the researchers who coded the text) and one dependent variable (quantity/quality scores), one way between groups analysis of variance, ANOVA was employed (as a parametric test), and its equivalent non- parametric test (Kruskal-Wallis Test) was also performed.

significant difference between the mean scores in terms of quality and quantity for the main researcher and his supervisors.

Table 3 ANOVA and Kruskal-Wallis tests of differences among quantity and quality scores in the pilot study

Researcher	N	Quantity scores mean	Quality scores mean	Quantity scores mean rank	Quality scores mean rank
The main researcher	10	12.9	0.498	15.45	14.50
1st supervisor	10	13.7	0.495	16.50	14.40
2nd supervisor	10	12.2	0.577	14.55	17.60
Total	30	12.93	0.524		
ANOVA test: F value		0.118	0.463		
Kruskal-Wallis test: Chi-Square				0.247	0.857
Significance levels		0.889	0.634	0.884	0.651

Finally, the discrepancies between the coders' scores were analysed. Any issues that led to differences were resolved. Actually, there were few differences which were mainly related to KPI classification issues. For instance, a disagreement came from particular KPIs such as order book\ orders received \revenue; or sales per employee\ average room rate\ licenses signed\ growth in passenger journeys\miles\ unique active players\market share. Thus a rule is set in order to consider such a KPI as a financial KPI, because they are related and\or can be derived directly from financial statements. Ensuring that the disclosure measure is reliable and valid is an essential procedure before applying the research instrument to the main study sample.

2.4 Data

The current study focuses on analysing KPI reporting for a sample of FTSE 350 non-financial UK firms. Panel (A) in Table 4 shows the sample selection process that starts from focusing on the top 350 UK firms. Hence, the Financial Times ranking for 2011 is

used to define these companies based upon their market capitalisation value. Then, financial firms are excluded in order to identify the sample, following previous studies (e.g. Beretta and Bozzolan (2004); Abraham and Cox (2007)), because these firms have specific characteristics as well as a different framework for disclosure practices applicable to them. Following Elshandidy et al. (2013), firms with missing financial or corporate governance data are removed. Considering the time and effort needed in coding each annual report, this procedure is used in order to retain firms with a complete time series of data. Hence, the number of observations would not significantly drop in the next stage of the analysis because of the problem of missing data. Thus, the rule used to remove firms at this stage is: a firm should be excluded when it has one type of financial data which is missing for more than one year; or if more than one type of this data is missing for one year. Moving from the resultant firms (190 firms); sample firms are randomly selected from all possible sectors. Every sector is represented in the sample according to the following equation:

$$\text{Nsi} = \frac{\text{Sis}}{\text{Tn}} * 100$$

Where;

Nsi : represents the number of firms that have to be chosen from the sector i.

Sis: represents the total number of firms included sector i.

Tn : represents the total number of firms identified for all sectors (i.e., 190 firms).

Moving on from this, systematic sampling is used to select sample firms from each sector. Given that firms are initially ordered according to market capitalisation, the first firm in each sector is considered as the starting point, and then the process is continued by selecting the third, the fifth and so on. Following this procedure, 103 firms are identified (515 firm-year observations over the five year period 2006-2010). Subsequently, various observations are excluded for the reasons illustrated in Panel (A)

in Table 4, to end up with 503 observations as the final sample. Panel (B) in the same table provides a disaggregation of the sample across industries.

Firms' annual reports are collected from the company homepages and from the Thomson One Banker database. Data on firms' financial characteristics are collected from Datastream. The developed research instrument is employed to quantify KPI reporting, and to assign quality scores based upon ASB guidance for best practice.

Table 5 illustrates the definition and measurement for each variable of the present study.

Table 4 Sample Selection and its disaggregation across industries

PANEL A – SAMPLE SELECTION PROCESS	
Starting point: Top 350 UK firms based on market capitalisation, according to the 2011 Financial Times ranking. Financial firms are then excluded. Subsequently, 103 firms are selected randomly following two criteria: 1) each sector is represented in the same proportion as in the starting sample; 2) as firms are arranged according to market capitalisation; systematic sampling is used by choosing the first company in every sector as a starting point. Then, selection is continued by selecting the third, the fifth and so on. This process results in 515 observations [103 * 5 years (2006, 2007, 2008, 2009, and 2010)]. Thereafter, the following exclusions take place:	
***n* observations excluded thereafter**	**Reason for exclusion**
2	KPI regulation not applicable in 2006 [11]
4	Missing data on directors' compensation
6	Missing CG data
12	total number of observations excluded
503	***final sample***

PANEL B – SAMPLE CONSTITUENTS BY INDUSTRY		
Industry	**Frequency**	**Percentage**
Basic Materials	40	8.0
Consumer Goods	65	12.9
Consumer Services	107	21.3
Health Care	24	4.7
Industrials	143	28.4
Oil & Gas	54	10.7

[11] Two observations have been excluded as these companies' financial year started before 1-4-2005 (the date at which the requirement to include a business review in annual reports in the UK became applicable).

Technology	40	8.0
Telecommunications	10	2.0
Utilities	20	4.0
TOTAL	503	100

Table 5 Study variables: definitions & measurement

Panel (A) KPI reporting quantity

Variable	Definition	Measurement
QNFKS	Quantity of financial KPI reporting	The number of financial KPIs disclosed in KPI section.
QNNFKSEC	Quantity of non-financial KPI reporting	The number of non-financial KPIs disclosed in the KPI section.
QNNFKREP	Quantity of total non- financial KPI reporting	The number of non-financial KPIs disclosed in the whole report.
QNTKSEC	Quantity of KPI reporting	The total number of financial and non-financial KPIs disclosed in the KPI section.
QNTKREP	Quantity of total KPI reporting	The total number of financial and non-financial KPIs disclosed in the whole report.

Panel (B) KPI reporting quality

Variable	Definition	Measurement
QLFKS	Quality of financial KPIs reported	The aggregated quality score of financial KPIs that are disclosed in the KPI section.
QLNFKSEC	Quality of non-financial KPIs reported	The aggregated quality score of non-financial KPIs disclosed in the KPI section
QLNFKREP	Quality of total non-financial KPIs reported	The aggregated quality score of non-financial KPIs that are disclosed in the whole report
QLTKSEC	Quality of KPIs reported	The aggregated quality score of financial and non-financial KPIs that are disclosed in the KPI section.
QLTKREP	Quality of total KPIs reported	The aggregated quality score of financial and non-financial KPIs that are disclosed in the whole report

Panel (C) Firm characteristics

Variable	Definition	Measurement
SIZE	Firm size	The natural logarithm of market capitalisation (WC08001)
PROFITAB	Profitability	The profitability measured by return on equity ((WC01651) / (WC03501))
LEVERAGE	Leverage	The ratio of total debt to total capital (WC08221)
LIQUIDITY	Liquidity	The current assets (WC02201) / current liabilities (WC03101)
DIVYIELD	Dividend yield	Dividends per share / share price

		((WC05376)/(WC08001))
CROSSLIST	Cross listing	Dummy variable equals to 1 if the firm's shares are traded on foreign financial markets and 0 otherwise.

Table 6 gives a full picture of the characteristics of the sample firms. Panel (A) reports the descriptive analysis for the continuous variables. It shows that the natural logarithm of market capitalisation for these firms varies from a minimum of 8.00 (£16,506,000) to a maximum of 11.019 (£130.16 billion) with standard deviation of 0.685 (£17.8 billion). This significant variation is expected, as the sample firms are drawn from FTSE 350 which includes the largest UK firms. It shows that firm size should be considered as it might have effects on KPI reporting in practice. However, the large variation may refer also to the existence of outliers which will be identified and addressed later in chapter three. These firms' profitability mean measured by ROE is 0.08 which refers, in general, to firms' ability to generate profits from shareholders' equity. However, the value of the ROE ratio should exceed the cost of equity capital in order to add value to shareholders. The liquidity ratio median is 1.64 times which indicates that firms in the sample do not suffer from financial problems in short run. It shows that firms are able to cover their short term liabilities through their current assets. These companies are not highly leveraged, with a mean debt to total capital of 0.364. However, the minimum of zero and maximum of 1.42 for the leverage ratio indicates that these firms are varied to some extent in their reliance on debt to finance their investments.[12] Finally, the sample firms have a percentage of dividends to share price with median of 2.4%. As companies display a good ability to secure current liabilities, it may be implied that these firms may prefer to retain profits in order to finance their growth.

[12] Checking the annual reports showed that some companies have a leverage ratio of zero (e.g. Premier Oil, 2006). It seems that these companies do not rely on debt at all, which can be explained by their strong cash position. On the other hand, other companies display a very high leverage ratio (e.g. Severn Trent, 2009) due to the huge losses they made.

Panel (B) points out the analysis of cross listing as a categorical variable. It indicates that the majority of sample firms (90.29 %) are traded on foreign financial markets.

Table 6 Descriptive statistics of continuous variables

Panel (A) Descriptive statistics for the continuous variables

Variable	Max	Min	Mean	Med	SD	N
SIZE	11.019	8.000	9.195	9.067	0.685	503
PROFITAB	0.524	-0.172	0.080	0.067	0.087	503
LIQUIDITY	8.574	0.268	1.644	1.329	1.320	503
LEVERAGE	1.420	0.000	0.364	0.337	0.279	503
DIVYIELD	0.219	0.000	0.029	0.024	0.032	503

Panel (B) Descriptive statistics for the categorical variable

Variable	Proportion	N
CROSSLIST	90.29	503

Panel A displays descriptive statistics of continuous variables used in the present study as proxies for firm characteristics: **SIZE i**s the natural logarithm of market capitalization; **PROFITAB** is the profitability measured by return on equity (the ratio of net income to book value of equity); **LIQUDITY** is measured by the current ratio; **LEVERAGE** is calculated as the ratio of total debt to total capital; **DIVYIELD** is a proxy for dividend policy (dividends per share / share price).
Panel (B) displays the descriptive statistics for the categorical variable: **CROSSLIST** is a dummy variable equals to1 if the firm's shares are traded on foreign financial markets and 0 otherwise.

After getting this idea about the characteristics of the sample firms, their KPI reporting is analysed. Accordingly, the main features of KPI reporting in UK firms could be observed, and hence, Q1 will be addressed.

2.5 Findings of the analysis

This section aims to provide answers to research question 1. Descriptive statistics illustrate the main features of KPI reporting in terms of quantity and quality on the part of UK firms. It offers insights into KPI reporting in terms of quantity and quality in the sample firms. In general, descriptive results are used to show KPI reporting in practice through giving examples from the firms' annual reports, analysing KPI disclosures and its subcategories to study the development over the period 2006-2010, and exploring any changes in KPI reporting in terms of quantity and quality across industries.

2.5.1 Companies' disclosures

This section aims to answer the first research question. It provides some direct quotes from companies' annual reports to illustrate the attitude of these companies regarding KPI reporting.

In general, there are many examples of practice which indicate that KPI reporting is most likely to be voluntary. For instance, 49 companies did not provide any information regarding their KPIs in their annual reports. One of the commentaries on this practice was:

> *'The group is a pure exploration group with no production or proven reserves, the standard KPIs are not relevant. The management therefore focuses on the achievement of work programmes and protection of licences. Throughout the year, the management has exceeded minimum work programme requirements, and licences have therefore been protected'* (Rockhopper Exploration, 2009, p. 13).

Despite that, most companies were keen to provide financial KPIs. This type of KPI had not been reported in 56 year observations. On the other hand, it is apparent that companies did not show the same concern with regard to disclosing non-financial KPIs. It is found that the disclosure of non-financial KPIs was absent in 196 year-observations. From these observations, 23 companies did not provide any non-financial KPI-related information for the period examined (2006-2010). One of these companies gave the following justification:

> '*In addition to financial KPIs, the board considers non-financial factors such as the group compliance with corporate governance standards and environmental considerations relevant to some of the group's mining interests. These factors cannot be efficiently measured, so do not form part of the group's KPIs*' (Anglo

Pacific Group, 2008, p. 10).

Additionally, the majority of companies did not separate KPIs in terms of financial and non-financial KPIs. Furthermore, there is no general rule to classify what can be considered as financial or non-financial KPI. Thus, many classification differences existed in practice, as each company relied on its own rule to categorise the disclosed KPIs. For example, Research and Development is considered as a financial KPI by the majority of companies. However, Cookson Group reported it as a non-financial KPI (Cookson Group, 2008).

In contrast, a number of companies showed good practice regarding KPI reporting, For example, when one of its KPIs was replaced; Hikma Pharmaceuticals Plc. stated:

> *'We are no longer including R&D costs as a percentage of revenue as a KPI as this is no longer the best way to measure our investment in our pipeline, given the increase in spending on product acquisitions. This year, however, we have added new product launches as a non-financial KPI*' (Hikma Pharmaceuticals Plc., Annual Reports and Accounts 2007, p. 16).

Similarly, Pace Plc. presented a new KPI by indicating the reason behind abandoning the previous KPI:

> *'Going forwards we are introducing return on sales (ROS) as a new performance indicator after concentrating on gross margin for the last few years. Now as our product mix changes, as we target high and low-end opportunities and start to rollout infrastructure products from our Networks group, margin is no longer the best overall measure of success. Refocusing our business around ROS is helping to establish a new mind-set, as we take Pace to the next level*' (Pace Plc, Annual Reports and Accounts 2008, p. 5).

What is worth noting is the fact that all companies with the exception of small ones, are

asked to publish financial and non-financial KPIs. However, the above examples give another view on the nature of KPI reporting. It reveals that companies are controlling KPI disclosures in practice. That leads to an expectation, which is that KPI reporting scores might vary across the sample firms. That variation can be observed by analysing the quality and quantity scores of KPI reporting. To start the analysis, it is noted that the majority of firms allocate specific section for KPIs or refer to pages that contain KPI information, while other firms do not. To highlight this practice, the study distinguishes between KPI disclosures in the KPI section (which also includes KPI disclosures within the section(s)/ page(s) that are mentioned by the firm in the report), and KPI disclosures in the whole report (which include the KPIs disclosed in the KPI section as well as KPIs disclosed elsewhere). Accordingly, the aggregated scores - either for quantity of KPI reporting or for its quality - are disaggregated based upon these two categories (financial and non-financial KPIs). The next subsection starts with analysing KPI reporting with regard to its quantity.

2.5.2 Descriptive statistics for the quantity of KPI reporting

Table 7 provides a descriptive analysis for KPI quantity scores. It indicates that the number of KPIs disclosed in the KPI section (QNTKSEC) by the sample firms ranges from a minimum of zero to a maximum of 24 KPIs. The median of QNTKSEC is 7 KPIs. It seems that most of the KPIs disclosed are financial KPIs. The median of financial KPIs disclosed in the KPI section (QNFKS) is 5 KPIs, while the median of the non-financial KPIs disclosed in the KPI section (QNNFKSEC) is only one KPI. After considering the KPIs disclosed outside the KPI section, the median of non-financial KPIs disclosed in the whole report (QNNFKREP) is found to be 2 KPIs. It appears that KPIs disclosed outside the KPI section are more likely to be one non-financial KPI. This conclusion is confirmed when comparing the mean of QNTKSEC - 7.48 KPIs -

with the mean of the QNTKREP 8.18 KPIs. Generally, the high standard deviation values show the high variation in KPI reporting quantity among the sample firms.

Table 7 Descriptive statistics for KPI quantity scores

Variable	Max	Min	Mean	Med	SD	N
QNTKSEC	24.00	0.00	7.48	7.00	5.03	503
QNFKS	19.00	0.00	5.34	5.00	3.44	503
QNNFKSEC	15.00	0.00	2.17	1.00	2.91	503
QNNFKREP	16.00	0.00	2.87	2.00	3.40	503
QNTKREP	24.00	0.00	8.18	7.00	5.36	503

QNTKSEC is the total number of financial and non-financial KPIs disclosed in KPI' section**; QNFKS is** financial KPIs disclosed in KPI' section**; QNNFKSEC** is non-financial KPIs disclosed in KPI' section**; QNNFKREP** is non-financial KPIs disclosed in the whole report**; QNTKREP** is the total number of financial and non-financial KPIs that disclosed in the whole report**.**

2.5.2.1 The frequency of the disclosed KPIs

Table 8 shows the KPIs disclosed most frequently by the sample firms. Panel (A) illustrates that the highest financial KPI disclosed is revenues. This is reported in 32% of the year-observations, followed by underlying earnings per share (25%), free cash flow (22%), basic earnings per share (22%), and return on capital employed (ROCE) (21%).

Panel (B) show that the most frequently reported non-financial KPI is accident incident rate (AIR) – which is disclosed 146 times over 503 observations. Other non-financial KPIs that are widely disclosed are employee turnover\retention (13%), accident numbers (11%), energy consumption (10%), and carbon dioxide emissions (10%).

Table 8 The frequency of KPIs disclosed by the sample firms

Panel (A) The frequently reported financial KPIs

KPI	Frequency	Percentage
Revenues	161	32%
Underlying earnings per share	126	25%
Free cash flow	111	22%
Basic earnings per share	110	22%
Return On Capital Employed (ROCE)	106	21%
Total sales growth	91	18%
Operating profit margin	86	17%

Organic revenue growth	75	15%

Panel (B) The frequently reported non-financial KPIs

KPI	Frequency	Percentage
Accident Incident Rate (AIR)	146	29%
Employee turnover\ retention	65	13%
Accident numbers	55	11%
Energy consumption	51	10%
Carbon Dioxide emitted	50	10%
Waste to landfill	50	10%
Water consumption	40	8%
Average Headcount	25	5%

2.5.2.2 Quantity of KPI reporting across the sample period

The trend in the quantity of KPI reporting is analysed by following the descriptive statistics from 2006 to 2010. In Table 9, it is observed that the quantity of KPI reporting, as well as its subcategories, have been increasing across the sample period (2006-2010).

It is documented that the mean (median) of QNTKSEC was 5.52 (5.0) KPIs in 2006. It then shows a steady increase across the sample period to reach a mean (median) of 8.6 (7.5) KPIs in 2010. Similarly, the mean (median) of QNFKS has increased from 4.15 (4.0) KPIs in 2006 to reach a mean (median) of 5.98 (6) KPIs in 2010. The results illustrate that the number of financial KPIs disclosed is always greater than non-financial ones. However, the mean (median) of QNNFKSEC has increased from 1.42 (0) KPIs in 2006 to reach a mean (median) of 2.61 (2) KPIs in 2010. Thus, it is shown that firms pay particular attention to disclosing more KPIs in general and non-financial ones in particular. This can be observed also when considering non-financial KPIs disclosed outside the KPI section, which have increased during the same period. The mean (median) of QNNFKREP has increased from 1.76 (1) KPIs in 2006 to reach a mean (median) of 3.90 (3) KPIs in 2010. As a result, KPIs reported in the whole report

have increased from a mean (median) of 5.83 (5.0) KPIs in 2006 to a mean (median) of 9.89 (9) KPIs in 2010.

Table 9 Quantity of KPI reporting across years

2006						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	24.00	0.00	5.52	5.00	4.79	96
QNFKS	15.00	0.00	4.15	4.00	3.38	96
QNNFKSEC	13.00	0.00	1.42	0.00	2.50	96
QNNFKREP	16.00	0.00	1.76	1.00	2.88	96
QNTKREP	24.00	0.00	5.83	5.00	4.90	96
2007						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	24.00	0.00	7.03	6.00	5.18	101
QNFKS	19.00	0.00	5.18	5.00	3.58	101
QNNFKSEC	15.00	0.00	1.93	1.00	3.01	101
QNNFKREP	16.00	0.00	2.30	1.00	3.20	101
QNTKREP	24.00	0.00	7.40	6.00	5.29	101
2008						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	24.00	0.00	7.88	7.00	5.15	102
QNFKS	19.00	0.00	5.59	5.00	3.38	102
QNNFKSEC	15.00	0.00	2.31	1.00	3.10	102
QNNFKREP	16.00	0.00	2.89	2.00	3.39	102
QNTKREP	24.00	0.00	8.45	7.00	5.42	102
2009						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	24.00	0.00	8.26	7.00	4.82	102
QNFKS	19.00	0.00	5.75	5.50	3.25	102
QNNFKSEC	15.00	0.00	2.51	2.00	2.93	102
QNNFKREP	15.00	0.00	3.41	3.00	3.41	102
QNTKREP	24.00	0.00	9.17	8.00	5.12	102
2010						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	24.00	0.00	8.60	7.50	4.68	102
QNFKS	19.00	0.00	5.98	6.00	3.37	102
QNNFKSEC	15.00	0.00	2.61	2.00	2.84	102
QNNFKREP	16.00	0.00	3.90	3.00	3.66	102
QNTKREP	24.00	0.00	9.89	9.00	5.21	102

QNTKSEC is the total number of financial and non-financial KPIs disclosed in the KPI section**; QNFKS is** financial KPIs disclosed in the KPI section**; QNNFKSEC** is non-financial KPIs disclosed in the KPI section**; QNNFKREP** is non-financial KPIs disclosed in the whole report**; QNTKREP** is the total number of financial and non-financial KPIs disclosed in the whole report**.**

As mentioned above, it seems that there is a variation in the quantity of KPIs reported during the sample period.[13] However, the study compares KPI reporting quantity across the sample period to test whether or not the differences between these scores are significant. Table 10 indicates that an F value of 8.62 is significant, suggesting that the means are not all equal. Furthermore, a Bonferroni test is carried out to identify where the differences in the quantity scores are. The test makes multiple comparisons in order to examine the differences between each pair of quantity score means. The results reported in Table 10 illustrate that there is an increasing trend in the quantity of KPIs reported between 2006 and 2010. However, there are significant differences between the quantity scores' mean of 2006 and the quantity scores' means of 2008, 2009, and 2010 at a significance level of 5%. Moreover, the results show a statistically significant difference between the quantity scores' mean of 2007 and the quantity scores' mean of 2010, but at the 10% level. Thus, Table 44 in Appendix (1) indicates that the latter difference becomes significant at a level of 5%, if the non-financial KPIs disclosed - outside the KPI section - are considered. With respect to the quantity of financial and non-financial KPI reporting, Table 41 and Table 42 in Appendix (1) confirm that significant differences exist only between the quantity scores' mean of 2006 and the quantity scores' means of 2008, 2009, and 2010 at a level of 5%. These results suggest that, despite the significant differences between quantity scores in general, those differences are mainly in correspondence with the quantity scores of 2006. Interestingly, these tests do not provide evidence suggesting that the financial crisis in 2008 influenced KPI reporting in terms of quantity. For instance, it appears that there are no significant differences between the quantity scores' means of 2009 and 2010, and those of 2007. This might indicate that companies did not use KPI reporting as a tool to

[13] That trend is also tested using Cuzick test - developed by Cuzick (1985) - to test for trends across ordered groups. The results of that non-parametric test documents a statistically significant trend in all proxies of KPI reporting in terms of quantity at a level of 1% (results are not tabulated).

communicate with annual report users with respect to the consequences of the financial crisis.

Table 10 Anova test to compare KPI reporting quantity across the sample period

year	Summary of QNTKSEC Mean	Std. Dev.	Freq.
2006	1.9895769	1.2562748	96
2007	2.3659792	1.2023142	101
2008	2.603028	1.0568603	102
2009	2.7042436	.98009983	102
2010	2.7893563	.9083085	102
Total	2.4966587	1.1187863	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	40.6973947	4	10.1743487	8.62	0.0000
Within groups	587.647379	498	1.18001482		
Total	628.344774	502	1.25168282		

Bartlett's test for equal variances: chi2(4) = 14.4918 Prob>chi2 = 0.006

Comparison of QNTKSEC by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.376402 0.154			
2008	.613451 0.001	.237049 1.000		
2009	.714667 0.000	.338264 0.270	.101216 1.000	
2010	.799779 0.000	.423377 0.057	.186328 1.000	.085113 1.000

QNTKSEC is the total number of financial and non-financial KPIs disclosed in the KPI section.

2.5.2.3 Quantity of KPI reporting across industries

The quantity of KPI reporting disclosed across industries is analysed, in order to shed light on any possible variations between industries in practice. Table 11 shows that industries are - to some extent - varied in terms of KPI reporting quantity. The highest number of KPIs is provided by Utilities firms, either when considering KPIs disclosed outside the KPI section or not. The mean number of QNTKSEC in Utilities firms is 15.25 KPI, while the mean of QNTKREP is 15.8 KPIs. Accordingly, the highest

number of financial and non-financial KPIs is disclosed by Utilities firms. The mean of QNFKS is 6.95 KPIs; the mean of QNNFKSEC is 8.9 KPIs, while after considering KPIs disclosed outside the KPI section, the mean of QNNFKREP is 9.6 KPIs. It is worth mentioning that, Utilities is the only industry which disclosed more non-financial KPIs than financial ones.

In contrast, Table 11 indicates that the lowest number of KPIs disclosed is shown in the case of Healthcare firms. The mean number of QNTKSEC in these firms is 3.67 KPIs, while it becomes 5.67 (the mean of QNTKREP) if KPIs disclosed outside the KPI section are considered. Moreover, Healthcare firms show the lowest numbers of financial and non-financial KPIs disclosed among the sample industries. The median of QNFKS is 3 KPIs, whereas the median of QNNFKSEC is zero, and the median of QNNFKREP is 2 KPIs.

Table 11 Quantity of KPI reporting across industries

Basic Materials						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	24.00	0.00	7.75	6.00	5.31	40
QNFKS	11.00	0.00	4.53	5.00	2.59	40
QNNFKSEC	15.00	0.00	3.28	2.00	4.01	40
QNNFKREP	16.00	0.00	3.55	2.00	4.13	40
QNTKREP	24.00	0.00	8.00	6.00	5.46	40
Consumer Goods						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	14.00	0.00	7.31	7.00	3.55	65
QNFKS	12.00	0.00	5.94	7.00	2.78	65
QNNFKSEC	5.00	0.00	1.37	1.00	1.77	65
QNNFKREP	8.00	0.00	2.03	1.00	2.54	65
QNTKREP	20.00	0.00	7.97	7.00	4.32	65
Consumer Services						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	24.00	0.00	7.99	7.00	5.60	107
QNFKS	19.00	0.00	5.88	6.00	4.31	107
QNNFKSEC	10.00	0.00	2.09	1.00	2.50	107
QNNFKREP	12.00	0.00	2.57	2.00	2.84	107
QNTKREP	24.00	0.00	8.47	7.00	5.81	107

Healthcare						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	6.00	0.00	3.67	4.00	1.88	24
QNFKS	6.00	0.00	2.83	3.00	1.63	24
QNNFKSEC	4.00	0.00	0.83	0.00	1.27	24
QNNFKREP	10.00	0.00	2.83	2.00	3.36	24
QNTKREP	15.00	0.00	5.67	4.50	4.29	24
Industrials						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	19.00	0.00	7.39	6.00	4.48	143
QNFKS	13.00	0.00	5.37	5.00	3.31	143
QNNFKSEC	10.00	0.00	2.02	2.00	2.23	143
QNNFKREP	16.00	0.00	2.77	2.00	2.81	143
QNTKREP	20.00	0.00	8.14	7.00	4.50	143
Oil & Gas						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	18.00	0.00	6.52	6.00	5.15	54
QNFKS	9.00	0.00	4.39	4.50	3.22	54
QNNFKSEC	10.00	0.00	2.13	2.00	2.43	54
QNNFKREP	10.00	0.00	2.30	2.00	2.65	54
QNTKREP	18.00	0.00	6.69	6.00	5.31	54
Technology						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	14.00	0.00	6.13	5.50	3.05	40
QNFKS	11.00	0.00	5.48	5.50	2.83	40
QNNFKSEC	5.00	0.00	0.65	0.00	1.25	40
QNNFKREP	9.00	0.00	1.68	0.00	2.49	40
QNTKREP	18.00	0.00	7.15	6.00	4.50	40
Telecommunications						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	15.00	0.00	7.70	7.50	4.88	10
QNFKS	12.00	0.00	6.00	5.50	3.46	10
QNNFKSEC	4.00	0.00	1.70	2.00	1.64	10
QNNFKREP	14.00	0.00	4.60	2.00	5.97	10
QNTKREP	23.00	0.00	10.60	8.50	8.49	10
Utilities						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QNTKSEC	24.00	0.00	15.25	17.00	6.58	20
QNFKS	17.00	0.00	6.95	5.50	3.93	20
QNNFKSEC	15.00	0.00	8.90	9.00	5.01	20
QNNFKREP	16.00	2.00	9.60	10.00	4.91	20
QNTKREP	24.00	4.00	15.80	17.00	6.12	20

QNTKSEC is the total number of financial and non-financial KPIs disclosed in the KPI section**; QNFKS is** financial KPIs disclosed in the KPI section**; QNNFKSEC** is non-financial KPIs disclosed in the KPI section**; QNNFKREP is** non-financial KPIs disclosed in the whole report**; QNTKREP** is the total number

of financial and non-financial KPIs that are disclosed in the whole report.

Furthermore, the study compares KPI reporting quantity scores across industries to test whether the differences between industries in quantity scores are significant.

Table **52** in Appendix (1) shows that the means are not all equal as F value is significant. A Bonferroni test conducts multiple comparisons between each pair of quantity scores. Generally, the results reported in

Table **52** show that Utilities firms report a number of KPIs which is statistically significant and higher than the rest of the industries. Rather, in spite of disclosing a higher number of KPIs than other industries,

Table **52** reports that the differences between the quantity scores of Basic Material firms and those of other industries are not significant. In contrast,

Table **52** shows that Healthcare firms present a number of KPIs which is lower than that of other industries. Hence, the differences between quantity scores of Healthcare firms and those of Consumer Goods, Consumer Services, Industrials, and Utilities firms are statistically significant. Yet, as indicated in Table 53 in Appendix (1), these differences turned to be insignificant (except those with regard to Utilities firms) when non-financial KPIs disclosed - outside the KPI section - are considered. Concerning, the quantity of financial KPI reporting, Table 49 in Appendix (1) illustrates that most of the differences between quantity scores among the sample industries are not significant. On the other hand, Table 50 indicates that Utilities firms report a higher number of non-financial KPIs than other industries. In contrast, Technology firms provides a statistically significant and lower number of non-financial KPIs than firms in Basic Materials, Consumer Services, Industrials, Oil & Gas, and Utilities industries.

2.5.3 Descriptive statistics for quality of KPI reporting

Table 12 shows the general statistics with regard to KPI reporting quality scores. It seems that companies are widely varied in terms of KPI disclosure quality. For instance, the quality level for KPIs -disclosed in the KPI section- range from 0 to 0.688. Yet, it is obvious that all quality means and medians record a remarkably low level.

For those KPIs disclosed in the KPI section, the mean (median) of financial KPI reporting quality (QLFKS) is 0.347 (0.375). The level of non-financial KPI reporting quality (QLNFKSEC) is lower with a mean (median) of 0.268 (0.286). As a result, the mean (median) of KPI reporting quality (QLTKSEC) is 0.363 (0.375). However, it seems that a high quality of KPI reporting outside the KPI section has driven the total quality of KPI reporting QLTKREP to be slightly higher than the corresponding QLTKSEC, with a mean (median) of 0.371 (0.390).

Table 12 Descriptive statistics for KPI quality scores

Variable	Max	Min	Mean	Med	SD	N
QLTKSEC	0.688	0.00	0.363	0.375	0.174	503
QLFKS	0.691	0.00	0.347	0.375	0.176	503
QLNFKSEC	0.786	0.00	0.268	0.286	0.250	503
QLNFKREP	0.818	0.00	0.309	0.333	0.252	503
QLTKREP	0.665	0.00	0.371	0.390	0.170	503

QLTKSEC is the aggregated quality of financial and non-financial KPIs disclosed in the KPI section**; QLFKS** is the quality of financial KPIs disclosed in the KPI section**; QLNFKSEC** is the quality of non-financial KPIs disclosed in the KPI section**; QLNFKREP** is the quality of non-financial KPIs disclosed in the whole report**; QLTKREP** is the aggregated quality of financial and non-financial KPIs disclosed in the whole report**.**

As quality scores are identified as being based upon the ASB guidelines, it would be useful to explore companies' practices with respect to the eight dimensions used to evaluate KPI quality.

2.5.3.1 KPI reporting quality: qualitative attributes in practice

Table 13 displays the individual averages with regard to the 8 qualitative attributes recommended by the ASB (2006). It is indicated that the majority of firms display their information by considering two recommendations. It is shown that firms provide the definition for 86.9% of the KPIs disclosed in the KPI section and 87.4% of the KPIs disclosed in the whole report. Additionally, firms quantify KPI data for 79.6 % of the KPIs disclosed in the KPI section and 79.7% of the KPIs disclosed in the whole report. On the other hand, companies show a modest tendency to explain the purpose of presenting each KPI. The purpose is explained in 48.8% of KPIs disclosed in the KPI section, and 51.1% of the KPIs disclosed in the whole report. In contrast, firms show a very weak reporting practice with regard to other attributes of KPI reporting quality.

In line with the arguments discussed earlier in this chapter, it worth noting that the qualitative attributes is integrated to produce useful KPI information for the reader. Thus, it can be claimed that annual report users might find this information irrelevant in terms of their decision making.[14] On the other hand, these results confirm and explain the above conclusion about the low level of KPI reporting in general. The results also suggest that reporting quality is higher as long as KPIs disclosed outside the KPI section are included in the analysis. However, these findings raise questions about the need to introduce clear guidelines and benchmarks concerning KPI disclosure, and the mechanisms required in order to make firms more compliant.

Table 13 KPI reporting quality: descriptive statistics of individual dimensions

Dimensions suggested by OFR (2006)	KPI section	The whole report
Provision of the definition	0.869	0.874
Explanation of the purpose	0.488	0.511

[14] This could limit the conclusions made about the implications of KPI reporting quality in particular.

Disclosure of the source	0.294	0.301
Quantify the targets	0.098	0.104
Commentary on future targets	0.053	0.059
Quantify the data	0.796	0.797
Disclosing F.S data adjusted	0.183	0.182
Disclosure of any changes	0.041	0.044

The following subsections shed more light on the quality of KPI reporting by analysing quality scores throughout the sample period, as well as studying it across industries.

2.5.3.2 Quality of KPI reporting across the sample period

Table 14 illustrates the statistics with regard to KPI reporting quality for the full sample across the period under consideration. It is shown that KPI reporting quality has increasing during the period 2006-2010. The mean (median) of QLTKSEC starts with 0.285 (0.295) in 2006, then increases across the sample period to reach a mean (median) of 0.414 (0.423) in 2010. It seems that the quality of non-financial KPI reporting outside the KPI section is usually higher than the corresponding figure with regard to QLNFKSEC. As a result, QLNFKREP leads QLTKREP in term of being always higher than the level of QLTKSEC throughout the sample period. QLTKREP has increased from a mean (median) of 0.288 (0.301) in 2006 to reach its maximum in 2010 with a mean (median) of 0.426 (0.436).

Looking at the trend with regard to financial and non-financial KPI reporting, Table 14 shows that the quality levels show a steady increase over the sample period. Yet, the figures indicate that QLFKS is always higher than QLNFKSEC as well as QLNFKREP. For instance, the mean (median) of QLFKS in 2006 was 0.264 (0.282), whereas the mean (median) of QLNFKSEC and QLNFKREP in the same year were 0.191 (0.000) and 0.215 (0.136) respectively. The improvement in quality levels is shown in the corresponding statistics for the next years covered. For example, the mean (median) of

QLFKS in 2010 becomes 0.402 (0.404), whereas the mean (median) of QLNFKSEC and QLNFKREP in the same year reaches a level of 0.320 (0.346) and 0.380 (0.429) respectively. These results suggest that the low level of non-financial KPI reporting in terms of quality causes the overall level of KPI reporting in terms of quality to be lower.

Table 14 Quality of KPI reporting across the years

2006						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.688	0.00	0.285	0.295	0.194	96
QLFKS	0.691	0.00	0.264	0.282	0.192	96
QLNFKSEC	0.786	0.00	0.191	0.000	0.237	96
QLNFKREP	0.818	0.00	0.215	0.136	0.241	96
QLTKREP	0.665	0.00	0.288	0.301	0.190	96
2007						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.688	0.00	0.342	0.357	0.180	101
QLFKS	0.691	0.00	0.326	0.357	0.176	101
QLNFKSEC	0.786	0.00	0.252	0.286	0.249	101
QLNFKREP	0.818	0.00	0.284	0.286	0.250	101
QLTKREP	0.625	0.00	0.348	0.360	0.176	101
2008						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.688	0.00	0.379	0.391	0.163	102
QLFKS	0.691	0.00	0.362	0.375	0.165	102
QLNFKSEC	0.786	0.00	0.279	0.286	0.251	102
QLNFKREP	0.786	0.00	0.318	0.357	0.251	102
QLTKREP	0.665	0.00	0.387	0.399	0.157	102
2009						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.680	0.00	0.392	0.394	0.157	102
QLFKS	0.691	0.00	0.374	0.385	0.166	102
QLNFKSEC	0.786	0.00	0.292	0.295	0.248	102
QLNFKREP	0.818	0.00	0.345	0.429	0.249	102
QLTKREP	0.665	0.00	0.400	0.418	0.154	102
2010						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.688	0.00	0.414	0.423	0.144	102
QLFKS	0.691	0.00	0.402	0.404	0.148	102
QLNFKSEC	0.786	0.00	0.320	0.346	0.249	102
QLNFKREP	0.818	0.00	0.380	0.429	0.243	102

QLTKREP	0.666	0.00	0.426	0.436	0.141	102

QLTKSEC the aggregated quality of financial and non-financial KPIs disclosed in the KPI section**; QLFKS** is the quality of financial KPIs disclosed in the KPI section**; QLNFKSEC** the quality of non-financial KPIs disclosed in the KPI section**; QLNFKREP** the quality of non-financial KPIs disclosed in the whole report**; QLTKREP** the aggregated quality of financial and non-financial KPIs disclosed in the whole report**.**

Furthermore, the study compares KPI reporting quality scores across the sample period to test whether the differences between these scores are significant. Table 15 indicates that the means are not all equal, as the F value is 9.30. The multiple comparisons between quality scores explore the differences between each pair of quality score means. The findings presented in Table 15 show that there is an increasing trend in the quality of KPI reporting between 2006 and 2010. However, there are significant differences between the quality scores' mean of 2006 and the quality scores' means of 2008, 2009, and 2010, at a level of 5%. In addition, the results show a statistically significant difference between the quality scores' mean of 2007 and the quality scores' mean of 2010. Thus, Table 48 Appendix (1) indicates that these findings are not changed when non-financial KPIs disclosed - outside the KPI section - are considered. Furthermore, Table 45 in Appendix (1) confirms the same results with respect to the quality of financial KPI reporting. In addition, it shows that the difference between the quality scores of 2006 and those of 2007 is significant at the 10% level.

Table 15 Anova test to compare KPI reporting quality across the sample period

year	Summary of QLTKSEC Mean	Std. Dev.	Freq.
2006	.46048894	.27060419	96
2007	.5332513	.24024106	101
2008	.58411464	.19614196	102
2009	.60000241	.17932706	102
2010	.62449125	.15650629	102
Total	.56171643	.21866956	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	1.66818294	4	.417045735	9.30	0.0000
Within groups	22.335639	498	.044850681		
Total	24.0038219	502	.047816378		

Bartlett's test for equal variances: chi2(4) = 38.2462 Prob>chi2 = 0.000

Comparison of QLTKSEC by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.072762 0.163			
2008	.123626 0.000	.050863 0.877		
2009	.139513 0.000	.066751 0.252	.015888 1.000	
2010	.164002 0.000	.09124 0.023	.040377 1.000	.024489 1.000

QLTKSEC the aggregated quality of financial and non-financial KPIs disclosed in the KPI section.

On the other hand, Table 46 in Appendix (1) shows that significant differences exist only between non-financial KPI reporting quality scores of 2006 and those of 2009, and 2010. Likewise the results discussed with regard to KPI reporting quantity differences, quality score differences are mainly in relation to the quality scores of 2006. Thus, these tests do not provide evidence that UK firms significantly extended KPI reporting

quality after the financial crisis in 2008. As concluded earlier, this might reflect firms' focus on other disclosure types in this time period.

2.5.3.3 Quality of KPI reporting across industries

The study explores the variation in practice with respect to the quality of KPIs disclosed across industries. Similar to the picture of KPI reporting in terms of quantity, it appears that industries vary in the quality of KPI reporting. Table 16 indicates that the highest level of KPI reporting in terms of quality is provided by the Basic Materials industry either when considering KPIs disclosed outside the KPI section or not. The mean (median) of QLTKSEC in Basic Materials firms is 0.459 (0.475), while the mean (median) of QLTKREP is 0.461 (0.483). The same industry presents the highest quality of financial KPI reporting with a mean (median) of 0.434 (0.471). However, the highest quality of non-financial KPI reporting is shown in the Utilities industry with a mean (median) of 0.436 (0.476) in the KPI section, and 0.461 (0.476) in the whole report.

On the other hand, firms in the Oil & Gas industry come at the bottom with regard to KPI reporting quality even if KPIs disclosed outside the KPI section are considered or not. Table 16 indicates that the mean (median) of QLTKSEC in this industry is 0.291 (0.321), while the mean (median) of QLTKREP is 0.294 (0.321). Oil & Gas firms also provided the lowest level of financial KPI reporting in terms of quality with a mean (median) of 0.289 (0.323). In turn, Healthcare firms show the lowest level of non-financial KPI reporting in terms of quality among the sample industries with a mean (median) of 0.122 (0.000).

It is worth mentioning that the statistics of the Oil & Gas and Utilities industries are unique, as the levels of non-financial KPI reporting quality in these industries exceed the corresponding figures for financial KPIs. In contrast to other industries, the high

levels of non-financial KPI reporting quality in the Oil & Gas and Utilities industries result in an upwards trend in the total level of KPI reporting in terms of quality.

Table 16 Quality of KPI reporting across industries

Basic Materials						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.688	0.00	0.459	0.475	0.184	40
QLFKS	0.686	0.00	0.434	0.471	0.176	40
QLNFKSEC	0.786	0.00	0.355	0.429	0.321	40
QLNFKREP	0.818	0.00	0.374	0.443	0.323	40
QLTKREP	0.665	0.00	0.461	0.483	0.184	40
Consumer Goods						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.688	0.00	0.373	0.386	0.176	65
QLFKS	0.691	0.00	0.362	0.386	0.172	65
QLNFKSEC	0.714	0.00	0.227	0.143	0.247	65
QLNFKREP	0.714	0.00	0.272	0.286	0.254	65
QLTKREP	0.665	0.00	0.369	0.386	0.170	65
Consumer Services						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.582	0.00	0.328	0.353	0.158	107
QLFKS	0.583	0.00	0.320	0.339	0.161	107
QLNFKSEC	0.720	0.00	0.271	0.286	0.226	107
QLNFKREP	0.720	0.00	0.311	0.333	0.222	107
QLTKREP	0.582	0.00	0.343	0.357	0.155	107
Health Care						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.604	0.00	0.359	0.393	0.198	24
QLFKS	0.604	0.00	0.360	0.422	0.204	24
QLNFKSEC	0.429	0.00	0.122	0.000	0.166	24
QLNFKREP	0.492	0.00	0.218	0.286	0.199	24
QLTKREP	0.534	0.00	0.342	0.393	0.180	24
Industrials						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.658	0.00	0.384	0.408	0.148	143
QLFKS	0.632	0.00	0.355	0.375	0.158	143
QLNFKSEC	0.786	0.00	0.292	0.333	0.258	143
QLNFKREP	0.818	0.00	0.337	0.429	0.259	143
QLTKREP	0.665	0.00	0.397	0.417	0.146	143
Oil & Gas						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.612	0.00	0.291	0.321	0.215	54
QLFKS	0.627	0.00	0.289	0.323	0.217	54

QLNFKSEC	0.714	0.00	0.296	0.286	0.225	54
QLNFKREP	0.714	0.00	0.299	0.286	0.227	54
QLTKREP	0.612	0.00	0.294	0.321	0.216	54
Technology						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.582	0.00	0.342	0.324	0.144	40
QLFKS	0.593	0.00	0.320	0.300	0.163	40
QLNFKSEC	0.714	0.00	0.114	0.000	0.188	40
QLNFKREP	0.810	0.00	0.205	0.000	0.263	40
QLTKREP	0.633	0.00	0.356	0.373	0.150	40
Telecommunications						
Variable	**Max**	**Min**	**Mean**	**Med**	**SD**	**N**
QLTKSEC	0.675	0.00	0.392	0.391	0.24	10
QLFKS	0.691	0.00	0.399	0.389	0.247	10
QLNFKSEC	0.571	0.00	0.260	0.229	0.276	10
QLNFKREP	0.671	0.00	0.280	0.254	0.298	10
QLTKREP	0.614	0.00	0.384	0.391	0.228	10
Utilities						
Variable	**Max**	**Min**	**Mean**	**Median**	**SD**	**N**
QLTKSEC	0.608	0.00	0.407	0.406	0.163	20
QLFKS	0.575	0.00	0.370	0.375	0.144	20
QLNFKSEC	0.657	0.00	0.436	0.476	0.176	20
QLNFKREP	0.657	0.00	0.461	0.476	0.142	20
QLTKREP	0.608	0.00	0.427	0.406	0.133	20

QLTKSEC the aggregated quality of financial and non-financial KPIs disclosed in the KPI section**; QLFKS** is the quality of financial KPIs disclosed in the KPI section**; QLNFKSEC** the quality of non-financial KPIs disclosed in the KPI section**; QLNFKREP** the quality of non-financial KPIs disclosed in the whole report**; QLTKREP** the aggregated quality of financial and non-financial KPIs disclosed in the whole report**.**

To test whether the differences between industries in terms of quality scores are significant,

Table **52** in Appendix (1) shows that the means are not all equal as the F value is significant. A Bonferroni test conducts multiple comparisons between each pair of quality scores. The results reported in Table 57 in Appendix (1) indicate that Basic Material firms provide higher levels of disclosure quality, but the differences in terms of quality scores with other industries are not significant. In contrast, it seems that Oil & Gas provide KPI reporting at a lower level compared with other industries. However, significant differences exist between scores in terms of quality in the case of Oil & Gas

firms and those of Basic Materials as well as Industrials. Table 58 in Appendix (1); reports that these findings hold if KPIs disclosed outside the KPI section are considered. With respect to the quality of financial KPI reporting, Table 54 in Appendix (1) reports that Basic Materials firms show a higher scores in terms of quality compared with other industries. However, all the differences are not significant, except those in the case of Oil & Gas firms. Rather, Table 55 in Appendix (1) illustrates that Utilities' firms report higher levels of non-financial KPI reporting in terms of quality than other industries. The differences are statistically significant compared with firms in the Consumer Goods, Healthcare, and Basic Materials industries. In contrast, Technology firms provide statistically significant and lower levels of non-financial KPI reporting in terms of quality than other firms. The differences are mainly significant in respect to firms in the Basic Materials, Consumer Services, Industrials, Oil & Gas, and Utilities industries.

2.5.4 Correlation between KPI reporting quantity and its quality

Descriptive statistics show that, to some extent, sample firms vary in terms of the quantity and quality of KPI reporting. Thus, the current study also seeks to get an initial indication on whether each dimension is to some extent related. Table 17 illustrates Pearson's correlation coefficients between KPI reporting quantity and quality proxies. It appears that the correlation is positive and statistically significant between proxies that are used to measure KPI reporting quantity or quality separately. This shows the consistency among each group of measures in capturing the required information.

Table 17 Pearson correlation matrix

Dependent Variables	QNTKSEC	QLTKSEC	QNFKS	QNNFKSEC	QNNFKREP	QNTKREP	QLFKS	QLNFKSEC	QLNFKREP	QLTKREP
QNTKSEC	1									
QLTKSEC	0.7645*	1								
QNFKS	0.8915*	0.7041*	1							
QNNFKSEC	0.6945*	0.4302*	0.3399*	1						
QNNFKREP	0.6321*	0.4659*	0.3575*	0.7972*	1					
QNTKREP	0.9499*	0.7658*	0.8655*	0.6192*	0.7458*	1				
QLFKS	0.7328*	0.9190*	0.7840*	0.3270*	0.3820*	0.7410*	1			
QLNFKSEC	0.5963*	0.5292*	0.3545*	0.8348*	0.6443*	0.5286*	0.4220*	1		
QLNFKREP	0.5697*	0.5494*	0.3835*	0.6840*	0.8160*	0.6407*	0.4531*	0.8354*	1	
QLTKREP	0.7291*	0.9614*	0.6740*	0.4040*	0.4944*	0.7701*	0.8838*	0.5052*	0.5959*	1

*Significance at the 5% level or above.
QNTKSEC: the quantity of financial and non-financial KPIs disclosed in the KPI section; **QLTKSEC**: the aggregated quality of financial and non-financial KPIs disclosed in the KPI section; **QNFKS**: the quantity of financial KPIs disclosed in the KPI section; **QLFKS**: the aggregated quality score of financial KPIs disclosed in KPI section; **QNNFKSEC**: the quantity of non-financial KPIs disclosed in the KPI section; QLNFKSEC: the aggregated quality score of non-financial KPIs disclosed in the KPI section; **QNNFKREP**: the quantity of non-financial KPIs disclosed in the whole report; **QLNFKREP**: the aggregated quality score of non-financial KPIs disclosed in the whole report; ; **QNTKREP**: quantity of financial and non-financial KPIs disclosed in the whole report; **QLTKREP**: the aggregated quality score of financial and non-financial KPIs disclosed in the whole report. All variables are defined in Table 5.

In addition, a positive and statistically significant relationship is found between the number of KPIs disclosed in the KPI section and their quality ($\rho = 0.76$). Hence, this initial evidence might confirm the assumption of several empirical studies that use quantity of information disclosed as a proxy for disclosure quality (e.g. Berretta and Bozzolan, 2004; Mouselli and Hussainey, 2010). However, it is not possible to obtain strong evidence with regard to this research question (Q4) at this early stage of the analysis. Further investigation is needed to test this assumption in the next hypothesis.

2.6 Discussion and overall conclusion

The main objective of the current study is to explore the main features of KPI reporting by UK firms. Therefore, a research instrument is first developed to measure the quantity and to evaluate the quality of KPI disclosure. The quantity of KPI disclosure is measured by counting the number of KPIs disclosed in the annual reports. The study approach to measure KPI reporting quality is based upon a framework of a well recognised regulatory body (the ASB, 2006), that aims at information usefulness.

Arguably, firms with a high alignment to this guidance would provide KPI information that is relevant, has a forward-looking orientation, is comprehensive and understandable, is balanced and neutral, complements and supplements financial statements, is verifiable and comparable over time. As the index focus is on assessing the quality of the information unit, it would be relevant to measure the quality of different types of information disclosed (e.g. risk reporting). The approach followed aimed at measuring disclosure quality does not allow a high degree of subjective judgment. This adds to the reliability of the measure, which has been assured by conducting a pilot study.

The study focuses on exploring KPI reporting practices in FTSE 350 non-financial UK firms. The study sample is identified as 103 firms with 515 annual reports published between 2006 and 2010. A research instrument is used to quantify KPI reporting and to assign quality scores to the sample firms.

The analysis of firms' practices indicates that the majority of UK firms specify a section of the business review in order to present KPIs, or at least they make a reference to the part in which they discuss KPI information. However, the nature of the regulations regarding KPI reporting appears to give the directors a large degree of discretion when it comes to controlling such disclosures. Some firms are unconcerned with providing any KPI disclosures, especially those related to non-financial KPI information, while others provide more KPIs in their annual reports, with a continuous increase in reporting quality across the sample period (2006-2010).

Whereas, the most popular financial KPIs disclosed by the sample firms are revenues followed by underlying earnings per share and free cash flow, the most common non-financial KPIs disclosed are accident incident rate, employee turnover\ retention,

accident numbers. Descriptive analyses show that firms gradually increased the number of KPIs disclosed across the period (2006-2010). The significant differences between the quantity scores' mean of 2006 and the quantity scores' means of 2008, 2009, and 2010 might reflect the normal effect of a learning curve with regard to KPI reporting in practice.

Although the median number of non-financial KPIs has increased from 0 in 2006 to 2 in 2010, it is observed that the level of these KPIs is relatively low. This result is in line with the ASB (2007) review of companies' narrative reporting practices. Hence, the number of non-financial KPIs disclosed could not cover all the different aspects of performance.

With respect to KPI reporting quality, a remarkably low level of KPI reporting quality is observed. That level is slightly improved if the KPIs disclosed outside the KPI section are considered. Similar to the picture of reporting quantity, the analysis indicates the increasing trend in quality levels across the sample period. The level of financial KPI disclosure quality is always larger than the corresponding figure for non-financial KPIs during the period 2006-2010.

Generally, the low level of reporting quality could be explained by firms' weak performance with regard to most of the individual attributes that have been suggested by the ASB (2006) guidance in order to achieve KPI reporting quality. Firms place emphasis only on providing appropriate definitions and in quantifying KPI data. In contrast, they do not pay a great deal of attention to the other attributes of KPI reporting quality. This raises the question about the need to introduce clear guidelines and benchmarks concerning KPI disclosures. Furthermore, additional mechanisms might be required from regulators to make UK firms more compliant.

The findings show that there are no significant differences between KPI reporting

scores before and after the financial crisis of 2008. Hence, the results do not provide evidence suggesting that the financial crisis affected either KPI reporting quantity or its quality. It appears that companies did not use KPI reporting to communicate with annual reports users with respect to the impact of the financial crisis on the business during this period.

The analyses provide a full picture with regard to the variation between UK industries in terms of KPI reporting. It is believed that KPI reporting is influenced by different types of businesses that have different and unique value creation activities. This is in line with different disclosure theories. For instance, signalling theory suggests that companies in the same industry would follow the same disclosure practices to show that they are not hiding any bad news (Craven and Marston, 1999; Oyelere et al., 2003). On the other hand, different industries are subject to different political costs, which result in different disclosure practices across different industries (Ball and Foster, 1982).

For instance, Utilities sector companies such as electric, gas and water providers usually rely on significant investments and debts. These firms also place stress on non-financial KPI reporting which could be explained by their aim to demonstrate their ability to achieve sustained growth. Therefore, Utilities firms disclose the largest amount of KPIs to show their ability to meet the different needs of their stakeholders (e.g. creditors, employees, customers, suppliers, and government authorities). This is in line with stakeholder theory; Utilities companies try to use KPI information as a vehicle to ensure that these stakeholders are informed, even if they do not use this information (Deegan and Unerman, 2006).

On the other hand, Healthcare firms present the lowest number of KPIs in general. Furthermore, Technology firms provide the lowest number of non-financial KPIs, with

a significantly lower degree of reporting quality. Arguably, these industries should increase their focus on KPI reporting. Previous research has documented that these industries are characterised as having intensive intangibles. Therefore, they should rely on non-financial information, as investors find the financial information disclosed in the financial statement irrelevant (Amir and Lev, 1996).

Likewise, Oil & Gas firms provide low level of KPI reporting quality. The activities of these companies have different impacts on the environment. This could also affect their current and future financial performance. Shareholders might overestimate the potential effects of such activities. Thus, it appears that Oil & Gas companies avoid the negative consequences of high quality KPI disclosure. In turn, in accordance with political cost theory, it can also be argued that these companies involved in vulnerable activities are under the public eye, and hence they control their disclosures to alleviate political costs related to their activities (Oyelere et al., 2003).

These findings indicate that industries vary in terms of KPI reporting. Therefore, one might argue that the industry could affect reporting quantity and quality, and hence, should be considered while examining the factors that drive KPI reporting. In addition, the variation between firms in terms of KPI reporting could be a good motive to study the economic impact of KPI reporting.

This study is the first part of an integrated research project that aims to identify factors affecting KPI reporting, as well as investigating the impact on firm value. In general, there is limited empirical evidence on firms' practices with regard to KPI reporting in the UK. The current study contributes to the existing literature by its comprehensive analysis of KPI disclosures in the UK setting. It provides an answer to the first research

question (Q1) with regard to exploring the main characteristics of KPI reporting on the part of UK firms.

Finally, the research approach is to make a distinction between disclosure quantity and its quality. This distinction helps to answer Q4 of the research questions about the validity of using quantity of disclosure as a proxy for its quality in accounting studies. Descriptive results suggest a significant and positive relationship between KPI reporting quantity and its quality ($\rho = 0.76$). On the other hand, the comparison between industries in terms of KPI reporting illustrates that the industries with the highest quantity of KPI disclosure do not appear to be the best in terms of KPI disclosure quality. Thus, Utilities firms were the highest in terms of KPI reporting quantity, but they just show the highest level of non-financial KPI reporting quality. In contrast, the highest level of KPI reporting quality is provided by the Basic Materials industry. Furthermore, Healthcare firms provide the lowest level of KPI reporting quantity, but Oil & Gas and Technology firms provide the lowest level of total KPI reporting quality.

Nevertheless, that is not enough to provide evidence of the relationship between quantity and quality of KPI reporting in this early stage of analysis. Thus, these initial findings represent a good motive to conduct further analyses. These analyses could provide empirical evidence on whether the quantity and the quality of KPIs might be used interchangeably.

Chapter 3 - The determinants of KPI reporting in the UK

3.1 Overview

As mentioned earlier, the UK Company Act (CA) of 2006, in accordance with the European Union (EU) Accounts Modernisation Directive (2003), requires all companies – with the exception of small ones - to publish key performance indicators (KPIs). However, these regulations allow company directors to report on KPIs which can be considered as necessary and appropriate when it comes to analysing their companies' performance. Thus, it can be argued that the KPI reporting extent would be derived from directors' motivation to voluntarily disclose more information on KPIs. The aim of this chapter is to provide answers to research questions Q2 and Q4. It explores which factors affect the level of quantity and quality of KPI reporting in the UK (Q2). It also links the findings to question the validity of using quantity of disclosure as a proxy for its quality in accounting studies (Q4). The study provides evidence on the CG mechanisms that influence the quantity and quality of KPI reporting. In particular, it contributes to the existing but limited studies on the association between directors' compensation and corporate disclosure. Moreover, this study shows that that the quantity and the quality of KPI disclosure are not identically derived from the same factors.

The remainder of this chapter is organised as follows: section 3.2 provides a theoretical basis for explaining the managerial incentives to control corporate disclosure, and identifies factors affecting this disclosure. Section 3.3 presents the potential determinants of KPI reporting according to the previous literature. Section 3.4 develops the hypotheses of the study. Section 3.5 illustrates the data, provides the descriptive results, and introduces the regression models. Section 3.6 contains the main analysis; it includes the basic procedures to ensure a high degree of confidence in the results. In

addition, it reports the empirical findings with regard to the determinants with regard to reporting on KPIs sub-categories. Section 3.7 provides a discussion of the empirical results. Section 3.8 includes further analyses that consider KPIs reported outside the KPI section to show their effect on the main findings. Finally, a conclusion of the current study is provided in section 3.8.

3.2 Theories that explain KPI reporting

Generally, the literature presents many theories in order to explain the variation between entities in terms of their level of disclosure.[15] Various theories have been developed to explain managers' incentives for disclosure. However, there is no general or comprehensive disclosure theory that can be applied (Verrecchia, 2001). Apparently, each theory explains different aspects of corporate disclosure, or it looks at this phenomenon from different perspectives (Al-Htaybat, 2005). Therefore, it was argued that several theories could be used in an integrated framework to provide an explanation for managerial incentives which affect corporate disclosure (Al-Htaybat, 2005). The objective of this section is to present the main theories that provide a fundamental background with regard to the determinants of voluntary disclosure. These theories include: agency theory, signalling theory, capital need theory, political cost theory, stakeholder theory, and information costs theory.

3.2.1 Agency theory

Agency theory is widely used to explain managers' incentives for providing voluntary disclosure. Jensen and Meckling (1976) pointed to the agency relationship that arises from the separation of ownership and control of public companies. Based on this situation, a contractual relationship is established between owners (the principals) and managers (the agents) in order for the latter to perform some services on the owners'

[15] See for example: Spence (1973); Jensen and Meckling (1976); Hughes (1986); Watts and Zimmerman (1990); Cooke (1992); Healy and Palepu (2001); Al-Htaybat (2005).

behalf. According to agency theory, a conflict of interests can exist when the agent (managers) acts in his own interest.

Jensen and Meckling (1976) identified three types of agency costs which are associated with the agency problem. First: monitoring costs that are incurred by giving certain incentives to the agent which motivates him to act in the principal's interests. Second: bonding costs which occur when the agent uses additional resources to make sure that his actions will not be against the principal's interests. Third: the residual loss that results from the reduction in the principal's welfare. [16]

On the other hand, another conflict could exist between corporate managers and their lenders, as the managers can take actions that transfer wealth from the debt-holders. Healy and Palepu (2001) argued that an information asymmetry problem usually exists as managers have corporate information which is not available to the various stakeholders. Voluntary disclosure is a means used by insiders to reduce information asymmetry through disseminating the information they have to outsiders (Lakhal, 2005). Thus, incentives schemes and contracts are used to encourage managers to provide adequate information (Healy and Palepu, 2001).

Consistent with this conjecture, corporate directors voluntarily extend the limit of information disclosed to reduce agency problems. Hence, they present information that proves that they are acting in the interests of the shareholders and the debt holders. Therefore, it can be argued that the provision of KPI information by the management (the insider who has this kind of information) to the investors and debt-holders (the

[16] Managers display a tendency towards maximizing their own wealth and, hence, this is more likely to lead to a reduction in shareholder value in the long run. For instance, they supplement their salaries with many perquisites (Solomon, 2010). Schleifer and Vishny (1997) showed that managers benefit from this by building their own empires, enjoying perks, insider trading, inappropriate investments and management entrenchment.

outsiders who usually do not have this information) would reduce the information asymmetry problem.

Agency theory provides a framework for explaining disclosure practices on the part of different firms. It was claimed that agency theory predicts that agency costs are associated with different corporate characteristics such as size, leverage and listing status (Watson et al., 2002). Furthermore, corporate governance (CG) mechanisms are introduced by shareholders in order to ensure that managers' actions are aligned with shareholder's interests. As a result, many empirical studies use firm characteristics and CG mechanisms as determinants of corporate disclosure; in accordance with agency theory assumptions (e.g. Cooke, 1992; Lang and Lundholm, 1993, Ghazali and Weetman, 2006; Ho and Wong, 2001; Haniffa and Cooke, 2002; Ajinkya et al., 2005; Tauringana and Mangena, 2009; Hussainey and Al-Najjar, 2011).

3.2.2 Signalling theory

Signalling theory was developed by Akerlof (1970) to explain the impact of the interaction of quality differences and uncertainty on the institution of the labour market in the U.S. This theory explains the impact on market equilibrium in the event of information asymmetry in the market. Despite the fact that this model has been used in the employment market where a job seeker signals his/her quality to a prospective employer, Spence (1973) argued that this model can be generalised to other settings. Basically, signalling theory can be applied in the event of information asymmetry, and hence this problem may be reduced when the party who has more information signals it to other interested parties (Morris, 1987). Therefore, this theory was used to explain managers' incentives to disclose more information in financial reports (e.g. Hughes, 1986; Haniffa and Cooke, 2002). Managers have to disclose adequate information in the financial statements in order to convey specific signals to potential users.

According to signalling theory, good performance will motivate the managers to disclose more information in order to distinguish themselves from others with lower quality performance (Morris, 1987). On the other hand, investors do not appreciate being surprised by bad news, and financial analysts may choose not to follow stocks of firms whose managers have a reputation for withholding bad news (Skinner, 1994).

Signalling theory can be used to explain managers' incentives to improve KPI reporting in order to convey particular signals to the stakeholders.[17] One can expect that they will report more good news through KPI disclosures, in order to signal themselves as high quality managers in the work market. This is of particular relevance in the present study. For instance, it leads to the assumption of a relationship between directors' compensation and KPI reporting. Moreover, directors attempt to send good signals to the investors and debt holders. Sending these signals to debt-holders may enable the company to avoid any additional restrictive covenants in debt contracts. Therefore, it is expected that the intent to obtain finance would affect KPI reporting. For investors, this kind of communication is credible, because managers sending fraudulent signals will be penalised (Hughes, 1986). On the other hand, managers could send bad news via KPI reporting in order to avoid the consequences of having a reputation for withholding bad news (Skinner, 1994).

3.2.3 Capital need theory

Capital need theory assumes a relationship between corporate disclosure and the entrance into the local / international capital market. Corporate managers have to respond to the demand for information in order to obtain funds or to raise capital as cheaply as possible (Choi, 1973). Cooke (1993) provided another reason which supports the capital-need hypothesis. He argued that listed and multiple listed

[17] It is argued that signalling theory would support the disclosure of certain types of ratios (some of them are considered as KPIs such as investment, profitability and efficiency ratios) by those companies wishing to highlight favourable aspects of their performance (Watson et al., 2002).

companies' aim to achieve overseas countries' acceptance. Therefore, they may increase social responsibility disclosures to show that their business acts in a responsible manner.

A high level of corporate disclosure would result in a clearer understanding of business strategies. Thus, managers will be able to mitigate information asymmetry through voluntary disclosure (Cooke, 1993; Healy and Palepu, 2001). Accordingly, one can argue that managers could use reporting on financial and non-financial KPIs in order to provide investors with a complete picture regarding corporate strategy and performance. Consequently, this would reduce perceived uncertainties which, in turn, could help firms raise capital as cheaply as possible, either from local or international markets.

3.2.4 Political cost theory

Besso and Kumar (2007) stated that companies direct their reporting towards key stakeholders who affect the activity of the company. Political cost theory was driven by Watts and Zimmerman's (1978) research into positive accounting theory to explain the determinants of managers' choices in an accounting practice context. They argued that politicians' decisions could affect corporate wealth through certain restrictions or regulations (e.g. tax laws). Hence, if a company is subject to potential wealth transfers, its management will be motivated to adopt several accounting procedures in order to reduce the reported earnings (Watts and Zimmerman, 1978).

Disclosure studies usually use this theory to investigate the influence of corporate size and profitability (e.g. Wong, 1988). Large or highly profitable companies attract political scrutiny, and therefore their managers are motivated to reduce the political cost by extending the extent of voluntary disclosure (Al-Htaybat, 2005). Similarly, Gazali (2004) claimed that the industry variable could be associated with political cost levels.

For instance, oil and gas companies have more incentives than others to disclose more information to avoid future regulatory costs.

In this context, KPI reporting could be used as a tool to avoid political costs, especially for companies in the public eye. For instance, managers will be motivated to provide more KPIs related to corporate social responsibility in order to alleviate political pressure.

Moreover, it is most likely that big and / or highly profitable companies would stay away from political costs through presenting more KPIs. Those KPIs would focus on other aspects of its performance rather than concentrating only on earnings' figures.

3.2.5 Stakeholder theory

Clarkson (1995, p. 106) defines stakeholders as '*Persons or groups that have, or claim, ownership, rights, or interests in a corporation and its activities, past, present, or future. Such claimed rights or interests are the result of transactions with, or actions taken by, the corporation, and may be legal or moral, individual or collective*.'

The idea behind stakeholder theory is that the organisation is a part of a broader social system, and it affects and is impacted on by other groups within society (Deegan et al., 2002). All stakeholders have the right to be informed about the organisation's influence on them, even if they choose not to use the information, and even if they have no direct impact on the organisation's survival (Deegan and Unerman, 2006). Therefore, managers should take into consideration the need to report to other groups who have a stake in the company (e.g. creditors, employees, customers, suppliers, government authorities).

Taking into consideration the conflict of interest between stakeholders, organizations tend to develop and improve their financial reporting. It is important for them to have

stakeholder dialogue in order to build and manage effective stakeholder relationships (Boesso and Kumar, 2009). However, the organisation most often gives the priority to the demands of stakeholder(s) that are considered to be powerful (Deegan and Unerman, 2006).[18]

Successful managers have to arrive at a balance when satisfying the needs of different powerful stakeholders (Deegan and Unerman, 2006). Corporate reporting could highlight corporate social responsibility activities to avoid accountability concerns. In addition, voluntary disclosure could be employed to satisfy stakeholders' expectations about corporate performance with regard to financial, social, and environmental aspects.

Ulmann (1985) argued that firms use social disclosures in order to manage its relationships with their stakeholders. He suggested that social disclosure is a function of three dimensions: stakeholders' power, strategic posture and economic performance. These dimensions are found to be related to both social disclosure levels (Robert, 1992) and environmental disclosures (Chan and Kent, 2003).

Given that non-financial KPI reporting covers social and environmental perspectives of corporate performance, managers are expected to increase the quantity and quality of KPI disclosures to manage and achieve better communications with various stakeholders. In line with stakeholder theory, it is expected that some firm's characteristics could affect KPI reporting. For instance, highly leveraged firms would provide more financial KPIs to meet the demands of debt-holders. On the other hand, firms with a concentrated ownership will not be motivated to disclose more KPIs in general or non-financial KPIs in particular.

[18] It was argued that whenever stakeholders have a conflict of interests, corporations will prefer to provide information to those stakeholders deemed to be more critical for their survival (Neu et al., 1998).

3.2.6 Information costs theory

Managers' decisions to provide voluntary information will be based on cost-benefit analysis. It was argued that corporate disclosure will be made as long as its benefits exceed its costs (e.g. collection, supervision, legal fees and auditing costs) (Cooke, 1992; Heitzman et al., 2010). However, it is not obvious if all benefits and costs - either neutrally or by weighting - are taken into account when it comes to determining disclosure levels (Beattie and Smith, 2012).

In general, financial disclosure costs can be classified into direct and indirect costs (Foster, 1986 cited by Al-Htaybat, 2005):

- Direct costs include costs related to collecting, preparing, processing and auditing financial information.

- Indirect costs include competitive disadvantage costs arising from the use of disclosed information by competitors, litigation costs when users claim for using incorrect financial information, and political costs like taxes required by the government.

Accordingly, additional KPI disclosures will be provided after considering its costs and benefits. However, there is no study that discusses the benefits of KPI reporting. Regarding costs, performance indicators are used to assess changes in performance, and hence most KPI information is already available without any incremental costs. Additionally, UK companies can avoid competitive disadvantage costs by considering disclosure of some KPIs that are seriously harmful to company's interests.

3.2.7 Summary of relevant theories

In summary, section 3.2 reviews the relevant theories which explain managers'

incentives to voluntarily provide a wide range of information. Managers may have many motives to control disclosure levels, and thus variations between companies with regard to disclosure level will exist. Each theory looks at the disclosure phenomenon from a different perspective. In this context, Gray et al. (1995) stated that different theoretical perspectives need to be seen as sources of explanation of different factors, at different levels of resolution, not as competitors for explanation. In line with this conclusion, Beattie and Smith (2012) documented that adopting more than economic and managerial theories will enable us to explain manager's incentives to voluntarily disclose information. This range of theories helps us to focus on different aspects of corporate behaviour.

KPI reporting incorporates financial and non-financial information which cover operating, social, and environmental issues. Previous research has found that, in such a setting, the incentives behind each type of disclosure and its importance would vary between disclosure topics or within its content (Kothari et al., 2009; Beattie and Smith, 2012). Therefore, it will not be appropriate to use a specific theory, on its own, as a logical base for KPI reporting in practice. Incentive theories for KPI reporting could include agency theory, signalling theory, in addition to capital need theory. For instance, in accordance with agency theory, managers will be motivated to present particular performance indicators that prove that they are acting in the interests of the shareholders. On the other hand, one can argue that this is driven by their need to signal themselves as high quality managers (signalling theory). In this regard, Morris (1987) argued that there is a consistency between both agency theory and signalling theory. He suggested that a combination of them would provide a better prediction of accounting choices. The same approach was also adopted by Watson et al. (2002) to get greater insight into managers' motives to voluntarily disclose accounting ratios in the UK. Hence, it is proposed that we consider agency theory and signalling theory as being

complementary. Additionally it will be acceptable to explain KPI reporting in terms of managers' response to investors' demand for information, which would be helpful with regard to raising capital at the lowest possible cost (capital need and stakeholder theories). Arguably, this approach will be relevant as there is a variety of variables that are suggested in the literature as explanatory factors for corporate disclosure. These variables that represent determinants of disclosure can be explained by more than one theory to obtain greater insights into the motivations for controlling the quantity and quality of KPI disclosures.

3.3 Previous literature

This section highlights the findings of previous researchers who have examined the determinants of corporate disclosure in general, and KPI reporting in particular. As mentioned before, KPI reporting is more likely to be voluntary in nature. Previous research provides evidence of the relationship between corporate disclosure and firm characteristics which have been used as proxies for a variety of theories discussed in the previous section (e.g. Cooke, 1989; Wallace et al., 1994; Ahmed and Courtis, 1999). In addition, many studies have investigated the impact of corporate governance (CG) attributes on corporate voluntary disclosure (CVD) as a whole (e.g. Ho and Wong, 2001; Wang et al., 2008). Furthermore, CG effect on CVD subcategories has been examined in the previous literature, such as forward-looking information (e.g. Wang and Hussainey, 2013; Hussainey and Al-Najjar 2011), online reporting (e.g. Abdelsalam and Street, 2007; Aly et al., 2010), and intellectual capital disclosure (e.g. Li et al., 2008).

In particular, there have been a limited number of studies that have investigated the determinants of KPI disclosure in annual reports. Boesso and Kumar (2007) examined the factors driving voluntary disclosure practices. They employed content analysis to

measure the quantity and quality of KPIs provided in the Management Discussion & Analysis (MD&A) sections of the annual reports of 72 US and Italian companies during 2002. A list of 42 KPIs was determined with regard to their importance to stakeholder's communication needs. The quantity score was calculated based on the number of sentences which contained any information concerning these KPIs. The quality score was derived by giving a higher weight to KPI sentences which included quantitative, non-financial and forward-looking information about KPIs. This study found that size, and to some extent the industry concerned, have an impact on the quantity and quality of KPI disclosures. Business complexity, instability and volatility were found to have an influence on KPI reporting quantity rather than on its quality. However, the study found that KPI reporting is not derived from CG or from intangibles. This study is a good attempt to consider both quantity and quality of KPI reporting in the US and Italy. However, the study suffers from several limitations. It is based on a small number of observations across two different countries in one year. Moreover, the quality index does not consider other qualitative characteristics of KPI information (e.g. the ability to understand its content and to compare results across years). Furthermore, the study does not control for many factors affecting CVD (e.g. CG mechanisms[19] and ownership structure).

Giunta et al. (2008) examined the quantity and quality of financial KPI reporting in the period 2004-2006 on the part of 49 medium sized Italian companies. They employed content analysis to capture the number of indicators published by each firm within the period, and then they classified these KPIs in terms of their role in assessing the development, profitability, and solvency of the firm. They measured KPI quality based on the presence/absence of 10 qualitative aspects. These aspects were then grouped in accordance with the four general dimensions presented by IASB (2005), which are

[19] The study only used the percentage of independent directors in the board as a proxy for CG structure in the company.

relevance, understandability, reliability, and comparability. The quality scores were derived by calculating the mean among the four dimensions. Their results showed the low quantity and quality of financial KPI reporting. These results support the call for regulating narrative disclosure in MC in general, and KPI reporting specifically. Nonetheless, the main limitation of this paper is its reliance on a relatively small sample comprising medium sized companies in an Italian setting. It also focused on only one type of KPI (financial KPIs).

Tauringana and Mangena (2009) examined the extent of KPI reporting and the factors affecting its level before and after the introduction of a business review. The results suggested that the introduction of the business review had a significant impact upon KPI reporting in the media sector. Additionally, the study showed that proportion of Non-Executive Directors (NED), company size, profitability and gearing are associated with the extent of KPI reporting in those companies. Although this study is the first to explore the determinants of KPI reporting in UK, its results could not be generalised because of its focus on media companies with only 32 companies as a sample. Furthermore, the study neither analysed the quality of KPIs disclosed, nor examined its determinants in this sector.

The UK Government seeks to improve communication between companies and the users of information. Despite the variety of information provided within KPI disclosures, previous studies have not provided empirical evidence showing what drives UK companies to control the amount of KPI disclosed and its reporting quality. The present study addresses this gap left by disclosure studies. Arguably, the study can help to improve the dialogue between companies and shareholders, taking into consideration the actual KPI reporting practices in the UK.

3.4 Research hypotheses

Exploring the determinants of KPI reporting quantity apart from its quality is the main objective of the analyses in this study. Hence, it would provide answers to research question (Q2). In addition, it helps to examine whether the quantity and quality of KPI disclosure are derived from the same determinants. Hence, it would provide answers to research question (Q4).

In fact, CG mechanisms are introduced - based on the agency theory framework - to mitigate managers' opportunistic behaviours and reduce information asymmetry. CG mechanisms should facilitate corporate monitoring as they lead to an improvement in companies' internal control, and consequently extend disclosure levels (Leftwich et al., 1981; Welker, 1995; Ho and Wong, 2001). Accordingly, it could be predicted that CG mechanisms could improve KPI reporting.

Thus, this study takes into consideration most of the CG mechanisms as potential determinants of KPI reporting. The Organisation for Economic Co-operation and Development (OECD) indicated that corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. It provides the structure through which the objectives of the company are set, and the means by which attaining those objectives and monitoring performance are determined (OECD, 2004). Ensuring timely and accurate disclosure regarding the financial situation, performance, ownership and governance of the company is considered as one of the main principles of corporate governance (OECD, 2004).

Schleifer and Vishny (1997) stated that providing a degree of confidence to the suppliers of finance is the aim of CG. However, CG involves not only this objective but also has effects on other stakeholders. The Cadbury Report (1992) in the UK refers to the wider interests of corporate governance that intend to achieve a balance between

economic and social goals, and between individual and communal goals. The presence of an effective CG system for each individual company across an economy helps to use resources more efficiently, and therefore maintain sustainable economic growth for the economy (OECD, 2004).

It is noted that most of the previous research has focused on CG mechanisms that are related to the monitoring role of corporate board of directors. Hence, it has tested the influence of the board and its sub-committee characteristics on the amount of information disclosed. For instance, several studies examined the impact of board size, board independence, members' experience, role duality, board activity, board committees, audit committee size, the experience of audit committee members, and audit committee meetings (e.g. Forker, 1992; Ho and Wong, 2001; Haniffa and Cooke, 2002; Ajinkya et al., 2005; Tauringana and Mangena, 2009; Hussainey and Al-Najjar, 2011). Additionally, the impact of ownership structure has been examined to understand managers' incentives to extend corporate disclosure (e.g. Lakhal, 2005; Wang and Hussainey, 2013).

The present study builds on the previous literature in order to develop and form the hypotheses of the present study. After controlling for firm characteristics effects, the current study suggests CG mechanisms as the main drivers for both quantity and quality of KPI reporting. In order to obtain more insight into managers' incentives to control disclosures, this study examines the impact of directors' compensation, and their plans to get finance from different sources on KPI quantity and quality.

In particular, the proposed KPI reporting determinants include - in addition to firm characteristics - directors' compensation, board size, board composition, board meetings, role duality, audit committee size (AC) size, AC meetings, managerial

ownership, major shareholding, and the issuance of shares, bonds and loans.

To facilitate forming and testing the hypotheses, these determinants can be classified into the following categories: 3.4.1 Directors' compensation, 3.4.2 Board characteristics, 3.4.3 Audit committee characteristics, 3.4.4 Ownership structure, 3.4.5 Capital need variables, and 3.4.6 Firm characteristics variables as controls.[20]

3.4.1 Directors' compensation

Directors' compensation and their interests in company shares may be sufficient incentives for controlling KPI reporting. Because of the separation of ownership and control, there is a need to monitor managers' actions (Jensen and Meckling, 1976). Directors' compensation works as an efficient corporate governance mechanism. This mechanism aims to align the directors' and the shareholders' interests. Previous studies find that directors' remuneration plans have an impact on CVD (Aboody and Kasznic, 2000; Nagar et al., 2003; Grey et al., 2012). For instance, Aboody and Kasznic (2000) found that top executives take opportunistic disclosure decisions in order to affect their stock option compensation. Thus, they tend to disseminate bad news and delay good news around stock option award times. However, previous research did not examine how the extent and quality of CVD are affected by the average compensation for both categories of directors. Consistent with agency theory, firms with higher directors' compensation can mitigate the agency problem. As directors of these companies would

[20] The main objective of the regulatory bodies - according to their theoretical frameworks - is to maintain the high quality of information disclosed. Hence, previous studies originally aimed at studying the determinants and consequences of corporate disclosure relying on the differences between firms in disclosure quality. However, these studies used disclosure quantity to measure disclosure quality. Therefore, one can argue that these theories and principles - followed in the previous literature - can serve to study the quantity as well as the quality of KPI reporting. Furthermore, the relatively high correlation which is found between both KPI reporting quantity proxies and KPI reporting quality proxies in Table 17 in the previous study ($\rho = 0.76$), is another motivation to test whether or not they are substitutes. Consequently, the same hypotheses are developed for KPI reporting quantity and quality either in examining their determinants or their impact on firm value. Arguably, testing these shared hypotheses empirically in each study would indicate whether quantity and quality of KPI reporting have identical\different drivers\impacts. Hence, this would help us to find whether or not the quantity of KPI reporting could work as a proxy for its quality.

tend to disclose their private information, a lower degree of information asymmetry between directors and shareholders might be expected. Hence, this may improve the quantity and quality of KPI reporting.

In line with this argument, signalling theory provides another explanation with regard to compensation influence on corporate disclosure. This is because executive and non-executive directors have incentives to improve KPI reporting in order to show their impact on company's performance and hence retain their high levels of compensation. Their objective may also be to signal themselves as high quality managers in the employment market. Therefore, these two hypotheses are formulated:

H1. *A positive association exists between executive compensation and KPI reporting quantity\quality.*

H2. *A positive association exists between non-executive compensation and KPI reporting quantity\ quality.*

3.4.2 Board characteristics

This group of variables is concerning with the board characteristics that may enhance\ alleviate the monitoring role of the board. These variables include: board size, board composition, board meetings, and role duality.

3.4.2.1 Board size

The board of directors represents the total number of executive and non-executive directors on the board. It plays an important role in the corporate governance of publicly listed companies. Healy and Palepu (2001) stated that electing a board of directors that acts on behalf of investors, is an efficient mechanism that affects mangers' voluntary disclosure decisions and controls the agency problem. However, it was claimed that UK boards have a much weaker monitoring role as a result of soft CG

regulations in the UK, which allow firms to choose the board size that is most appropriate for their own needs (Guest, 2008). Wang and Hussainey (2013) claimed that larger boards' effectiveness is negatively affected by the presence of problems regarding communication and coordination.

In turn, some studies have indicated that larger boards incorporate a variety of expertise which results in greater effectiveness in terms of the boards' monitoring role (e.g. Singh et al., 2004, Abdel Fattah, 2007). One can argue that directors serving on larger boards would have more incentive to signal their role in performance improvement to various parties. It was argued that talented managers are motivated by their desire to signal themselves to make voluntary disclosures (Graham et al., 2005). Furthermore, it was reported that this incentive is more important for managers of smaller and high growth firms (Graham et al., 2005). Thus, based on signalling theory, a positive association between board size and KPI reporting could be expected.

Some previous studies found a positive association between board size and voluntary disclosure (e.g. Laksamana, 2008; Hussainey and Al-Najjar, 2011). Others found there to be no significant impact in terms of board size on corporate disclosure (e.g. Lakhal, 2005; Cheng and Courtenay, 2006).

Based on these mixed results, the fourth hypothesis is formulated as:

H3. *A significant relationship exists between KPI reporting quantity\ quality and board size.*

3.4.2.2 Board composition

Board composition refers to the proportion of non-executive directors (NEDs) on the board. Non-executive directors are expected to provide independent advice to executive directors. Boards with a higher proportion of non-executive directors are expected to be

more effective in performing a monitoring role, and thereby having a positive effect on accounting reporting quality, as they may aim to signal their competence to potential employers (Fama and Jensen, 1983).

Previous studies which have examined the relationship between board composition and disclosure have provided mixed findings. Some studies found no statistically significant association between them (e.g. Ho and Wong, 2001; Haniffa and Cooke, 2002; Mangena and Pike, 2005; Lakhal, 2005). However, Tauringana and Mangena (2009) found that the proportion of NEDs is associated negatively with KPI reporting. On the other hand, a positive relationship has been reported between the proportion of NEDs and the level of corporate disclosure in many studies (e.g. Forker, 1992; Cheng and Courtenay, 2006, Abraham and Cox, 2007; Li et al., 2008; Laksamana, 2008; Wang and Hussainey, 2013). Following these studies, a stronger monitoring role would be expected from boards with a higher proportion of non-executive directors. Hence, a positive relationship between the proportion of non-executive directors on the board and KPI reporting will be hypothesised:

H4. *There is a positive relationship between board composition and KPI reporting quantity\ quality.*

3.4.2.3 Board meetings

Frequent board meetings are important as a CG mechanism, because they enable the directors to control the company effectively. Thus, it can be argued that active boards – those with more frequent meetings - are more likely to monitor financial reporting. On the other hand, a positive association between board meetings and KPI reporting is expected in accordance with signalling theory. Active boards' members will tend to signal their performance to potential employers. There is limited literature on the association between frequent board meetings and corporate disclosure in the UK.

Laksamana (2008) reported a positive association between board meetings and the transparency of compensation disclosure. In turn, Nelson et al. (2010) found no association between board meetings and the amount of executive stock options made by Australian companies.

The current study aims to provide evidence with regard to the influence of effective boards using data from UK firms. The following hypothesis is formulated:

H5. *A significant association exists between board meetings and KPI reporting quantity\ quality.*

3.4.2.4 Role duality

Role duality occurs if the chief executive officer (CEO) holds the chairman position at the same time. According to agency theory, effective control over management performance will only exist if the two roles are separated (Jensen and Meckling, 1976; Haniffa and Cooke, 2002). Concentration of decision-making power resulting from role duality could result in opportunistic behaviour on the part of the CEO (Wang and Hussainey, 2013). Moreover, this may impair the board's governance role regarding disclosure policies (Li et al., 2008).

It is important to investigate the impact of role duality on KPI reporting because the results of previous studies that examined the relationship between role duality and corporate disclosure are mixed. For instance, some studies found an insignificant influence in terms of duality on CVD (e.g. Ho and Wong, 2001; Cheng and Courtenay, 2006; Ghazali and Weetman, 2006). Other studies reported a significant and negative relationship between role duality and CVD (Forker, 1992; Haniffa and Cooke, 2002; Abdelsalam and Street, 2007; Wang and Hussainey, 2013). Thus, the following hypothesis is formulated:

H6. *A significant association exists between role duality and KPI reporting quantity\ quality*.

3.4.3 Audit committee characteristics

This group of variables is concerning with audit committee characteristics that improve financial reporting monitoring. These variables include: audit committee (AC) size, AC meetings.

3.4.3.1 AC size

The UK is the first country within the EU to show that the majority of its listed companies are keen to form ACs (Collier and Gregory, 1999). The Cadbury Committee (1992) in the UK stated that an audit committee adds assurance to shareholders that external auditors are serving as guards of their interests. The Smith Report (2003), states that the AC should monitor the integrity of the financial statements and review the company's internal financial control system, as well as its risk management systems. Moreover, the Corporate Governance Combined Code (2010) in the UK recommends that the audit committee should involve at least three, or in the case of smaller companies, two independent non-executive directors. The AC monitoring role is not only about the financial reporting process, but also extends to the reporting of non-financial information (Li et al., 2012). Mangena and Pike (2005) suggested that larger audit committees lead to more effective monitoring, since they are more likely to have the essential expertise and views to be able to do that. However, mixed results have been obtained from previous studies. Mangena and Pike (2005) and Tauringana and Mangena (2009) found no statistically significant relationship between the level of disclosure and AC size. Felo et al. (2003) and Li et al. (2012) reported a positive relationship between AC size and the quality of financial reporting. The present study will empirically explore the relationship between AC size and the quantity and quality

of KPI reporting. The following hypothesis is formulated:

H7. *A significant relationship exists between AC size and KPI reporting quantity\ quality.*

3.4.3.2 AC meetings

An active AC with a high frequency of meetings will have enough time to discharge its duties. The FRC (2012) recommends that should be no fewer than three AC meetings during the year. There are a few studies that have investigated the impact of active ACs. Collier and Gregory (1999) found that UK ACs are effective in their role of overseeing the external audit and ensuring audit quality. However, their study did not provide strong evidence that UK ACs are effective in strengthening firms' internal controls. Abbott et al. (2004) documented that the activity of the AC has a significant and negative relationship with the occurrence of the restatement of the annual report. Other studies have provided evidence on a positive relationship between AC meetings and subcategories of financial reporting such as internet reporting (e.g. Kelton and Yang, 2008; Li et al., 2012). The present study extends the empirical evidence on the association between active ACs and the information disclosed by examining the relationship between AC meetings and KPI reporting.

Thus, the following hypothesis is formulated:

H8. *There is a significant relationship between AC meetings and KPI reporting quantity\ quality.*

3.4.4 Ownership structure

Arguably, concentration of ownership affects disclosure levels. This group of variables include: managerial ownership and major shareholding.

3.4.4.1 Managerial ownership

According to agency theory, firms with a higher level of managerial ownership would align the interests of managers and shareholders, and hence may have lower agency costs (Jensen and Meckling, 1976). Hence, a positive association is expected between managerial ownership and CVD. However, the findings of previous research into this relationship are mixed. Several studies showed a positive monitoring influence of managerial ownership and hence a positive relationship impact upon corporate disclosure (e.g. Chau and Gray, 2002; Jaing and Habib, 2009). In contrast, Eng and Mak (2003) reported a negative relationship between managerial ownership and the quality of corporate disclosures. Wang and Hussainey (2013) argued that managers can maximize their private benefits by reducing the level of voluntary disclosure based on management entrenchment theory. On the other hand, Forker (1992) found that the association between managerial ownership and the quality of share option disclosure is not statistically significant.

Based upon agency and stakeholder theories, it is anticipated that managers with a high interest in the company's shares will be motivated to extend the level of quantity and quality of KPI disclosed. This behaviour would be explained by the manager's aim to reduce the agency problem (agency theory) and to meet other stakeholders' needs for information (stakeholder theory). Thus, the following hypothesis is formulated:

H9. *There is a significant relationship between managerial ownership and KPI reporting quantity\ quality.*

3.4.4.2 Major Shareholding

The presence of block holders reduces agency costs as it affects the monitoring of management's performance (Jensen and Meckling, 1976). A positive association

between block holder's ownership and voluntary disclosure is expected according to agency theory, as managers need to reduce information asymmetry. El-Gazzar (1998) argued that a high concentration of institutional ownership in a company motivates the managers to publish more voluntary disclosures in order to maintain confidence in the company. On the other hand, there is the counterargument that companies with a concentrated ownership structure do not have to disseminate more information, because the main shareholders can easily obtain it. They usually have access to such information perhaps through meetings with company management (Holland, 1998).

In fact, the evidence is mixed on the relationship between institutional ownership and disclosure in previous studies. While, Eng and Mak (2003) and Wang and Hussainey (2013) found no significant relationship between institutional investors and voluntary disclosure, some studies have provided evidence of a negative association between institutional ownership concentration and disclosure levels in interim reports (Schadewitz and Blevins, 1998). Other studies (e.g. Mangena and Pike, 2005; Lakhal, 2005) reported a positive association between the two variables. Accordingly, the current study is motivated by these mixed results to examine the association between KPI disclosure and institutional investors. Therefore, the following hypothesis is formulated:

H10. *There is a significant relationship between major shareholding and KPI reporting quantity\ quality.*

3.4.5 Capital need variables

Capital need theory assumes a relationship between corporate disclosure and the need to get funds or to raise capital as cheaply as possible (Choi, 1973). Thus, a plan to raise capital may represent a good incentive for controlling the quantity and quality of KPIs reported in the annual report. Corporate managers who look for funds could use one or

more of the following resources: the issuance of shares, bonds, or raising loans. Theoretically, the information asymmetry problem could exist between company managers and outsider investors who do not have access to internal information about the company. Therefore, managers should disclose more information in order to obtain access to more and different resources. High levels of corporate disclosure may result in a better understanding of the company's strategies. Thus, managers would be keen to mitigate information asymmetry through voluntary disclosure (Cooke, 1993; Healy and Palepu, 2001). Consequently, this will reduce perceived uncertainties and encourage investors to accept a lower rate of return (Choi, 1973). In line with this argument, Dhaliwal et al. (2011) found that firms that report non-financial social responsibility information are more likely to be able to raise larger amounts of equity capital in the two years following the reporting, compared with non-reporting firms.

From a signalling perspective, managers seeking finance may wish to send good signals to the investors and debt holders. For investors, such communication is credible because managers making fraudulent signals will be penalised (Hughes, 1986). On the other hand, sending good signals to debtors may enable the company to avoid any additional restrictive covenants in debt contracts. On the other hand, managers could issue bad news via KPI reporting so as to avoid the consequences of having a reputation of withholding bad news (Skinner, 1994).

In general, it is expected that directors' plans to obtain finance would affect KPI reporting. Managers could use reporting on financial and non-financial KPIs in order to provide investors with a complete picture regarding corporate strategy and performance. That would help to raise capital as cheaply as possible, either from local or international markets.

Moreover, the study extends the literature by examining whether or not managers'

plans to access a different source of funds would have a different influence on KPI reporting quantity and quality. Thus, the following hypotheses are formulated:

H11. *There is a significant relationship between issuance of equity and KPI reporting quantity\ quality.*

H12. *There is a significant relationship between issuance of bonds and KPI reporting quantity\ quality.*

H13. *There is a significant relationship between acquiring loans and KPI reporting quantity\ quality.*

Table 18 summarises the expected signs between KPI reporting quantity \ quality and the various explanatory factors to be used in this study, based on the findings of the previous literature.

3.4.6 Firm characteristics as control variables

It is worth noting that the study has to control for firm characteristics that have been suggested in previous research as determinants of corporate disclosure (e.g. Cooke, 1989; Malone et al., 1993; Wallace et al., 1994; Ahmed and Courtis, 1999; Watson et al., 2002, Mangena and Pike, 2005; Hussainey and Al-Najjar, 2011). Control variables include: firm size, profitability, liquidity, leverage, dividend yield, cross listing and industry.

Firm size is the most common variable that is used in exploring corporate disclosure determinants. Large firms have more incentives to increase their voluntary disclosure levels. The size effect can be explained by agency theory (Watts and Zimmerman, 1983, Inchausti, 1997), signalling theory (Wang and Hussainey, 2013), and political cost theory. In general, the majority of previous disclosure studies have found a positive

relationship between a firm's size and its level of disclosure (e.g. Hossain et al., 1995; Mangena and Pike, 2005).

Ahmed and Courtis (1999) showed that previous study results have provided mixed evidence on the association between a firm's profitability and the level of corporate disclosure. According to signalling theory, a positive association between disclosure and profitability is expected. Managers of highly profitable companies tend to signal their quality to interested parties. Hence, they also could get better rewards and compensation arrangements (Singhvi and Desai, 1971; Wallace et al., 1994). Moreover, to avoid external regulations, high profit firms will be motivated to provide more KPIs that are related to corporate social responsibility.

There are a few studies that have provided mixed findings regarding the relationship between liquidity and corporate disclosure. The relationship between liquidity and reporting practices can be explained by agency theory and signalling theory. However, Watson et al. (2002) claimed that these theories provide mixed predictions in terms of this relationship. Companies with weak liquidity may increase their disclosure in order to reduce agency costs and reassure shareholders (Wallace et al., 1994). On the other hand, according to signalling theory, company managers will have an incentive to disclose more information if their liquidity is high, to showcase their skills in managing liquidity risks compared with other managers in companies with lower liquidity ratios.

Furthermore, many empirical studies have denoted leverage (gearing) to be an important factor that may affect disclosure practices (e.g. Ho and Wong, 2001; Oyelere et al., 2003; Abraham and Cox, 2007; Hussainey and Al-Najjar, 2011). Based on agency theory, monitoring costs are higher in highly leveraged firms. To reduce these costs, they have to disclose more information in order to show their ability to meet any obligations for the sake of creditors (Jensen and Meckling, 1976). However, empirical

evidence on the association between gearing and disclosure is not conclusive.

Additionally, several empirical studies have considered dividend propensity as one of the key determinants of corporate disclosure (e.g. Archambault and Archambault, 2003; Hussainey and Al-Najjar, 2011; Wang and Hussainey, 2013). Signalling theory can be used to explain the impact of dividend propensity on corporate disclosure in the annual report. Companies with a high tendency to pay more dividends may have fewer incentives to disclose more information (Naser et al., 2006).

Previous literature has suggested that listing in foreign stock exchanges has a positive association with corporate disclosure levels (Wallace et al., 1994; Gray et al., 1995; Mangena and Pike, 2005; Aly et al., 2010). Cross listing, or listing in a foreign market, gives firms many chances to have access to several alternative sources of finance. The impact of cross listing can be explained by capital need theory. Participation in international capital markets offers the opportunity to increase the liquidity of a firm's shares (Hope, 2003). Firms with a foreign listing have an incentive to make additional disclosures to reduce investors' uncertainty about the performance of the firm (Gray et al., 1995).

Finally, previous disclosure studies have investigated the relationship between the level of corporate disclosure and sector type (e.g. Cooke, 1989; Wallace et al., 1994). The relationship between type of business and reporting practices can be explained by signalling theory and political cost theory. Signalling theory suggests that the more homogeneous the industry, the more likely it is that firms will adopt similar reporting practices (Malone et al., 1993; Wallace et al., 1994; Aly et al., 2010). If a company within an industry fails to follow the same disclosure practices as others in the same industry, then it may be interpreted as a signal that it is hiding bad news (Craven and

Marston, 1999; Oyelere et al., 2003).

On the other hand, within the framework of political cost theory, different industries are subject to different political costs (Ball and Foster, 1982). Thus, companies with vulnerable activities will employ voluntary disclosure to alleviate the political costs related to their activities (Oyelere et al., 2003).

Some studies found an insignificant relationship between the two variables such as Wallace et al. (1994). However, the majority of the previous studies found a significant relationship between sector type and corporate disclosure (Cooke 1992; Craven and Marston, 1999; Mangena and Pike, 2005; Beretta and Bozzolan, 2004). It is predicted that KPI reporting would be affected by the type of businesses. Different industries would be influenced by different and unique value creation activities. The findings discussed in the previous chapter show that there is a variation between industries in terms of the quantity and quality of KPI reporting. For instance, Utilities sector companies have disclosed the largest amount of KPI. This might be explained - in line with stakeholder theory - by their aim to meet the different needs of their stakeholders (e.g. creditors, customers, and suppliers). In turn, Oil & Gas firms have provided the lowest level of KPI reporting quality. Apparently, these companies have avoided the negative consequences of high quality KPI disclosure. Hence, they control their disclosures to alleviate the political costs related to their activities. Therefore, the type of industry should be considered when analysing the determinants of KPI disclosure.

Table 18 summarises the expected signs between KPI reporting and the various control variables to be used in this study, based on the findings of the previous literature.

Table 18 Explanatory variables and their expected relationship with KPI disclosure based on previous studies

Variables	Expected sign	Examples for previous studies
Directors' compensations	+	Aboody and Kasznic (2000); Nagar et al. (2003); Grey et al.(2012)
Managerial ownership	+	Forker (1992) ; Chau and Gray (2002); Jaing and Habib (2009); Wang and Hussainey(2013)
Board size	+	Singh et al. (2004); Lakhal (2005); Cheng and Courtenay (2006); Abdel-Fattah et al. (2007); Laksamana (2008); Wang and Hussainey(2013)
Board composition	+	Forker (1992); Ho and Wong (2001); Haniffa and Cooke (2002); Ajinkya et al. (2005); Tauringana and Mangena (2009); Hussainey and Al-Najjar (2011)
Board meetings	+	Laksamana (2008)
Role duality	-	Forker (1992); Haniffa and Cooke (2002); Ho and Wong (2001); Cheng and Courtenay (2006); Ghazali and Weetman (2006); Abdelsalam and Street (2007); Wang and Hussainey (2013)
AC size	+	Felo et al. (2003); Mangena and Pike (2005); Tauringana and Mangena (2009); Li et al. (2012)
AC meetings	+	Kelton and Yang (2008); Li et al. (2012)
Major shareholding	+	Schadewitz and Blevins (1998); Eng and Mak (2003); Mangena and Pike (2005); Lakhal (2005); Wang and Hussainey(2013)
The issuance of shares, bonds and loans	+	Lang and Lundholm (1993); Boubaker et al. (2011); Dhaliwal et al. (2011)
Firm size	+	Hossain et al. (1995); Watson et al. (2002); Boesso and Kumar (2007); Tauringana and Mangena; (2009); Wang and Hussainey (2013).
Profitability	+/-	Wallace et al. (1994); Ahmed and Courtis (1999); Tauringana and Mangena (2009); Hussainey and Al-Najjar (2011).
Leverage	+/-	Malone et al. (1993); Ahmed and Courtis (1999); Tauringana and Mangena, (2009); Hussainey and Al-Najjar (2011); Boubaker et al. (2011).
Liquidity	+/-	Wallace et al. (1994); Watson et al. (2002); Mangena and Pike, (2005); Anis et al. (2012).

Cross listing	+	Cooke (1992); Wallace et al. (1994); Gray et al. (1995); Mangena and Pike (2005); Aly et al. (2010); Elzahar and Hussainey, 2012).
Dividends	+	Naser et al. (2006); Wang, and Hussainey (2012); Hussainey and Al-Najjar (2011).
Industry	+/-	Cooke (1992); Craven and Marston (1999); Mangena and Pike (2005); Beretta and Bozzolan (2004); Boesso and Kumar (2007); Boubaker et al. (2011); Elzahar and Hussainey (2012).

3.5 The data, descriptive statistics, and the models

To investigate the relationship between KPI reporting and all explanatory variables, panel regressions are conducted based upon regression models. This section begins with identifying the sample and the variables used in the present study. Descriptive statistics for the variables of this study are presented in section 3.5.2. Then, section 3.5.3 will refer to some econometric concerns before carrying out the analyses. Finally, section 3.5.4 introduces the regression models.

3.5.1 The data

As mentioned earlier, the present study focuses on the annual reports of a sample of FTSE 350 non-financial UK firms over a five year period (2006-2010). The study sample is identified as 103 firms with 515 annual reports published between 2006 and 2010. The reports are collected from the companies' homepages and the Thomson One Banker database. Firms' financial characteristics are downloaded from Datastream. Directors' compensation data is collected from BoardEx. CG data is manually collected from the annual reports.

The steps followed in order to identify the sample firms are indicated in the previous chapter.[21] Subsequently, various observations are excluded for the reasons illustrated in Panel (A) in Table 19, to end up with 498 firms as the final sample. Panel (B) in the same table provides a disaggregation of the sample across industries. Finally,

Table 20 illustrates the definition and measurement for each variable in the present study.

Table 19 Sample Selection and its disaggregation across industries

PANEL A – SAMPLE SELECTION PROCESS	
Starting point: Top 350 UK firms based on market capitalisation, according to the 2011 Financial Times ranking. Financial firms are then excluded. Subsequently, 103 firms are selected randomly following two criteria: 1) each sector is represented in the same proportion as in the starting sample; 2) as firms are arranged according to market capitalisation; systematic sampling is used by choosing the first company in every sector as a starting point. Then, selection is continued by selecting the third, the fifth and so on. Then, selection is continued by selecting the third, the fifth and so on. This process results in 515 observations [103 * 5 years (2006, 2007, 2008, 2009, and 2010)]. Thereafter, the following exclusions take place:	
***n* observations excluded thereafter**	**Reason for exclusion**
2	KPI regulation not applicable in 2006 (because of year end date)
4	Missing data on directors' compensation
6	Missing CG data
5	Missing data on loans, equity, and bonds issued bonds the year next to the financial statements date.
17	total number of observations excluded
498	**final sample**

PANEL B – SAMPLE CONSTITUENTS BY INDUSTRY		
Industry	**Frequency**	**Percentage**
Basic Materials	40	8.0
Consumer Goods	65	13.1
Consumer Services	107	21.5
Health Care	24	4.8
Industrials	143	28.7
Oil & Gas	54	10.8
Technology	35	7.0
Telecommunications	10	2.0

[21] For more details on selecting the sample firms, please see section 2.4.

Utilities	20	4.0
TOTAL	498	100.0

Table 20 The definition and measurement of the explanatory variables

Variable	Definition	Measurement
EXCOMP	Executive compensations	The natural logarithm of executives directors' compensation average
NOEXCOMP	Non-executive compensations	The natural logarithm of non-executives directors' compensation average
BORSIZE	Board size	The total number of directors on board
BORCOMP	Board composition	The board composition and is calculated as the number of non-executive directors divided by board size
BORMEET	Board meetings	The total number of board meetings during the year
ROLEDUAL	Role duality	A dummy variable equals 1 if the chairman is the same person as the CEO of the firm,0 otherwise
ACSIZE	Audit committee size	The total number of directors in audit committee
ACMEET	Audit committee meetings	The total number of audit committee meetings during the year
MANGOWN	Managerial ownership	The percentage of directors' share interests to ordinary shares
MAJORSHAR	Major shareholding	The aggregate percentage of shares that hold by major shareholders (with at least 3% ownership).
FUT_EQUITY	The issuance of equity in t_{+1}	A dummy variable equals 1 if the firm has issued equity in the next year ,0 otherwise
FUT_BONDS	The issuance of bonds in t_{+1}	A dummy variable equals 1 if the firm has issued bonds in the next year ,0 otherwise
FUT_LOANS	The issuance of loans in t_{+1}	A dummy variable equals 1 if the firm got loans in the next year ,0 otherwise
SIZE	Firm size	The natural logarithm of market capitalization (WC08001)
PROFITAB	Profitability	The profitability measured by return on equity ((WC01651) / ((WC03501))
LIQUDITY	Liquidity	The ratio of total debt to total capital (WC08221)
LEVERAGE	Leverage	The current assets (WC02201) / current liabilities (WC03101)

DIVYIELD	Dividend yield	Dividends per share / share price ((WC05376)/(WC08001))
CROSSLIST	Cross listing	A dummy variable equals 1 if the firm's shares are traded on foreign financial markets and 0 otherwise.

Note: The definitions and measurement of the dependent variables are presented in Table 5.

3.5.2 Descriptive statistics

Table 21 shows the descriptive statistics for the explanatory variables of the current study. Panel (A) displays the descriptive statistics for the continuous variables. Whereas the executive directors' compensation ranges from £164,960 to £13,000,000, the average ranges from £24,060 to £315,480 for non-executive directors. The mean of the directors' share interests in ordinary shares is 0.05. The median number of directors on the board is 9 with a minimum of 5 and a maximum of 16. The mean in terms of board composition illustrates that non-executive directors make up 62% of the board. This indicates that non-executive directors dominate the board structure of the sample firms, which can be considered as an indication of board monitoring in these firms. The number of board meetings as a proxy of board activity shows that the median number of meetings is 8 per year. The audit committee size median is 4 directors. A median of 4 meetings is recorded for audit committee meetings during the year. That number of meetings is greater than three, which is the minimum number of audit committee meetings recommended by FRC (2012). Finally, the major shareholders hold a mean of 38% stake in the firms represented in the sample, with a minimum 4% and a maximum of 77%.

With regard to firm characteristics, the natural logarithm of market capitalisation for the sample firms varies from a minimum of 8.00 (£17,000,000) to a maximum of 11.019 (£130 billion) with standard deviation of 0.688 (£18 billion). This huge variation is expected, as the sample firms are drawn from the FTSE 350 which includes the largest UK firms. It shows that firm size should be considered as it might have an effect on

KPI reporting in practice. However, the large variation may also refer to the existence of outliers. These firms' profitability mean as measured by ROE is 0.08 which refers, in general, to the firms' ability to generate profits from shareholders' equity. However, the value of the ROE ratio should exceed the cost of equity capital, in order to add value to shareholders. The liquidity ratio median is 1.64 times, which indicates that firms in the sample do not suffer from financial problems in the short run. It shows that firms are able to cover their short term liabilities through their current assets. These companies are not highly leveraged, with a mean debt to total capital ratio of 0.366. However, the minimum of zero and the maximum of 1.42 for the leverage ratio indicate that these firms vary to some extent in their reliance on debt to finance their investments. Finally, the sample firms have a dividend to share price ratio with a median of 2.4%. As companies display good ability to secure current liabilities, it may be implied that these firms may prefer to retain profits in order to finance their growth.

Panel (B) shows the descriptive statistics for the categorical variables; it indicates that most of the firms included in the sample (90.16%) are traded on foreign financial markets. Similarly, it is noted that the majority of the sample firms (95.79%) make a distinction between the chairman and the CEO positions. According to agency theory, this distinction between the two roles mitigates the agency problem. It works against CEO entrenchment, and supports board monitoring. Moreover, the proportion of firms that got loans in the year following the financial statements' date (25.7%) is double that of the proportion who got funds through issuing equity.

Table 21 Descriptive statistics of explanatory variables

Panel (A) Descriptive statistics of continuous variables

Variable	Max	Min	Mean	Median	SD	N
EXCOMP	13,000	164.960	1,700	1,100	2,000	498
NOEXCOMP	315,480	24,060	77,305	66,000	43,465	498
MANGOWN	0.53	0.00	0.05	0.01	0.11	498
BORSIZE	16.00	5.00	9.35	9.00	2.43	498
BORCOMP	0.86	0.33	0.62	0.62	0.12	498
BORMEET	17.00	4.00	8.61	8.00	2.51	498

ACSIZE	6.00	2.00	3.62	4.00	0.87	498
ACMEET	8.00	1.00	3.99	4.00	1.27	498
MAJORSHAR	0.77	0.04	0.38	0.39	0.17	498
SIZE	11.019	8.00	9.194	9.064	0.688	498
PROFITAB	0.52	-0.17	0.08	0.07	0.09	498
LIQUIDITY	8.57	0.26	1.64	1.33	1.32	498
LEVERAGE	1.42	0.00	0.366	0.338	0.279	498
DIVYIELD	0.219	0.00	0.030	0.024	0.032	498

Panel (B) Descriptive statistics for the categorical variables

Variable	**Proportion**	**N**
FUT_LOANS: Proportion of firms got loans in the year next to the financial statements date.	25.7%	498
FUT_BONDS: Proportion of firms issued bonds in the year next to the financial statements date.	21.48%	498
FUT_EQUITY: Proportion of firms issued equity in the year next to the financial statements date.	13.25%	498
CROSSLIST: Proportion of firms whom shares are traded in foreign financial markets	90.16%	498
ROLEDUAL : Proportion of directors who are the chairmen and the CEO for a company at the same time	4.21%	498

Panel A displays descriptive statistics of continuous variables used in the present study as proxies for firm characteristics and corporate governance attributes; **EXCOMP** is executives directors' compensation average (in thousands); **NOEXCOMP** is non-executives directors' compensation average; **MANGOWN** is the managerial ownership which is computed as a percentage of directors' share interests to ordinary shares; **BORSIZE** is the total number of directors on board; **BORCOMP** is the board composition and is calculated as the number of non-executive directors divided by board size; **BORMEET** is the total number of board meetings during the year; **ACSIZE** is the is the total number of directors in audit committee; **ACMEET** is the total number of audit committee meetings during the year; **MAJORSHAR** is the aggregate percentage of shares hold by major shareholders (with at least 3% ownership), **SIZE i**s the natural logarithm of market capitalization (in £million); **PROFITAB** is the profitability measured by return on equity (the ratio of net income to book value of equity); **LIQUDITY** is measured by the current assets to current liabilities ratio; **LEVERAGE** is calculated as the ratio of total debt to total capital; **DIVYIELD** is a proxy for dividend policy (dividends per share / share price).

Table 22 illustrates the descriptive statistics of the dependent variables which have been used in the main analysis or in further analyses. Panel (A) presents the descriptive statistics for the KPI quantity scores. The number of KPIs disclosed in the KPI section (QNTKSEC) by the sample firms ranges from a minimum of zero to a maximum of 24 KPIs. The median of QNTKSEC is 6 KPIs. It appears that the majority of the KPIs reported are financial KPIs. The median number of financial KPIs disclosed in the KPI section (QNFKS) is 5 KPIs. While the median of non-financial KPIs disclosed in the KPI section (QNNFKSEC) is only one KPI, after considering the KPIs disclosed

outside the KPI section, the median number of non-financial KPIs disclosed in the whole report (QNNFKREP) is found to be 2 KPIs. It appears that the KPIs disclosed outside the KPI section are more likely to be one non-financial KPI. This conclusion is confirmed when comparing the mean of QNTKSEC (7.49) KPIs with the mean of QNTKREP (8.15) KPIs.

Regarding KPI disclosure quality, the quality level for KPIs disclosed in the KPI section (QLTKSEC) ranges from 0 to 0.688. For the KPIs disclosed in the KPI section, the mean (median) of financial KPI reporting quality (QLFKS) is 0.345 (0.375). The level of non-financial KPI reporting quality (QLNFKSEC) is lower, with a mean (median) of 0.267 (0.286). As a result, the mean (median) of KPI reporting quality (QLTKSEC) is 0.363 (0.375). However, it seems that the high quality of KPI reporting outside the KPI section has driven the total quality of KPI reporting QLTKREP to be slightly higher than the corresponding QLTKSEC, with a mean (median) of 0.37 (0.388).

Table 22 Descriptive statistics of dependent variables

Panel (A) Descriptive statistics for KPI Quantity scores

Variable	Max	Min	Mean	Median	SD	N
QNTKSEC	24.00	0.00	7.49	6.00	5.08	498
QNFKS	19.00	0.00	5.34	5.00	3.50	498
QNNFKSEC	15.00	0.00	2.17	1.00	2.92	498
QNNFKREP	16.00	0.00	2.84	2.00	3.38	498
QNTKREP	24.00	0.00	8.15	7.00	5.38	498

Panel (B) Descriptive statistics for KPI Quality scores

Variable	Max	Min	Mean	Median	SD	N
QLTKSEC	0.688	0.000	0.362	0.375	0.174	498
QLFKS	0.691	0.000	0.345	0.375	0.175	498
QLNFKSEC	0.786	0.000	0.267	0.286	0.251	498
QLNFKREP	0.818	0.000	0.309	0.327	0.254	498
QLTKREP	0.665	0.000	0.370	0.388	0.170	498

Panel (A) displays descriptive statistics for KPI quantity scores: **QNFKS is** financial KPIs disclosed in the KPI section**;** **QNNFKSEC** is non-financial KPIs disclosed in the KPI section**;** **QNNFKREP** Non-financial KPIs disclosed in the whole report**;** **QNTKSEC** is the total number of financial and non-financial KPIs disclosed in the KPI section**.** **QNTKREP** is the total number of financial and non-financial KPIs disclosed in the whole report**.**

Panel (B) displays descriptive statistics for KPI quality scores: **QLFKS** is the quality of financial KPIs

disclosed in the KPI section; **QLNFKSEC** is the quality of non-financial KPIs disclosed in the KPI section; **QLNFKREP** the quality of non-financial KPIs disclosed in the whole report; **QLTKSEC** is the aggregated quality of financial and non-financial KPIs disclosed in the KPI section. **QLTKREP** is the aggregated quality of financial and non-financial KPIs disclosed in the whole report.

3.5.3 Econometric procedures

Cooke (1998) states that the transformation of data is basically helpful in many cases: when non-linear relationship exists between dependent and independent variables, in the event that the errors are not nearly a normal distribution, where a problem of hetroscedasticity exists, or when the relationship between dependent and independent variables is monotonic. Based upon the original distribution of the scores, common transformations include logarithm, square root, inverse, reflect and log, reflect and square root, reflect and inverse (Tabachnick and Fidell, 2007, p.87). Following most of the disclosure studies (e.g. Li et al., 2012); many continuous variables have been transformed. Directors' compensation (EXCOMP, NOEXCOMP) and firm size (SIZE) are transformed using the log of the original values in order to become more approximate to a normal distribution (Cooke, 1998; Pallant, 2005; Tabachnick and Fidell, 2007).

Furthermore, many procedures are performed to avoid multicollinearity among the independent variables. A perfect relationship between these variables would affect the reliability of the estimates, and might cause a wide degree of inflation with regard to the standard errors for the coefficient (Acock, 2008). Tabachnick and Fidell (2007) state that multicollinearity among independent variables results in a problem in terms of assessing the importance of each dependent variable in the regression. Therefore, it is needed to compare the total relationship of the independent variables with the dependent variable (correlation) and the correlations of the independent variables with each other (in the correlation matrix) (Tabachnick and Fidell, 2007). The Pearson correlation matrix is the initial tool to detect multicollinearity. Gujarati (2003) indicates

that collinearity among the independent variables is acceptable if the correlation coefficient (r) is a maximum of 0.80.

At an earlier step in the analysis, any proxy that is found to have a strong relationship with another explanatory variable is replaced with another one. For instance, the number of non-executives on the board was introduced as a proxy for board independence. However, it is replaced with another proxy which is the number of non-executive directors divided by the board size. Moreover, the Pearson correlation matrix is illustrated in Table 23 and indicates that multicollinearity is not a problem in the present study. It is clear that all associations among the explanatory variables are below 0.80.[22]

Finally, Table 23 shows that the correlation is positive and statistically significant between proxies that are used to separately measure KPI reporting quantity or quality. This shows a consistency among each group of measures in capturing the required information. In addition, a positive and statistically significant relationship is found between the number of KPIs disclosed in the KPI section and their quality ($\rho = 0.76$). It is shown that the quantity and the quality of KPI reporting share the same determinants. Each of KPI reporting quantity and quality is positively correlated with most of the CG attributes and firm characteristics (i.e. Executive compensation; Non-executive compensation; Board size; Board composition; Audit committee size; Audit committee meetings; Firm size). In contrast, KPI reporting quantity\quality looks to be negatively associated with role duality, liquidity, managerial ownership, and major shareholding. However, further investigation is needed to obtain empirical evidence on the KPI reporting determinants. This investigation should take into account the mutual effects of these determinants.

[22] Further check for multicollinearity is performed by calculating the variance inflation factor (VIF) after carrying out each regression.

3.5.4 Regression models

As mentioned above, a positive relationship exists between the quantity of (financial\ non-financial\total) KPIs disclosed in annual reports and their quality. This is considered as a motivation for examining whether or not both KPI reporting quantity and quality are derived from the same determinants. To empirically test the relationship between the quantity and quality of KPI reporting and the proposed determinants, the following models are employed:

QNTKSEC = α + β1 EXCOMP + β2 NOEXCOMP + β3 BORSIZE+ β4 BORCOMP+ β5BORMEET+ β6 ROLEDUAL+ β7 ACSIZE+ β8 ACMEET + β9MANGOWN + β10 MAJORSHAR+ β11 FUT_EQUITY+ β12 FUT_BONDS+ β13 FUT_LOANS+ Firm characteristics as control variables+ ε.

QLTKSEC= α + β1 EXCOMP + β2 NOEXCOMP + β3 BORSIZE+ β4 BORCOMP+ β5BORMEET+ β6 ROLEDUAL+ β7 ACSIZE+ β8 ACMEET + β9MANGOWN + β10 MAJORSHAR+ β11 FUT_EQUITY+ β12 FUT_BONDS+ β13 FUT_LOANS+ Firm characteristics as control variables+ ε.

Where:

QNTKSEC = the total number KPIs disclosed in the KPI section. QLTKSEC = the aggregated quality average for financial and non-financial KPIs disclosed in the KPI section. α = the intercept.

β1 …….β 13= Regression coefficients.

ε = Error term

Table 23 Pearson correlation matrix for explanatory variables

Variable	QNTKSEC	QLTKSEC	QNFKS	QNNFKSEC	QNNFKREP	QNTKREP	QLFKS	QLNFKSEC	QLNFKREP	QLTKREP	EXCOMP	NOEXCOMP	MANGOWN	BORSIZE	BORCOMP	BORMEET	ROLEDUAL	ACSIZE	ACMEET	MAJORSHAR	FUT_EQUITY	FUT_BONDS	FUT_LOANS	SIZE	PROFITAB	LIQUIDITY	LEVERAGE	DIVYIELD	CROSSLIST
QNTKSEC	1																												
QLTKSEC	0.7645*	1																											
QNFKS	0.8915*	0.7041*	1																										
QNNFKSEC	0.6945*	0.4302*	0.3399*	1																									
QNNFKREP	0.6321*	0.4659*	0.3575*	0.7972*	1																								
QNTKREP	0.9499*	0.7658*	0.8655*	0.6192*	0.7458*	1																							
QLFKS	0.7328*	0.9190*	0.7840*	0.3270*	0.3820*	0.7410*	1																						
QLNFKSEC	0.5963*	0.5292*	0.3545*	0.8348*	0.6443*	0.5286*	0.4220*	1																					
QLNFKREP	0.5697*	0.5494*	0.3835*	0.6840*	0.8160*	0.6407*	0.4531*	0.8354*	1																				
QLTKREP	0.7291*	0.9614*	0.6740*	0.4040*	0.4944*	0.7701*	0.8838*	0.5052*	0.5959*	1																			
EXCOMP	0.2656*	0.3233*	0.2721*	0.1254*	0.2357*	0.3127*	0.2942*	0.2013*	0.2937*	0.3380*	1																		
NOEXCOMP	0.2769*	0.2866*	0.2146*	0.2455*	0.3160*	0.3111*	0.2419*	0.2266*	0.2863*	0.2865*	0.5655*	1																	
MANGOWN	-0.1146*	-0.0958*	-0.0949*	-0.1014*	-0.1364*	-0.1324*	-0.0586	-0.1481*	-0.1764*	-0.1004*	-0.3139*	-0.2271*	1																
BORSIZE	0.2830*	0.2790*	0.2452*	0.2423*	0.2344*	0.2829*	0.2787*	0.2396*	0.2241*	0.2641*	0.4747*	0.3240*	-0.1693*	1															
BORCOMP	0.2050*	0.2975*	0.2164*	0.0846	0.1706*	0.2366*	0.2815*	0.1647*	0.2546*	0.3110*	0.5487*	0.2952*	-0.1892*	0.1822*	1														
BORMEET	-0.076	-0.0176	-0.0597	-0.1020*	-0.0496	-0.0491	-0.0371	-0.087	-0.0457	0.0073	-0.1055*	-0.0827	-0.1177*	-0.1387*	-0.0098	1													
ROLEDUAL	-0.1136*	-0.1532*	-0.0849	-0.0992*	-0.1289*	-0.1296*	-0.1333*	-0.1429*	-0.1765*	-0.1647*	-0.0816	-0.1746*	0.2866*	-0.0607	-0.0981*	-0.0813	1												
ACSIZE	0.1188*	0.2542*	0.1225*	0.0604	0.1198*	0.1493*	0.2212*	0.1503*	0.1808*	0.2515*	0.4080*	0.2438*	-0.2416*	0.5208*	0.3606*	-0.0211	-0.0305	1											
ACMEET	0.1641*	0.2763*	0.1742*	0.0621	0.1289*	0.1937*	0.2675*	0.1222*	0.1789*	0.2865*	0.3307*	0.2300*	-0.1472*	0.2892*	0.3778*	0.2168*	-0.0053	0.3483*	1										
MAJORSHAR	-0.1669*	-0.1323*	-0.1496*	-0.1343*	-0.2634*	-0.2348*	-0.1248*	-0.1201*	-0.2167*	-0.1508*	-0.4077*	-0.3377*	0.3728*	-0.3992*	-0.0559	-0.0647	0.1725*	-0.2867*	-0.1587*	1									
FUT_EQUITY	0.0285	-0.0231	0.0483	0.0041	-0.0373	0.0063	-0.0079	0.0127	-0.0202	-0.0335	-0.0686	-0.008	0.0042	-0.0255	0.0691	0.0341	0.0948*	-0.0414	-0.0103	0.0898*	1								
FUT_BONDS	0.2335*	0.1585*	0.1975*	0.1899*	0.2125*	0.2452*	0.1410*	0.1492*	0.1677*	0.1575*	0.4223*	0.3044*	-0.2190*	0.4455*	0.2712*	-0.019	-0.0368	0.3169*	0.2056*	-0.3041*	-0.0314	1							
FUT_LOANS	0.2605*	0.1823*	0.2331*	0.2156*	0.2350*	0.2670*	0.1926*	0.1836*	0.2000*	0.1653*	0.2978*	0.2826*	-0.1347*	0.3269*	0.1915*	-0.0213	-0.0091	0.1707*	0.1687*	-0.1988*	0.1767*	0.3076*	1						
SIZE	0.2827*	0.2827*	0.2452*	0.2274*	0.2935*	0.3104*	0.2787*	0.2083*	0.2554*	0.2682*	0.7749*	0.5562*	-0.2488*	0.6956*	0.4310*	-0.1532*	-0.0437	0.4426*	0.3727*	-0.4874*	-0.0565	0.5256*	0.4084*	1					
PROFITAB	-0.0408	0.0041	-0.08	-0.0221	-0.0299	-0.0474	-0.0252	-0.0299	-0.0309	0.0004	0.0817	-0.0255	0.0926*	-0.0495	0.0679	-0.0671	-0.0119	-0.0596	-0.0597	0.0234	-0.0418	-0.0714	-0.1258*	0.0732	1				
LIQUIDITY	-0.1067*	-0.0943*	-0.0911*	-0.0930*	-0.1410*	-0.1335*	-0.0974*	-0.1017*	-0.1430*	-0.1157*	-0.3464*	-0.2102*	0.3276*	-0.2082*	-0.2525*	-0.0776	0.1073*	-0.1513*	-0.1889*	0.2286*	0.0405	-0.2118*	-0.1396*	-0.3042*	0.0791	1			
LEVERAGE	0.1073*	0.022	0.0424	0.1430*	0.1169*	0.0907*	-0.0141	0.0628	0.0596	0.0085	0.1671*	0.2469*	-0.2808*	0.0964*	0.1250*	0.1787*	-0.0376	0.0417	0.1703*	-0.1613*	0.0435	0.2194*	0.0651	0.1475*	-0.0659	-0.4140*	1		
DIVYIELD	0.1205*	0.0702	0.0769	0.1470*	0.1188*	0.1227*	0.0682	0.1070*	0.0856	0.0958*	0.0403	0.1511*	-0.1269*	0.0638	0.0188	0.1437*	-0.035	0.047	0.0709	-0.1682*	0.1206*	0.0573	0.0553	-0.0046	0.0436	-0.1740*	0.3175*	1	
CROSSLIST	0.1627*	0.1042*	0.1508*	0.1303*	0.0669	0.1195*	0.0895*	0.1171*	0.0578	0.051	0.1429*	0.2106*	-0.0672	0.1489*	0.1274*	-0.0039	0.0106	0.0718	-0.0722	-0.1093*	0.0496	0.1236*	0.1789*	0.2041*	0.0249	0.005	0.1548*	0.0102	1

*Significance at the 5% level or above. All variables are defined in Table 5 and Table 18.

3.6 The main analyses

The main analyses aim at getting clear answers to research questions 2 and 3. By employing the models illustrated in the previous section, the hypotheses that were developed in section 3.4 are tested. This section includes the basic procedures to ensure a high degree of confidence in the results in 3.6.1. Additionally, the empirical results are provided in 3.6.2.

3.6.1 Econometric procedures

One of the key concerns that could negatively affect the confidence in terms of the regression results are the outliers. The term 'outlier' refers to an observation of the dependent or independent variables, with values that are inconsistent with the rest of the observations in the data set (Rawlings et al., 1998, p.331). Severe outliers lead to an asymmetric distribution of the residuals, and may dominate the results (Acock, 2008).

There are many ways to detect outliers and identify the influential observations. Using software such as Stata makes it easier to conduct a Shapiro-Wilk test to check whether or not the residuals are normally distributed around the predicted dependent variable scores. Rejecting the null hypothesis in that test (normality) gives an indication of the outliers' existence.

To identify these outliers (Acock, 2008), the software is asked to predict the estimated score based upon the regression, then to predict the residuals and sort them according to their values. Consequently, observations with regard to the highest and lowest Z score are to be considered as outliers.

Tabachnick and Fidell (2007) indicate two strategies to reduce the influence of the outliers after considering the following alternatives:

a) At first the original data should be checked to ensure its accuracy.

b) If the outliers are caused by a variable which is highly correlated with other variables, but is not important in the analysis, it can be eliminated.

c) If the cases with extreme scores are not part of the targeted population, they should be deleted.

If the outliers are retained in the analysis, there are two possible strategies to reduce their impact on the analysis:

a) Changing the largest and smallest scores by assigning specified scores to them.

b) Transforming variables to make the distribution more nearly normal.

In order to maintain the sample size, the present study does not adopt any option that leads to the elimination of some cases. Moreover, all cases are part from the target population, and hence they represent a source of information that could be critical to the analysis. The study deals with the outliers by adopting both of these strategies. Following several studies (e.g. Aggarwal et al., 2009); the data is winsorised by setting all outliers at 99% of the data. This option is usually preferred by researchers to reduce the impact of outliers on the estimators (Tabachnick and Fidell, 2007).

As indicated before with regard to some independent variables, transformation is also utilised with regard to the scores of the dependent variables. Rawlings et al. (1998) state that transformation could handle heterogeneous variances in dependent variables' data so as to make them more homogeneous on the transformed scale. As mentioned above, there are several methods to transform variables. Cook (1998) argued that the following methods are used in disclosure studies - ranks, percentile ranks, normal scores, and the log of odds ratio. He suggests that selecting the relevant method of transformation would

be affected by the data itself. For instance, getting the square root of scores (SQRT) would suit a distribution with a moderate positive skewness, while using the log of scores would be more convenient for a distribution with a significant positive skewness (Tabachnick and Fidell, 2007). Therefore, Tabachnick and Fidell (2007) conclude that researchers should try more than one method of transformation in order to have the fewest outliers, and get the nearest kurtosis and skewness values that are too close to zero. Accordingly, the study carries out many regressions after undertaking different methods of transformation (log of dependent and\or independent variables, SQRT of dependent and\or independent variables, normal scores). The best improvement in the analysis is achieved by transforming dependent scores using SQRT, as long as transforming many dependent variables is done by applying log as mentioned above.

Wooldridge (2003) points out that using panel data has some econometric concerns. The unobserved residuals for the unit (the firm in the current study) mean that these unobserved residuals may be serially correlated - because of an unobserved effect - across years.[23] Furthermore, the residuals for a specific year may be correlated across firms (Petersen, 2009). Failure to deal with cross-sectional dependence (the firm effect) and time series dependence (the time effect) in the panel data, leads to biased standard errors and incorrect inferences (Petersen, 2009; Gow et al., 2010). Petersen (2009) argues that even if one source of correlation is addressed (e.g. by including time dummies to correct for the time effect), yet the other effect (i.e. the firm effect) will be left in the data. Gow et al. (2010) evaluated the different methods that are applied by researchers in accounting studies to address firm and time effects. These methods include OLS standard errors, White standard errors, Newey-West standard errors, Fama-MacBeth, Z2, as well as

[23] '*The key feature of panel data that distinguishes it from a pooled cross section is the fact that the same cross-sectional units (individuals, firms, or counties) are followed over a given time period'* (Wooldridge, 2003, p.11).

robust standard errors clustered by time, firm and both. Those methods are examined under four different settings: a) non-existence of firm and time effects, b) existence of firm effects only, c) existence of time effects only, and d) existence of both firm and time effects. In contrast to other methods, they found that only clustering by firm and time (CL-2) produced well-specified tests statistics under all assumptions. Rather, when applying other methods, the estimates either are not robust with regard to any form of effects (in the event of performing OLS and White standard errors), or just robust for one form of effect (in the event of following other methods). Consistent with this finding, Petersen (2009) states that fixed and random effect models produce unbiased estimates in the case of the permanent firm effect. On the other hand, clustering by firm and time effects is unbiased, and correctly produces confidence intervals whether the firm effect is permanent or temporary.

The current study uses a panel data on a sample of UK companies for five years. Therefore, the study employs clustering by both firm and time in order to consider any unobserved firm and time effects within the panel data set. As indicated above, this technique would improve the accuracy of the analysis through getting correct estimates and inferences. To employ clustering by firm and time technique, the necessary commands and programing instructions are provided by Petersen (2009). The researcher had to follow these instructions and install the commands before carrying out the analysis. [24]

In order to empirically test the hypotheses of the present study, all regressions are run using Stata software. Stata is a flexible statistical program that allows users to apply pre-programmed commands or use further commands that have been invented by different users (Hamilton, 2006).

[24] The needed commands and programing instructions are provided in: http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se_programming.htm

As mentioned before, after carrying out each regression, the variance inflation factor (VIF) is calculated. This procedure is an additional step to ensure that explanatory variables are not extremely correlated. The rule that has been applied is that correlation between independent variables is accepted as long as VIF is still smaller than 10 (Gujarati, 2003; Acock, 2008).

Despite the fact that all procedures showed that multicollinearity among explanatory variables is acceptable in accordance with previous studies, the study considers any concerns with regard to hidden correlations that might exist between CG variables. Therefore, these variables are grouped into groups: executive and non executive directors' compensation, board characteristics, audit committee characteristics, and ownership structure. Then, these groups are included separately - together with the control variables - in different models from model (1) to model (5). Additionally, capital need variables are included - together with control variables - in model (6). Finally, all explanatory variables are included in model (7).[25]

3.6.2 Empirical results

As mentioned above, all regressions are run using Stata software. The analyses include industry dummies to control for the industry effect. Moreover, the study employs clustering by firm and time effects to counter any unobserved cross-sectional and time series dependence. The results regarding the determinants of the quantity of and the quality of total KPIs disclosed in the KPI section are presented in 3.6.2.1. The results with respect to the determinants of reporting on KPI subcategories are presented in 3.6.2.2.

[25] The researcher is grateful to the external examiner Dr Basil Al-Najjar for this suggestion.

3.6.2.1 The determinants of KPI reporting

Table 24 and Table 25 present the empirical findings with regard to the factors affecting the quantity of total KPIs disclosed in the KPI section within the annual report (QNTKSEC), and the quality of reporting with regard to these KPIs (QLTKSEC) respectively. In general, the findings show that the regression models are significant with high F values at the 1% level. This means that the proposed determinants explain a significant part of the quantity and quality of KPI reporting. In addition, the VIF values refer to the absence of multicollinearity between the explanatory variables. The adjusted R^2 values in Table 24 and Table 25 indicate that the proposed models can explain 14.8% - 22.3% of the variation in QNTKSEC, and 11.8% - 24.5% of the total variation in QLTKSEC.

Table 24 KPI reporting in the KPI section: the determinants of quantity

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	0.517 0.324						0.369 0.271
NOEXCOMP		**0.785**** 0.316					**0.61**** 0.262
BORSIZE			**0.09**** 0.035				**0.12**** 0.039
BORCOMP			**1.56**** 0.606				**1.27**** 0.603
BORMEET			**-0.04*** 0.022				**-0.05*** 0.024
ROLEDUAL			**-0.6**** 0.258				**-0.57*** 0.32
ACSIZE				-0.027 0.091			-0.146 0.108
ACMEET				0.086 0.071			0.092 0.078
MAJORSHAR					0.171 0.333		-0.008 0.322
MANGOWN					-0.034 0.754		0.447 0.695
FUT_EQUITY						0.048 0.21	0.001 0.207

FUT_BONDS						**0.169*** 0.097	**0.12**** 0.045
FUT_LOANS						**0.347**** 0.147	**0.284*** 0.145
SIZE	**0.292*** 0.173	**0.380**** 0.127	0.149 0.132	**0.47***** 0.124	**0.54***** 0.128	**0.40***** 0.111	-0.253 0.197
PROFITAB	-1.033 0.72	-0.77 0.7	-0.811 0.628	-0.846 0.767	-0.995 0.709	-0.69 0.663	-0.42 0.593
LIQUIDITY	0.079 0.074	0.065 0.072	0.095 0.062	0.07 0.071	0.072 0.073	0.074 0.072	0.087 0.066
LEVERAGE	-0.096 0.297	-0.143 0.295	-0.002 0.234	-0.15 0.272	-0.08 0.283	-0.078 0.243	-0.11 0.227
DIVYIELD	2.221 2.525	1.829 2.633	1.826 2.268	2.309 2.663	2.649 2.54	2.226 2.428	0.826 2.007
CROSSLIST	0.281 0.247	0.228 0.263	0.224 0.241	0.335 0.252	0.273 0.245	0.218 0.25	0.218 0.289
Constant	-3.7** 1.453	-5.2*** 1.503	-0.743 1.063	-2.5** 1.113	-3.04** 1.206	-1.707* 1.027	-2.188 1.52
F	9.2***	9.9***	8.5***	8.02***	7.65***	8.32***	5.9***
Adj R-squared	0.16	0.162	0.195	0.154	0.148	0.164	0.223
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.
Dependent variable**: QNTKSEC is** the total number of financial and non-financial KPIs disclosed in the KPI section. **Explanatory variables: executives' compensation in Mo1; non-executives' compensation in Mo2; board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industry dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Table 25 KPI reporting in the KPI section: the determinants of quality

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	**0.2**** 0.061						**0.127**** 0.04
NOEXCOMP		**0.18***** 0.055					**0.14***** 0.038
BORSIZE			**0.020**** 0.007				**0.023**** 0.008
BORCOMP			**0.42***** 0.112				**0.251**** 0.107
BORMEET			-0.002 0.003				-0.003 0.004

ROLEDUAL			**-0.17***** 0.038				**-0.191**** 0.06
ACSIZE				0.022 0.021			0.001 0.026
ACMEET				**0.034***** 0.01			**0.033**** 0.011
MAJORSHAR					0.075 0.066		0.065 0.063
MANGOWN					-0.045 0.152		0.156 0.109
FUT_EQUITY						-0.014 0.045	-0.025 0.042
FUT_BONDS						0.006 0.01	-0.013 0.01
FUT_LOANS						**0.045**** 0.016	0.027 0.018
SIZE	0.031 0.031	**0.07***** 0.017	0.017 0.023	**0.06***** 0.018	**0.11***** 0.021	**0.09***** 0.021	**-0.077**** 0.034
PROFITAB	-0.13 0.137	-0.063 0.137	-0.058 0.113	-0.019 0.141	-0.117 0.131	-0.083 0.125	0.029 0.106
LIQUIDITY	0.006 0.014	0.002 0.014	0.01 0.012	0.003 0.012	0.004 0.014	0.004 0.014	0.008 0.011
LEVERAGE	-0.043 0.067	-0.053 0.063	-0.031 0.049	-0.057 0.061	-0.039 0.062	-0.034 0.056	-0.047 0.057
DIVYIELD	0.468 0.646	0.401 0.673	0.353 0.63	0.422 0.685	0.623 0.689	0.55 0.648	0.151 0.604
CROSSLIST	0.032 0.062	0.019 0.065	0.016 0.058	0.053 0.057	0.03 0.061	0.024 0.061	0.032 0.061
Constant	-0.7** 0.243	-0.96** 0.311	-0.002 0.161	-0.261 0.18	-0.50** 0.223	-0.283 0.209	-0.71** 0.275
F	9.4***	9.11***	10.0***	9.9***	6.2***	5.7***	7.4
Adj R-squared	0.147	0.137	0.194	0.156	0.118	0.12	0.245
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.
Dependent variable**: QLTKSEC is** the aggregated quality score of financial and non-financial KPIs disclosed in the KPI section. **Explanatory variables: executives' compensation in Mo1; non-executives' compensation in Mo2; board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industry dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

The findings illustrate the impact of each group of variables on the quantity and quality of KPI reporting. Regarding the effect of Directors' compensation, model (1), model (2), and model (7) in Table 24 indicate that only non-executives' compensation has a significant influence on QNTKSEC at a level of 5%. In contrast, model (1) and model (7) in Table 25 show that executives' compensation has a significant impact on QLTKSEC at the 5% level. Moreover, model (2) and model (7) in Table 25 indicate that non-executives' compensation have a positive and significant relationship with QLTKSEC at the 1% level. Therefore, H1 that expects a positive association between executive compensation and the quantity as well as the quality of KPI reporting, is partially accepted. On the other hand, H2 is supported, as non-executives' compensation are found to have a positive and significant effect on KPI reporting quantity and quality.

Concerning the effect of board characteristics, the results in model (3) and model (7) in Table 24 and Table 25 show that, board size and board composition have a positive and significant impact on QNTKSEC as well as on QLTKSEC. Hence, these results support H3 and H4. In contrast, the reported results in model (3) and model (7) in Table 24 reveal that the board meetings variable has a weak and negative influence on QNTKSEC at a level of 10%, whereas it has no significant effect on QLTKSEC as is indicated in model (3) and model (7) in Table 25 . Hence, H4 is partially accepted. Moreover, it is indicated that role duality has a negative and significant influence on QNTKSEC as well as on QLTKSEC. These results lead us to accept H6, which anticipates a significant association between role duality and KPI reporting.

H7 posits that a significant relationship exists between AC size and KPI reporting, but the results reported in model (4) and model (7) in Table 24 and Table 25 illustrate that this relationship is not statistically significant. Hence, H7 is not accepted. However, AC meetings significantly affect QLTKSEC according to the results reported in model (4)

and model (7) in Table 25, while these meetings have an insignificant association with QNTKSEC. Therefore, H8, which expects a significant relationship between AC meetings and KPI reporting, is partially accepted.

With regard to the effect of ownership structure, the results reported in model (5) and model (7) in Table 24 and Table 25 do not provide supporting evidence for the relationship between the quantity and quality of KPI reporting on the one hand, and managerial ownership as well as major shareholding, on the other. As a result, H9 and H10 cannot be accepted.

Concerning the impact of capital need variables, model (6) and model (7) in Table 24 and Table 25 indicate that plans to issue equity do not influence KPI reporting. Thus, these results do not support H11. On the other hand, the plans to issue bonds have a statistically significant and positive relationship with KPI reporting quantity rather than with its quality. Therefore, H12, which posits a significant relationship between the plans to issue bonds and KPI reporting, is partially accepted. Furthermore, model (6) and model (7) in Table 24 show that the intent to obtain loans has a positive and statistically significant relationship with KPI reporting quantity at levels of 5% and 10% respectively. However, the plans to acquire loans appear to have a significant relationship with KPI reporting quality at a level of 5% in model (5) in Table 25. Thus, H13 can be partially accepted.

Finally, the findings do not support a significant association between the firm characteristics group (i.e. firm size, profitability, liquidity, leverage, dividend yield, and cross listing) and QNTKSEC as well as QLTKSEC. The exception to this conclusion is

firm size, which has a positive and significant effect on KPI reporting in the majority of the models reported in Table 24 and Table 25 . [26]

3.6.2.2 The determinants of reporting on KPI subcategories

This section reports the empirical findings with regard to the determinants of reporting on financial as well as non-financial KPIs. These findings would help in investigating whether KPI reporting quantity and quality are derived from the same factors.

3.6.2.2.1 The determinants of financial KPI reporting

Table 59 in Appendix (2) shows the key factors that affect reporting in terms of the quantity of financial KPIs (QNFKS). High F values indicate that the regression models are significant at the 1% level. The models proposed can explain 19.5% - 24.0% of the variation in QNFKS. Table 60 in Appendix (2) presents the determinants of non-financial KPI reporting (QLFKS). The models proposed can explain 11.1% - 18.0% of the variation in QNFKS. Table 59 and Table 60 indicate that there are no concerns regarding multicollinearity between the determinants of QNFKS and QLFKS according to VIF values.

As illustrated in Table 59, executives' compensation positively affects QNFKS at a level of 5% which are executives' compensation, whereas non-executive compensation has a weak positive effect on QNFKS at the 10% level (as reported in model 2). With respect to CG characteristics, board size has a positive and statistically significant association with QNFKS at the 5% level (as reported in model 3 and model 7). Model (3) in Table 59 suggests that board composition has a positive and significant relationship with QNFKS at the 5% level (as reported in model 3).

[26] To check the robustness of the results, all models reported in Table 24 and Table 25 are re-estimated using different measurements for some of firm characteristics variables. The findings are almost similar to the results discussed in 3.6.2.1.

The findings in Table 59 do not support the significant association between AC characteristics as well as ownership structure variables with QNFKS. On the other hand, the results indicate a significant positive relationship between firm's plans to get loans and QNFKS at the 5% level (as reported in model 6 and model 7).

Table 60 reveals that the same factors significantly affect QLFKS. In addition, the results indicate that QLFKS is also positively influenced by AC meetings at a significance level of 5%, while it has is a negative and significant relationship with role duality.

3.6.2.2.2 The determinants of non-financial KPI reporting

Table 61 and Table 62 in Appendix (2) illustrate the determinants that affect non-financial KPI reporting quantity (QNNFKSEC) and quality (QLNFKSEC). The importance of this analysis is that, despite being recommended by the UK CA (2006), companies do not disclose sufficient KPIs in practice, as displayed in descriptive statistics. These analyses would introduce the characteristics of companies that pay attention to enhancing QNNFKSEC and QLNFKSEC.

Table 61 and Table 62 indicate that the proposed explanatory variables explain a significant part of the variation in QNNFKSEC and QNNFKSEC. The models proposed can explain 19.5% - 24.0% of the variation in QNNFKSEC, and explain 11.1% -18.8% of the total variation in QLNFKSEC. As indicated in Table 61 and Table 62, three variables show identical results with regard to their positive and highly significant association with QNNFKSEC as well as QLNFKSEC. These variables are: non-executives' compensation, board size, and board composition. Moreover, it is noted that QLNFKSEC is influenced significantly and positively by executives' compensation (as indicated in model 1 and model 7 in Table 62), and negatively with both role duality and board meetings (as indicated in model 2). Finally, the findings provide evidence that incentives to increase

QNNFKSEC depend on the source for raising capital. Firms show a tendency to increase the quantity and quality of non-financial KPI reporting when they are planning to obtain loans at a level of 10% (as noted in model 6 and model 7 in Table 61 for QNNFKSEC, and model 6 in Table 62 for QLNFKSEC). In contrast, a negative and significant relationship is documented between getting funds through issuing equity and QNNFKSEC at a level of 10% (as noted in model 7 in Table 61).

3.7 Discussion of the results

This section discusses the results in detail in terms of the explanatory variables groups. This discussion links the findings with the hypotheses that are developed in section 3.4.

3.7.1 Directors' compensation variables

Table 26 summarises the findings with regard to directors' compensation variables (executives' compensation, and non-executives' compensation).

Table 26 The findings in terms of directors' compensation variables

Variable	QNTKSEC		QLTKSEC	
	Model (1)	Model (7)	Model (1)	Model (7)
EXCOMP			(+)**	(+)**
	Model (2)	Model (7)	Model (2)	Model (7)
NOEXCOMP	(+)**	(+)**	(+)***	(+)***

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. (+): positive relationship; (-): Negative relationship. **QNTKSEC** is the total number of financial and non-financial KPIs disclosed in the KPI section; **QLTKSEC** is the aggregated quality score of financial and non-financial KPIs disclosed in the KPI section. Explanatory variables: **EXCOMP** is Executive compensation; **NOEXCOMP** is Non-executive compensation. **Explanatory variables: Mo1 includes executives' compensation in addition to control variables; Mo2 includes non-executives' compensation in addition to control variables; and all explanatory variables used in the analyses are included in Mo7.**

The results indicate that executives' compensation has a positive and statistically significant relationship with the quality of KPI reporting, but is not significantly associated with its quantity. These findings are in line with agency and signalling theories. Shareholders in firms with highly compensated directors would be eager to

evaluate the results produced by those directors (Jonas, 2007). The analyses' findings suggest that highly compensated directors will tend to disclose high quality KPI information. This information might include their private information about the targets for each KPI. Consequently, a lower degree of information asymmetry between directors and shareholders could be achieved. Similarly, it is clear that highly compensated non-executives are more likely to signal themselves as high quality managers in the employment market. Accordingly, they improve the level of quantity and quality of KPI reporting. These results provide evidence suggesting that managerial remuneration plays an important role for the shareholders. Hence, they support the choice to increase the quantity and quality of KPI information which is disseminated by the directors. There are relatively few previous studies that have investigated the link between directors' compensation and corporate disclosure (e.g. Aboody and Kasznic, 2000; Nagar et al., 2003; Grey et al., 2012). The findings of the current study add to the literature by providing evidence on the association between directors' compensation and both the amount and quality of disclosure.

3.7.2 Board characteristics

Table 27 presents a summary of the results with regard to board-related variables (board size, board composition, board meetings and role duality).

Table 27 The findings of board characteristics variables

Variables	QNTKSEC		QLTKSEC	
	Model (3)	Model (7)	Model (3)	Model (7)
BORSIZE	(+)**	(+)**	(+)**	(+)**
BORCOMP	(+)**	(+)**	(+)***	(+)**
BORMEET	(-)*	(-)*		
ROLEDUAL	(-)**	(-)*	(-)***	(-)**

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. (+): positive relationship; (-): Negative relationship. **QNTKSEC**: the total number of financial and non-financial KPIs disclosed in the KPI section; **QLTKSEC**: the aggregated quality score of financial and non-financial KPIs disclosed in the KPI section. Explanatory variables: **BORSIZE**: Board size; **BORCOMP**: Board composition; **BORMEET**: Board meetings; **ROLEDUAL**: Role duality. **Explanatory variables: Mo3 includes board characteristics in addition to control variables; and all explanatory variables used in**

the analyses are included in Mo7.

The findings reported indicate that board size variable has a positive and statistically significant relationship with the quantity and quality of KPI reporting. These findings are in line with some of the previous literature that examines the relationship between board size and corporate disclosure (e.g. Laksamana, 2008; Hussainey and Al-Najjar, 2011). The positive association demonstrates the effectiveness in terms of performing the monitoring role on the part of UK boards.

These findings might be against Guest's (2008) argument that UK soft regulations lead to weakness in performing monitoring role on the part of UK boards. The results suggest that larger boards increase the quantity of KPI reporting, and improve its quality thanks to the diversity of expertise on the board. The results could be explained by signalling incentives. Larger boards have a greater motivation to disclose more high quality KPIs in order to magnify their performance, and hence more likely to be followed and assessed by different employers.

The results also indicate that board composition has a positive and significant relationship with the dependent variables. Although the findings concerning KPI quantity is different from the findings of Tauringana and Mangena (2009) who reported a negative association between the proportion of NEDs and the amount of KPI disclosed, that study focused only on one sector (i.e. the media sector). The findings of the current study show consistency with the findings of many previous studies that focus on disclosure quantity (e.g. Li et al., 2008; Laksamana, 2008; Wang and Hussainey, 2013), or disclosure quality (e.g. Forker, 1992).

The results support the evidence that boards with a high proportion of non-executive directors are expected to be more effective in performing the monitoring role, and hence, affect corporate disclosure positively. The findings suggest that independent directors might affect KPI reporting positively in order to signal their competence to potential employers (Fama and Jensen, 1983).

With regard to the board meetings variable, the findings display a weak and negative relationship between board meetings and the number of KPIs disclosed in the KPI section. The findings also indicate that board meetings have no significant effect on KPI reporting quality.

Arguably, active boards with frequent meetings lead to better monitoring in terms of financial reporting (Laksamana, 2008). However, the findings may be because board meetings are used for discussing general objectives and polices. Consequently, detailed issues may be left to the meetings of the relevant sub-committees (the audit committee in our case). Moreover, it could be claimed that board meetings do not measure accurately the extent of board activity and its reflection on financial reporting. In this regard, future research may look for another proxy for board activity. For instance, board meeting minutes which identify how much of the meeting is allocated to the discussion of financial reporting issues. This would be a relevant proxy that measures - in detail - the efficiency of board meetings in terms of discussing disclosure choices.

Concerning the impact of role duality on KPI reporting, the findings indicate that the relationship is negative and statistically significant between role duality and KPI reporting quantity as well as its quality. It is observed that the negative impact of role duality is stronger on the quality of KPI reported in the KPI section. These findings are consistent with other studies which report a significant and negative relationship between

role duality and CVD quantity (e.g. Haniffa and Cooke, 2002; Abdelsalam and Street, 2007; Wang and Hussainey, 2013), and quality (Forker, 1992).

The present findings can be interpreted using the propositions of agency theory. The concentration of decision-making power resulting from role duality could weaken a board's monitoring role with regard to disclosure practices (Li et al., 2008). Combining the two roles of the CEO and the chairman creates resistance against some other CG forces like NEDs and ACs (Forker, 1992). As a result, a dominant personality leads to a negative effect on providing more KPI information or improving its quality.

3.7.3 Audit committee characteristics

The present study investigates the relationship between two of the AC characteristics and KPI reporting (i.e. AC size and AC activity).

Table **28** presents a summary of the findings with regard to these variables.

Regarding AC size, no evidence is found of a relationship between AC size and KPI reporting quantity or quality. These results are consistent with the finding of previous studies (i.e. Mangena and Pike, 2005; Tauringana and Mangena, 2009; Elzahar and Hussainey, 2012) that reported the same findings with respect to AC size association with disclosure quantity.

Table 28 The findings with regard to AC characteristics

Variables	QNTKSEC		QLTKSEC	
	Model (4)	Model (7)	Model (4)	Model (7)
ACSIZE				
ACMEET			(+)***	(+)**

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. (+): positive relationship; (-): Negative relationship. **QNTKSEC**: the total number of financial and non-financial KPIs disclosed in the KPI section; **QLTKSEC**: the aggregated quality score of financial and non-financial KPIs disclosed in the KPI section. Explanatory variables: **BORSIZE**: Board size; **BORCOMP**: Board composition; **BORMEET**: Board meetings; **ROLEDUAL**: Role duality; **ACSIZE**: Audit committee size; **ACMEET**: Audit committee meetings. **Explanatory variables: Mo4 includes audit committee**

characteristics in addition to control variables; and all explanatory variables used in the analyses are included in Mo7.

These results can be interpreted in line with the Corporate Governance Combined Code (2010) which recommends that the audit committee should involve at least three - or in the case of smaller companies, two - NEDs. As presented in the descriptive statistics in Table 21, it seems that UK companies comply with this recommendation. The number reported for AC members is between 2 to a maximum of 6, and the average as well as the median number of AC members is almost 4 members. This might causes the insignificant relationship that was found between AC size and KPI reporting in the present study.

Concerning the impact of active ACs, despite being unable to support a positive association between AC activity and KPI reporting quantity, the findings show that the coefficient estimate with regard to ACMEET is positive and highly significant for KPI reporting quality.

That result indicates the role of AC meetings as a CG mechanism, suggesting that active ACs would be able to have an oversight of, and control, KPI reporting quality. The finding supports the argument that frequent AC meetings enable the committee to have enough time to discharge its duties. As the positive effect on KPI reporting quality has been achieved with an average of four AC meetings in the current sample, it can be suggested that UK companies should be encouraged to follow the FRC (2012) recommendation that asks for many AC meetings during the year, with a minimum of three.

3.7.4 Ownership structure

The results with regard to ownership structure variables (managerial ownership and major shareholding) indicate that there is no significant impact of either of them on the quantity

or the quality of KPI reporting.

The insignificant effect of managerial ownership adds to the mixed results reported in previous studies (e.g. Chau and Gray, 2002; Eng and Mak, 2003). However, this result is consistent with Forker (1992) who found that the association between managerial ownership and quality of share option disclosure is not statistically significant. The result may be the outcome of two different managerial incentives with contradictory impacts. The first is the managers' motivation to increase KPI reporting in order to reduce the agency problem (based on agency theory). The second is their motivation to achieve self benefits by withholding some KPIs or reducing the quality of KPI information disclosed.

On the other hand, despite the fact that a high concentration of ownership is considered as a CG mechanism that motivates managers to reduce agency costs and increase CVD (Jensen and Meckling, 1976; El-Gazzar, 1998), the findings are not consistent with agency theory. The results might be due to the fact that the main shareholders have easy access to KPI information via other means (e.g. interviews with board members). However, the findings are in line with some previous studies such as those of Eng and Mak (2003) and Wang and Hussainey (2013) who found no significant relationship between institutional investors and voluntary disclosure.

3.7.5 Capital need variables

Table 29 presents a summary of the results with regard to capital need variables (the issuance of equity in t+1, the issuance of bonds in t+1, and the issuance of loans in t+1). The findings show that managers' plans to obtain finance from different sources have different implications for KPI reporting.

Table 29 The findings of capital need variables

Variables	QNTKSEC		QLTKSEC	
	Model (6)	Model (7)	Model (6)	Model (7)
FUT_EQUITY				
FUT_ BONDS	(+)*	(+)**		
FUT_LOANS	(+)**	(+)*	(+)**	

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. (+): positive relationship; (-): Negative relationship. **QNTKSEC**: the total number of financial and non-financial KPIs disclosed in the KPI section; **QLTKSEC**: the aggregated quality score of financial and non-financial KPIs disclosed in the KPI section. Explanatory variables: **MAJORSHAR**: Major shareholding; **FUT_EQUITY**: The issuance of equity in t+1; **FUT_ BONDS**: The issuance of bonds in t+1; **FUT_LOANS**: The issuance of loans in t+1. **Explanatory variables: Mo6 includes capital need variables in addition to control variables; and all explanatory variables used in the analyses are included in Mo7.**

The results do not provide evidence of the relationship between KPI reporting and managers' plans to issue new equity. These results could be interpreted as being in line with Lang and Lundholm's (2000) study which found that firms that substantially increase their disclosure levels before the offering may experience a dramatic fall in the stock price after announcing the offering (which exceeds the increase in the price that existed before the announcement). In contrast, firms with a consistent level of disclosure before an announcement might not suffer from this substantial correction reaction in price. In the current study, it can be argued that there is a trade-off between managers' incentives to mitigate information asymmetry through increasing KPI disclosure levels and quality, and their motivation to maintain a steady level of disclosure so that they can avoid any major decline in share price after an announcement date. This trade-off could result in the insignificant relationship that exists between the plans to issue equity and KPI reporting.

With respect to other variables in this group, the findings document a positive and statistically significant association between the corporate tendency to issue bonds and the number of KPIs reported in the KPI section. Furthermore, the results show that companies which plan to obtain loans are more likely to increase the number of KPIs reported.

These results confirm the fact that managers are driven by the need for finance to increase the volume of KPI disclosures. However, managers do not place the same emphasis on KPI reporting quality. The results provide insight into the impact of the potential source of finance on disclosure practices. The managers show their focus by sending particular signals to a sector of the stakeholders (i.e. potential creditors) through publishing more KPIs, while they do not place the same stress when they communicate with other investors (i.e. when they plan to issue new equity).

3.7.6 Firm characteristics (control variables)

Six firm characteristics variables are introduced in the current study as control variables (firm size, profitability, liquidity, leverage, dividend yield, and cross listing). Interestingly, only firm size shows a significant and positive influence on KPI reporting quantity and quality. However, similar results have been reported in previous studies. For instance, it is documented that an insignificant association exists between corporate disclosure and profitability (e.g. Mangena and Pike, 2005), liquidity (e.g. Mangena and Pike, 2005; Anis et al., 2012), leverage (e.g. Ho and Wong, 2001; Oyelere et al., 2003; Abraham and Cox, 2007), dividend yield (Naser et al., 2006), and cross listing (e.g. Oyelere et al., 2003; Elzahar and Hussainey, 2012).

Notably, firm size shows a negative association with KPI reporting quality in model (7) of Table 25. This result is in contrast with the majority of previous studies which found a positive association between firm size and disclosure quantity or quality for CVD (e.g. Hossain et al., 1995; Mangena and Pike, 2005; Hassan et al., 2006; Boesso and Kumar, 2007; Tauringana and Mangena, 2009; Wang and Hussainey, 2013). Model (7) of Table 25 includes the whole set of variables used in the current study. Giving that the negative sign of firm size coefficient is reported only in this model, while it shows a positive direction in other models (that include the sub-groups of those variables), it can be

claimed that the negative sign results from hidden multicollinearity among the explanatory variables. [27] However, this result indicates that larger firms tend to provide a lower level of KPI disclosure quality than smaller firms. This might be due to the nature of the KPI information itself, as it was argued that the significance of disclosure incentives differs according to the disclosure topic or even within the same topic (Beattie and Smith, 2012). Furthermore, the negative association between firm size and KPI reporting might be explained by the larger firm's preference to provide this information via other means of communication (e.g. conference calls, presentation to financial analysts, and websites).

Overall, drawing upon the findings of the main analyses, two groups of variables appear to have a significant impact on KPI reporting quantity and quality: directors' compensation, and board characteristics variables. In turn, the key effect in terms of capital need variables is on KPI reporting quantity.

The analyses findings indicate that KPI reporting is not associated with other firm characteristics. The non-significant results with regard to these characteristics - which are commonly used as controls in previous research - shed light on the important role of CG mechanisms and directors' compensation as drivers for corporate disclosure. According to the main analyses findings, focusing on these factors would motivate UK firms to increase the amount and quality of KPI reported in the KPI section in the annual report.

Concerning the analyses that investigate the determinants of KPI subcategories, the results suggest that the factors proposed in the current study could explain the variation in financial and non-financial KPI reporting.

[27] The researcher is grateful to the external examiner Dr Bassil Al-Najjar for this clarification.

Regarding the findings with respect to factors that affect financial KPI reporting, these findings are important as the majority of companies place stress on disclosing financial KPIs. The results are consistent with agency and signalling theories. Directors with high levels of compensation, larger boards with a high percentage of NEDs tend to improve QNFKS and QLFKS in order to show their action in support of shareholders' interests, and to signal themselves as talented directors in the employment market. Additionally, agency theory, stakeholder theory, and capital need theory can be used to interpret the positive relationship between firms' plans to obtain loans and QNFKS as well as QLFKS. The results also reveal that QNFKS and QLFKS are not derived from identical set of determinants.

The findings suggest that, in line with agency theory, the monitoring power of active AC lead to an increase in QLFKS. Correspondingly, role duality shows a negative effect on QLFKS as it works against the monitoring role of the board. Finally, the positive relationship between managerial ownership and QLFKS can be explained by the alignment of interests among managers and shareholders when managers own a relatively large stake in the firm (Jensen and Meckling, 1976).

With respect to non-financial KPI reporting determinants, the results suggest that CG mechanisms that are related to board characteristics play a key monitoring role, which in turn, lead to higher levels of QNNFKSEC and QLNFKSEC. In addition, the findings provide evidence that incentives to increase QNNFKSEC depend on the source for raising capital. Firms show a tendency to increase the quantity and quality of non-financial KPI reporting when they are planning to seek loans. In contrast, they limit QNNFKSEC in the event of getting funds through issuing equity. This finding could be explained by capital need and stakeholder theories; directors may use reporting on non-financial KPIs in order to provide debtors with a complete picture regarding corporate

strategy and performance. In contrast, directors may prefer to focus on providing financial performance information when they communicate with shareholders with regard to increasing their stake in the firm.

3.8 Further analysis

As mentioned before, the research instrument is designed to collect and score other KPIs that are disclosed in other parts of the annual report rather than in the KPI section. This procedure mainly affects the non-financial KPI reporting scores, and the total KPI reporting scores. As a result, new dependent variables are introduced. These variables are: QNNFKREP, which represents the number of non-financial KPIs disclosed in the whole report (those in the KPI section + those in other parts of the report), QNTKREP which represents the total number of financial and non-financial KPIs that are disclosed in the whole report, QLNFKREP which is the quality score of non-financial KPIs disclosed in the whole report, and QLTKREP which represents the aggregated quality score of financial and non-financial KPIs that are disclosed in the whole report.

In a further step of the analyses, the KPIs that are reported in other sections in the annual report are considered. These analyses add more depth to the study, as they show the extent to which the main findings are robust when considering these KPIs.[28]

3.8.1 The determinants of total non-financial KPI reporting

Table 63 Table 64 in Appendix (2) present the results with regard to the key determinants affecting reporting on non-financial KPIs disclosed in the whole report. The models proposed can explain 17.3% to 23.3% of the variation in QNNFKREP, and explain 10.8% to 21.6% of the total variation in QNNFKREP. Furthermore, there are no concerns

[28] To check the robustness of these results, all models reported in Table 59, Table 60, Table 61, and Table 62 are re-estimated using different measurements for some of the firm characteristics variables. The results confirm the findings discussed in 3.6.2.1

regarding multicollinearity between the determinants of QNNFKREP and QLNFKREP according to VIF values.

Regarding the results of these analyses, it seems that the majority of explanatory variables continue to have the same relationship with reporting on non-financial KPIs in the analyses that investigate the determinants of QNNFKSEC and QLNFKSEC.[29] In addition, Table 63 reveals that executives' compensation show a weak positive effect in terms of QNNFKREP, while major shareholding appears to have a negative influence on it at a significance level of 10%. On the other hand, a weak positive relationship is observed between AC meetings and QLNFKREP (as reported in model 4 in Table 64).

To conclude, these results are very close to the results in the analyses that investigate the determinants of QNNFKSEC and QLNFKSEC. Hence, they add to the robustness of the findings with regard to the determinants of non-financial KPI reporting.

3.8.2 The determinants of total KPI reporting

Table 65 and Table 66 in Appendix (2) report the analyses' findings which indicate the main factors affecting reporting on KPIs disclosed in the whole report in terms of quantity (QNTKREP) and quality (QLTKREP). The findings show that the proposed explanatory variables explain a significant part of QNTKREP and QLTKREP. The adjusted R^2 values indicate that the models proposed can explain 15.5% to 24.1% of the variation in QNTKREP, and explain 12.1% to 27.3% of the total variation in QLTKREP.

In short, the findings are consistent with the results produced in the main analyses which focus on the KPIs disclosed in the KPI section.[30] Compared with the main analyses, it is observed that the executives' compensation variable has become significant in its positive

[29] Look at Table 61 and Table 62 for further details.
[30] Look at Table 24 and Table 25 for further details.

effect on KPI reporting quantity at a level of 5% (as reported in model 1 and model 7 of Table 65).

For KPI reporting quality, Table 66 illustrates the results are almost as the same as those produced in the main analyses. However, it is revealed that managerial ownership shows a weak positive effect on QLTKREP.

3.9 Conclusion

This study provides answers to research questions Q2 and Q3; it examines factors affecting the level of quantity and quality of KPI reporting in the UK (Q2). It also links the findings to question the validity of using the quantity of disclosure as a proxy for quality in accounting studies (Q4).

Arguably, KPI information is disclosed on voluntarily basis. Directors are able to control the level and the quality of KPI reporting thanks to the elastic nature of the regulations. The study draws upon different theories that explain directors' motivations to disseminate more information. Consequently, the determinants of KPI reporting quantity and quality are proposed and sorted into six groups of variables. Panel data regressions are conducted to test the hypotheses of the study. Focusing on KPIs that are disclosed in the KPI section, the findings show that there is a significant relationship between board characteristics and KPI reporting. In particular, board size, board composition, non-executives' compensation, and firm's plans to acquire loans, have a significant and positive relationship with the quantity and quality of KPI reporting. In contrast, role duality has a negative influence on both of them.

Given the study objective to examine whether the quantity and quality of KPI reporting are derived from the same factors, it is observed that they are not identically derived from

the same factors. The study reports that executives' compensation and the number of AC meetings have a positive impact on the quality of KPI disclosures rather than their quantity. On the other hand, a firm intending to issue bonds is significantly and positively related with the quantity of KPIs disclosed in the KPI section, whereas board meetings have a negative association with it. These results question the proposition of using the quantity of disclosure as a proxy for its quality in most accounting studies.

Unlike previous research, it is documented that no firm characteristics have an influence on KPI disclosure with the exception of firm size which has a significant effect on KPI quality. These empirical results are confirmed by investigating the determinants of KPI subcategories. The findings of these analyses are consistent with the above results, suggesting that the factors proposed in the present study can explain the variation in quantity and quality of financial and non-financial KPI reporting.

To add to the robustness of the results, KPIs disclosed outside the KPI section are considered in further analyses. The findings of these further analyses are too close to those of the main analyses that investigate the determinants of KPI reporting for the KPIs disclosed in the KPI section.

In short, CG mechanisms and directors' compensation appear as the key drivers towards higher levels of KPI reporting in terms of quantity and quality. This places a stress on the need to improve CG mechanisms in UK firms. Moreover, the findings provide strong evidence that shareholders could affect the quantity and quality of KPI reporting by offering higher compensation for non-executives.

Chapter 4 - The impact of KPI reporting on firm value

4.1 Overview

KPI reporting could provide many types of information to the public. Some of this information is neither included in the financial statements, nor clearly presented in these statements. KPI reporting could include non-financial information such as the number of new stores, the number of senior appointments secured internally, recordable incident rates, and total emissions. Furthermore, according to ASB (2006), KPI information could contain forward-looking information that shows the targets for these KPIs as well as management commentary on these targets.

As indicated in the previous chapter, KPI information is available to insiders, and they decide to disclose it for many purposes (i.e. signalling). High quality KPI information could provide a better picture of business performance and progress to the investors. Information with respect to current and future performance can be compared with that of competitors. Given the variation between UK firms in terms of the quantity and quality of KPI reporting discussed earlier, it could be expected that KPI reporting could have an impact on firm value in the UK.

In general, the previous literature provides mixed results about the relationship between corporate disclosure and firm value. In addition, previous studies place more focus on the impact of providing a higher quantity of disclosure on firm value. This chapter aims to provide answers to research questions Q3 and Q4. It extends the literature by examining the effects of KPI reporting on firm value in the UK (Q3). Furthermore, it investigates whether the quantity and quality of KPI reporting have a different influence on firm valuation. Hence, the analyses carried out provide evidence with regard to the validity of using the quantity of disclosure as a proxy for its quality in accounting studies (Q4). Moreover, further analyses in this chapter provide evidence with regard to

how different types of KPI information (i.e. financial KPIs, and non- financial KPIs) could have a different impact on firm value.

The remainder of this chapter is organised as follows: section 4.2 provides the theoretical basis for explaining the value relevance of corporate disclosure, as well as reviewing previous relevant literature. Section 4.3 develops the hypotheses of the study. Section 4.4 illustrates the data, provides the data in terms of descriptive statistics, and introduces the regression models employed. Section 4.5 contains the main analyses, and a discussion of the empirical results. Section 4.6 reports the empirical findings with regard to the impact of KPI subcategories reporting. Finally, section 4.7 reports the conclusion of this part of the study.

4.2 Theory and previous literature

4.2.1 Theory

This chapter mainly focuses on examining whether disclosing more and higher quality KPI information affects firm value. The association between corporate disclosure and firm value can be explained through agency theory and the efficient market hypothesis.

Theoretically, firm value is increased as a result of enhanced disclosure levels through either reducing the cost of capital or increasing the cash flow to its shareholders, or both (Amihud and Mendelson, 1986; Diamond and Verrecchia, 1991). Arguably, high disclosure levels would reduce the cost of capital because it leads investors to reduce their estimation of the risk level, and therefore reduces the required rate of return when acquiring a firm's shares (Coles et al., 1995; Clarkson et al., 1996). Additionally, the value of the firm would be increased after the anticipated increase in stock liquidity as the transaction costs would be reduced, and the demand for firm's shares would be increased (Amihud and Mendelson, 1986; Diamond and Verrecchia, 1991).

As discussed before, the information asymmetry problem and agency conflicts could exist among company managers and outsider stakeholders (Healy and Palepu, 2001). Outsiders usually do not have access to internal information about the company which is available to managers. This could have an impact on the external shareholders' expectations regarding risk, required returns, and company cost of capital, and thus its share value. Hence, enhanced corporate disclosure is a tool used to mitigate these problems (Hassan, 2009).

Healy and Palepu (1993) claimed that the greater the disclosure level, the higher the possibility that investors understand managers' business strategies. Reducing the information asymmetry between management and uninformed investors would result in a reduction in the uncertainty surrounding the future performance of the firm, and an increase in its shares' liquidity (Diamond and Verrecchia, 1991). Consequently, the lower transaction costs as well as the higher demand for firm's shares could result in an increase in share price and hence the value of the firm would increase (Coles et al., 1995; Clarkson et al., 1996). On the other hand, a high demand for firm's shares could lead to a reduction in the firm's cost with regard to equity capital (Diamond and Verrecchia, 1991; Healy and Palepu, 1993).

However, these potential effects of enhanced disclosure may not be feasible because enhanced disclosure could have a negative effect upon the competitiveness of the firm (Healy and Palepu, 1993), and therefore one might anticipate that additional disclosure might have adverse effects on a firm's valuation.

Furthermore, Chung et al. (2012) argued that increasing the amount of disclosure, regardless of its quality, may not affect the capital market, suggesting that an incremental amount of disclosure increases the level of noise. Poor quality disclosure causes a lack of investor confidence, which could lead to difficulties in getting funds

from capital markets (Clarkson et al., 2004). In contrast, high quality reporting impacts positively on a firm's value as a result of attracting institutional investors and incurring lower capital costs (Dhaliwal et al., 2011).

KPI reporting provides information that helps different stakeholders to assess the current and future performance of a firm with regard to operating, social and environmental activities. However, KPI information offers clear measures to evaluate positive and negative developments in the firm (Boesso and Kumar, 2007). Therefore, the quantity and quality of KPI disclosures might have different effects on firm valuation.

Arguably, KPI information would mitigate the information asymmetry problem. It may reduce the uncertainty of firms' future performance, and hence increase stock liquidity which positively affects firm value.

Thus, if KPI information is provided by a firm with a lower level of reporting quality, investors' concerns about the credibility of this information would be increased. Consequently, the shares of this firm could be mispriced or undervalued by investors. Additionally, higher quantity KPI information might lead to negative effects on a firm's valuation if it displays a negative picture of the firm's social and environmental performance. Investors might overestimate the costs and risks related to these activities which might negatively influence their expectations with regard to future performance, and consequently their expectation about the firm's value. In this case, high quality KPI information could support a negative influence on investors' perceptions.

On the other hand, in line with the efficient market hypothesis, share prices are adjusted in line with the information available. According to Fama (1970), in an efficient stock market, information is incorporated in the share prices. Therefore, there is no chance of

outperforming the market by predicting future share prices either through technical or fundamental analyses (Malkiel, 2003). Thus, Fama (1970) shows that there are three forms of stock market in terms of efficiency: strong market efficiency, semi-strong market efficiency, and weak form of market efficiency.

First, in a strong efficient market, all available (public and private) information is fully reflected in share prices. Second, in a semi-strong efficient market, share price is adjusted based on public information disclosed about the firm. Finally, in a weak form of efficient market, share prices follow a random walk which is independent of the historical information that is available about prices.

However, it is argued that markets are not perfectly efficient. For instance, it is stated that:

'*By the start of the twenty first century, the intellectual dominance of the efficient market hypothesis had become far less universal. Many financial economists and statisticians began to believe that stock prices are at least partially predictable. A new breed of economists emphasized psychological and behavioural elements of stock-price determination, and they came to believe that future stock prices are somewhat predictable on the basis of past stock price patterns as well as certain "fundamental" valuation metrics. Moreover, many of these economists were even making the far more controversial claim that these predictable patterns enable investors to earn excess risk adjusted rates of return*' (Malkiel, 2003, p.60).

In reference to the current study, KPI disclosures that are published within the annual report would contain public and private information. It can be argued that, whatever the form of efficiency of the stock market, share prices would be adjusted as a result of the release of such information. Therefore, market participants would not be able to outperform the market and obtain abnormal returns using KPI information.

Investors would expect that KPI information - provided by the agent - is of high quality so as to incorporate this information into the stock valuation. However, managers may act against the interests of shareholders by building their own empires, enjoying perks, earning from insider trading, or by making inappropriate investments (Schleifer and Vishny, 1997). Hence, managers might maximise their own wealth at the expense of shareholder value. Therefore, shareholders need to monitor firm's disclosures to assess its quality, and to avoid any misleading information introduced by managers (Patten, 2005).

CG mechanisms are introduced to align the interests of the managers (the agent) and those of the shareholders (the principal) (Fama and Jensen, 1983). These mechanisms include incentive schemes that base directors' compensation on long term return targets (Jensen and Meckling, 1976). Moreover, CG mechanisms comprise activating the AC role in monitoring the financial reporting process, improving internal controls, and maintaining effective risk management. They also include increasing non executive directors' representation on the board in order to ensure that executive directors work on maximizing shareholder value. Finally, management ownership and block holders might help in reducing the conflict of interest between managers and shareholders. They carry out an effective role in ensuring that managers are not entrenched (Laporta et al., 2002; Haniffa and Hudaib, 2006; Setia-Atmaja, 2009).

4.2.2 Previous literature

The purpose of this section is to review the academic literature on the economic consequences of corporate disclosure, with particular emphasis on its impact upon firm value. This discussion provides insights on the potential impact of KPI reporting.

Corporate disclosure influences on the stock market is of a great interest in accounting research. Previous studies have shown that corporate disclosure could affect stock

market participants' anticipations and decisions. For instance, many studies have documented a relationship between disclosure levels and the number of analysts following the firm, analysts' forecast accuracy, cost of capital, and the value of the firm (e.g. Dhaliwal et al., 1979; Firth, 1984; Lang and Lundholm, 1996; Clarkson and Satterly, 1997; Botosan, 1997; Francis et al., 1997; Rogers and Grant, 1997; Sengupta, 1998; Eng and Teo, 2000; Botosan and Plumlee, 2002, Vanstraelen et al., 2003; Beak et al., 2004; Wang et al., 2008; Hassan et al., 2009; Yu, 2010 Dhaliwal et al., 2012). The findings of these studies are, to some extent, related to the current study, as they offer evidence of the usefulness of some types of information that are also provided as part of KPI reporting. This information includes forward-looking information and non-financial information.

On the other hand, the previous studies that investigated the impact of corporate disclosure on firm value showed mixed results. A number of these studies suggest that corporate disclosure - in general or by focusing on a particular type - has a positive association with firm value. For example, Uyar and Kiliç (2012) documented that voluntary disclosure levels in Turkish annual reports are related to the level of firm value (measured by market capitalisation). Similarly, Silva and Alves (2004) found that firm value has a significant and positive relationship with financial information voluntarily disclosed online by Latin American companies.

In turn, Murray et al. (2006) found no significant impact on the part of social and environmental disclosure upon the market performance of large UK firms. They highlighted the need to clarify the theory that explains why investors do not react to higher levels of social and environmental disclosure.

Hassan et al. (2009) found that the relationship between the two variables is complex and closely associated with the type of disclosure (mandatory/voluntary). They reported that there is no significant association between firm value and voluntary disclosure made by Egyptian firms, while it has a negative and significant relationship with mandatory disclosure. Furthermore, Uyar and Kiliç (2012) found that the association between voluntary disclosure and firm value has been affected by firm value measurement. In particular, their results changed from positive to being insignificant when they employed market-to-book value as the dependent variable in the regression model instead of market capitalisation.

Most previous studies did not focus on the potential effect of disclosure quality upon firm value. Accounting research usually uses disclosure quantity as a proxy for its quality (e.g. Hussainey and Mouselli, 2010; Mouselli et al., 2012). According to this proposition, one can assume an equivalent impact in terms of both disclosure quantity and quality upon firm value.

Few studies have shown that disclosure quality affects the stock market. These studies indicate that firms with lower reporting quality could face lower levels of stock returns, or suffer from mispricing problems (e.g. Healy et al., 1999; Drake et al., 2009; Chung et al., 2012, Mouselli et al., 2012). Notably, the previous literature that examined the impact of corporate disclosure quality has used different proxies that might not directly measure disclosure quality.[31]

A number of these studies were conducted in the US using the analysts' disclosure ratings (AIMR) or the existence of American Depositary receipts (ADR) as proxies for disclosure quality. For instance, Healy et al. (1999) found that higher reporting quality -

[31] For a further detailed review of disclosure quality measures, see section 2.2.2.

measured by analyst disclosure ratings - are associated with higher stock returns. The findings suggest that firms with high disclosure quality attract the attention of investors and analysts and increase stock liquidity.

Baek et al. (2004) study suggested a similar finding in the Korean setting during periods of Asian crises. They found that firms with higher disclosure quality (proxied by having ADR)[32], experienced a smaller decrease in their value during the financial crises. Chung et al. (2012) reported that investors in the Korean stock market misprice firms that issue derivative-related loss announcements of low disclosure quality (i.e. that issue the information on the underlying foreign currency subsequent to the announcement date). In the UK, Mouselli et al. (2012) showed that disclosure quality (measured by the number of future-oriented statements) can explain variations in stock returns.

To the best of the author's knowledge, there is no previous study that directly tested the effects of KPI reporting on firm value. KPI information includes different types of information that might attract stock market participants. KPI reporting provides financial and non-financial information that evaluates firm performance. KPI disclosures also present past and future-oriented information. This information is not only limited to financial performance, but also is related to social and environmental performance.

Therefore, the current study builds on previous research that generally showed the importance of information included within KPI disclosures for stock market participants. For instance, previous literature provides evidence of financial analysts focusing on certain types of information such as non-financial information (e.g. Epstein

[32] The existence of American Depositary Receipts (ADR) refers to non-US companies that are listed on the US stock market(s). ADR is used as a proxy of disclosure quality because of their commitment to enhance disclosure levels.

and Palepu, 1999; Breton and Taffler, 2001; Beattie and Pratt, 2002). Other studies highlighted the importance of narrative reporting to sell-side financial analysts, such as financial and non-financial indicators (Dempsey et al., 1997), and non-financial forward-looking information (Hussainey and Walker, 2006).

Haggard et al. (2008) argued that investors value credible and enhanced firm-specific information that is voluntarily disclosed by firms. The study indicates that firms that make this information easy to access by investors would avoid price crashes. Booker et al. (2011) conducted an experimental study that highlights the role of the content of non-financial performance indicator narratives on users' perceptions.

Empirically, Mavrinac and Seisfeld (1997) provided evidence of investor reliance upon non-financial data. In particular, they showed that investors express their interest in non-financial factors that could shape firms' performance in the future. These factors include product quality, the perceived quality of management, investment in employee development, and the corporate innovations. Therefore, it can be expected that firms that show clearly to the public any improvements in their KPI results concerning such factors could add to their shareholder value. Ittner and Larcker (1998) found that non-financial customer satisfaction indicators are value relevant to the stock market. They argued that disclosing these measures provide information to the market on expected cash flows. Thus, they found that releasing these measures is statistically associated with excess stock return over a ten day announcement period. However, Barton et al. (2010) examined the value relevance of some financial indicators including sales, EBITDA, operating income, income before income taxes, income before extraordinary items and discontinued operations, net income, total comprehensive income, and operating cash flows. They found that these indicators displayed value relevance in 46

countries during 1996–2005. No single indicator gained dominance in all countries. However, investors showed higher value towards those indicators that include core operating expenses and exclude more transitory items like extraordinary items, gains and losses, and other comprehensive income (i.e., operating income and EBITDA). On the other hand, Dorestani and Rezaee (2011a) examined the role played by non-financial KPIs in analysts' forecasts. They investigated the association between non-financial KPI disclosures and the accuracy of analysts' forecasts for a sample of US firms for the two-year period between 2006 and 2007. Their results suggest that the change in KPI quantity (measured by the ratio of the total number of KPI keywords disclosed to total words included in management discussion and analysis) does not have a significant impact on analysts' forecast accuracy (measured by forecast errors). Dorestani and Rezaee (2011b) found a positive association between the quantity of non-financial KPIs disclosed and the perceptions of investors about quality of earnings (measured by a factor that captures the association between current accruals and cash flows). Yet, they found this relationship significant only for Oil and Gas companies. However, Dorestani and Rezaee's studies examine the effects of non-financial KPI reporting quantity rather than its quality. They also did not consider financial KPI reporting in their analyses. Looking at UK studies that explored the importance of KPIs for stock market participants, only Hussainey and Walker (2006) investigated to what extent analysts' reports could rely on KPI disclosure. Their study gives a good indication that financial analysts depend on different KPIs among high and low growth UK companies. However, the study did not investigate the impact of KPI disclosures on firm valuation.

To conclude, the results of previous studies regarding the association between corporate disclosure and corporate value are mixed. It is argued that this association is sensitive to the type of disclosure, and the proxy employed for firm value. This suggests that the relationship between corporate disclosure and firm value is still an open empirical question. Additionally, a limited number of studies have investigated the impact of disclosure quality upon the stock market. None of these studies has examined the relationship between disclosure quality (considering the qualitative characteristics of information disclosed) and firm value. Although previous studies have shown that market participants pay attention to many types of information that can be included in KPI disclosures, there is a lack of evidence on KPI reporting association with firm value.

The variation among UK firms' KPI reporting in practice provides a good research avenue to test the association between KPI reporting and firm value. As mentioned earlier, this type of disclosure is mandated, but the regulations allow firms' directors to control it. Furthermore, although CG attributes are found to affect firm value in some previous studies (e.g. Klein, 1998; Haniffa and Hudaib, 2006; Aggarwal et al., 2009), the nature of CG regulations has a similar orientation. Firms are allowed to comply with the CG code or just explain the reasons for not complying with it. Therefore, it is interesting to examine how firm value could be affected by corporate KPI reporting in this unique setting.

In addition, the current study seeks to fill the following gap in the literature. As mentioned earlier, low quality incremental information could cause noise to stock market participants. Several studies reveal that disclosure quality is valued by investors (e.g. Baek et al., 2004). In contrast to the previous studies that used disclosure quantity

as a proxy for its quality, the current study challenges this proposition by measuring KPI reporting quality by considering all qualitative attributes of the information implied by the ASB (2006) guidance for best practice.

This study would extend the literature on the relationship between firm's value and corporate disclosure in general, and KPI reporting specifically. To the best of the author's knowledge, there is no study - either in the UK context or in any other context - that has examined whether the quantity of KPI disclosure and its quality have different relationships with firm value.

4.3 Research hypotheses

The aim of the current study is to test the effect of KPI quantity as well as KPI reporting quality on firm value (Q3). This helps to examine whether the quantity and quality of KPI disclosure have the same relationship with firm value, and hence, it could also help in examining whether disclosure quantity can be used as a proxy for its quality (Q4).

4.3.1 KPI reporting quantity and quality and firm value

The literature on the impact of corporate disclosure on firm value is limited and offers mixed results. In addition, most of these studies have focused on the impact of disclosure quantity regardless of its quality. This provides a good opportunity to analyse the relationship between KPI reporting including its subcategories and firm value.

KPI disclosures include different types of information that might be of interest to investors including financial indicators about firm operating activities, financial performance, and capital expenditure. Moreover, KPI information might contain non-financial indicators related to firm performance such as social and environmental activities.

From the agency theory perspective, since KPI reporting may provide investors with

data that is available to insiders, one could expect that KPI disclosures would mitigate the information asymmetry problem. Information on financial and non-financial KPI would reduce uncertainty about business performance. Therefore, increasing the quantity of KPIs disclosed could help the investor to evaluate the success of management in terms of achieving a firm's objectives, and also to evaluate future prospects. It is argued that more released information might lead to an increase in the demand for corporate shares and, in turn, its price (Healy and Palepu, 1993; Clarkson et al., 2013).

Some studies suggest a positive association between the quantity of disclosure and the value of the firm. For example, Healy et al. (1999) found that firms with higher levels of voluntary disclosure are more likely to show an increase in stock price, regardless of their earnings.

Therefore, one can expect that the higher the quantity of KPIs disclosed, the higher the market value of the firm. However, enhanced disclosure could have adverse effects if it puts the firm at a competitive disadvantage compared with its rivals (Healy and Palepu, 1993; Hassan et al., 2009), or if it makes more noise to the investors which negatively affects their valuation (Chung et al., 2012). As mentioned before, the extant literature does not present strong evidence on the positive association between corporate disclosure and firm value. Furthermore, it is found that the direction and magnitude of the relationship is associated with the type of disclosure (Hassan et al., 2009) and the proxy that is used for firm value (Uyar and Kiliç, 2012).

On the other hand, several studies show that the quality of different types of disclosure is relevant and important to the users. For example, it can improve share price anticipation of earnings (Hussainey et al., 2003; Schleicher et al., 2007, Hussainey and Walker, 2009). It is has also been shown that disclosure quality can be used

interchangeably with other information sources such as dividend propensity (Hussainey and Walker, 2009), and accruals quality (Mouselli et al., 2012). Regardless of the approach used to measure disclosure quality in these studies, it can be argued that reporting quality can be employed to affect the perceptions of stock market participants about firm performance. Gelb and Zarowin (2002) found that the relationship between stock price and firm's earning performance is stronger in firms with higher disclosure quality, in contrast to firms with low levels of disclosure quality (measured by disclosure ratings).

In general, the previous studies did not directly examine the impact of disclosure quality - as opposed to its quantity - on firm value. One exception was the study of Gelb and Zarowin (2002) that used analyst ratings as an indication of disclosure quality. However, previous studies used the amount of disclosure as a proxy for its quality. Their results are more relevant with regard to explaining the different impacts of disclosure quantity.

Taking into consideration that KPI information might include new and incremental information which is not included in the financial statements; investors might reflect this information in their share prices assessment. For instance, KPI information might provide the investors with future prospects of financial as well as non-financial KPIs and their relationship with the strategy of the firm. It also might include non-financial KPI information about environmental aspects such as recycling rates, emissions of manufacturing operations, and environmental accidents. In addition, KPI reporting may also provide vital information about the workforce such as staff attrition rate, and the number of senior appointments sourced internally. Therefore, it is expected that disseminating KPI information would lead to share prices adjustments in accordance with the efficient market hypothesis. However, stock market participants will not be

able to achieve abnormal returns relying on KPI information. In other words, KPI information would affect firm value, but without outperforming the market and yielding abnormal returns.

As mentioned before, markets do not seem to be perfectly efficient. For example, Ball (1978) documented the occurrence of drifts in share price after the announcement of new information. He argued that markets are not efficient in processing new information, and hence, this information was not incorporated in adjusting share prices. Furthermore, Owusu-Ansah (2000) pointed to the importance of the timeliness of annual reports. He claimed that accounting information - disclosed in the annual report - could be useless to the users if the annual report is published too late.

Therefore, it can be argued that KPI information would affect share prices based upon these considerations. First, this information should not be published too late. Second, KPI information should be of high quality in order for it to be comprehended and incorporated correctly in share prices by investors.

On balance, previous studies lead to the prediction of a relationship between KPI reporting and firm value. Taking into consideration the highly positive relationship between KPI reporting quantity and KPI reporting quality, one can expect that each of them has a similar effect upon firm value. However, given the contradictory and limited evidence in previous studies regarding corporate disclosure association with firm value in the UK, the current study investigates the direction and extent of the relationship between KPI reporting and firm value using a different measure to assess KPI disclosure quality. This would help to test whether KPI reporting quantity and its quality can work as substitutes. Therefore, it is hypothesised that:

H1: *There is a significant relationship between KPI reporting and firm value.*

H1a: *There is a significant relationship between KPI reporting quantity and firm value.*

H1b: *There is a significant relationship between KPI reporting quality and firm value.*

4.3.2 Corporate governance mechanisms and firm value

Drawing upon agency theory, the general objective of CG mechanisms is to align managers' interests with shareholders' interests. It is anticipated that CG mechanisms motivate managers to increase shareholder's value (Bruce et al., 2007). According to previous studies, it is expected that various factors have an impact on firm value. Therefore, this study considers the impact of CG mechanisms - proposed by previous studies - on firm value (e.g. Morck et al., 1988; Laporta et al., 2002; Haniffa and Hudaib, 2006 Hassan et al., 2009; Aggarwal, 2009; Setia-Atmaja, 2009; Ezat, 2010; Ammann et al., 2011; Ujunwa, 2012). To facilitate forming and testing the hypotheses, CG variables are classified into the following categories: Directors' compensation in section 4.3.2.1, Board characteristics in section 4.3.2.2, AC characteristics in section 4.3.2.3, and Ownership structure in section 4.3.2.4.

4.3.2.1 Directors' compensation

Al-Najjar et al. (2011) showed that high CEO compensation reflects high managerial talent which leads to making value added decisions for shareholders (e.g. cutting capital and M&A expenditures). According to agency theory, incentive plans are designed to encourage board directors to maximize shareholders' wealth (Jensen and Meckling, 1976). That is achieved by linking directors' compensation with the financial objectives of the firm. Hence, it can be expected that high directors' remuneration could be associated with higher firm performance. Bruce et al. (2007) claimed that bonus schemes makes executives perceive that they are being monitored. Al-Najjar et al. (2011) found that higher compensation paid to CEOs is positively associated with firm

performance as measured by Tobin's Q for UK firms over the period from 2003 to 2009.

However, to the best of the author's knowledge, the relationship between total compensation - either for executive or non-executive directors - and firm value has not been investigated in the literature. Therefore, the current study addresses this issue and the following hypotheses are formulated:

H2. *An association exists between executive compensation and firm value*.

H3. *An association exists between non-executive compensation and firm value*.

4.3.2.2 Board characteristics

4.3.2.2.1 Board size

It is claimed that the combined experience and knowledge of board members is essential in today's complex business environment (Conger et al., 1998). Hence, it is argued that a large board could help the firm to secure critical resources that positively impact on its financial performance (Dalton et al., 1999). However, previous studies have shown inconsistent results with regard to board size effect on firm performance or value (Goodstein et al., 1994; Yermack, 1996; Kiel and Nicholson, 2003; Haniffa and Hudaib, 2006; Ezat, 2010; Ujunwa, 2012). Thus, this relationship between board size and firm value is examined. The following hypothesis is formulated:

H4: *There is a significant relationship between board size and firm value.*

4.3.2.2.2 Board composition

Boards with a high proportion of NEDs can reduce the agency problem. Managers are usually dominated by their self-interest targets at the expense of shareholders. Therefore, boards with a high proportion of NEDs could better perform monitoring

roles (Dalton et al., 1999). Hence, it appears that this factor could have a significant effect on investment decisions and hence on firm value. However, there are some disadvantages of boards that are dominated by NEDs. In particular, such boards might suffer from the lack of strategic decisions (Goodstein et al., 1994), in addition to the lack of local experience and training of outsider directors in contrast to insiders (Dalton et al., 1999). Previous studies showed mixed findings regarding the association between board composition and firm value (Agrawal and Knoeber, 2001; Haniffa and Hudaib, 2006; Aggarwal et al., 2009; Setia-Atmaja, 2009). Therefore, the following hypothesis is formulated:

H5: *There is a significant relationship between board composition and firm value.*

4.3.2.2.3 Board meetings

In general, previous research does not provide clear evidence of the relationship between board meetings and firm value. Thus, it is suggested that boards with more frequent meetings are superior when it comes to setting a firm's strategy and monitoring managers' performance (Conger et al., 1998). In reference to agency theory, this could reduce the agency problem and, in turn, would affect shareholders' wealth. Therefore, the following hypothesis is formulated:

H6: *There is a significant relationship between board meetings and firm value.*

4.3.2.2.4 Role duality

According to agency theory, if the CEO of the firm holds the chairman position, board monitoring will be impaired. This situation would lead to CEO entrenchment which negatively affects the firm's financial performance (Chen at al., 2008; Ujunwa, 2012). However, several studies failed to find evidence that firm value is significantly affected by CEO duality (e.g. Haniffa and Hudaib, 2006; Aggarwal et al., 2009). It can be

argued that the concentration of power will enable the CEO - who has enough experience and knowledge about the operating and financial activities of the firm - to control the firm and improve its performance. Hence, this duality might have a positive impact on firm value. Therefore, the role duality effect on firm value will be investigated in the current study. Thus, the following hypothesis is formulated:

H7: *There is a significant relationship between role duality and firm value.*

4.3.2.3 Audit committee characteristics

As one of the main CG mechanisms, the AC role is to oversee financial reporting, the internal control system and risk management in the firm. It is anticipated that effective ACs which have enough human and time resources would have more ability to undertake its responsibilities, and protect shareholders' interests. Arguably, the larger ACs and the more active ACs would be associated with better firm valuation. Nevertheless, previous empirical studies have not provided evidence that directly supports this argument. In contrast, most of these studies focused on the association between AC characteristics and financial reporting quality (e.g. Klein, 2002; Carcello and Neal, 2003).

The next hypotheses are formulated as follows:

H8: *There is a significant relationship between AC size and firm value.*

H9: *There is a significant relationship between AC meetings and firm value.*

4.3.2.4 Ownership structure

4.3.2.4.1 Managerial ownership

Managerial ownership is considered as one of the CG mechanisms that reduces agency conflicts between managers and shareholders (Jensen and Meckling, 1976). In this

regard, Cheng et al. (2012) claimed that managerial ownership can operate as an alternative for board monitoring mechanisms. The previous literature has shown mixed results with respect to managerial ownership's impact on firm value. For instance, Haniffa and Hudaib (2006) found that there is no significant relationship between managerial ownership and firm value. Thus, Morck et al. (1988) indicated that at relatively low and high levels of ownership, firm value is positively associated with managerial ownership. Yet, this relationship turns out to be negative at the medium level of ownership. On the other hand, Cheng et al. (2012) found that management entrenchment causes the association between managerial ownership and firm value to be negative at low and high levels of ownership. In turn, this relationship becomes negative between the two variables at the medium level of ownership due to a convergence of interests effect. To test the relationship between managerial ownership and firm value, the following hypothesis is formulated:

H10: *There is a significant relationship between managerial ownership and firm value.*

4.3.2.4.2 Block holders' ownership

Block holders' ownership may have different effects on firm valuation. La Porta et al. (2002) indicated that controlling shareholders are willing to pay more for financial securities when they feel that their rights are better protected. Hence, they improve their valuation of a firm, as they know that most of its profits will come back to them. On the other hand, controlling shareholders might raise another agency problem. It can be expected that in the event of poor investor protection and/or weak CG in a firm, block holders might expropriate minority shareholders (Shleifer and Vishny, 1997; La Porta et al., 2002). In such a case, investors might lower their valuation of the firm. The relationship between block holders and firm value is investigated as the outcomes of empirical work on the block holders' valuation effect are mixed. A positive relationship

in terms of block holders' ownership and firm value is documented in some studies (e.g. La Porta et al., 2002; Aggarwal et al., 2009), whereas a negative association is reported in other studies (e.g. Haniffa and Hudaib, 2006; Ezat, 2010). The following hypothesis is formulated:

H11: *There is a significant relationship between block holders' ownership and firm value.*

4.3.3 Firm characteristics and other control variables

Following previous studies (e.g. Lins, 2003; Aggarwal et al., 2009; Hassan et al., 2009; Cheng et al., 2012), this study deals with several firm characteristics. These controls are: firm size, profitability, leverage, cross listing, cash to assets ratio, capital expenditure to assets ratio, and property, plant, and equipment to sales ratio.[33] Larger firms have more resources than smaller firms. Therefore, a positive association was reported between firm size and firm value in several previous studies (e.g. Hassan et al., 2009; Ezat, 2010). With regard to profitability, firms that report higher profits would signal their capabilities to the investors. It might be perceived that these firms have competitive advantages that enable them to achieve higher profits which positively affect shareholder value. In addition, profitable firms are perceived as firms with more growth opportunities. Hence, in line with Hassan et al. (2009), a positive relationship is also expected between profitability levels and firm value. With respect to leverage, Hodgson and Stevenson-Clarke (2000) stated that high leverage could lead to positive change in firm value for two reasons. First, tax deductibility on borrowing causes decrease in the cost of debt, and in turn increases firm value. Second, managers in highly leveraged companies send good signal to the investors in terms of their

[33] Some variables used in the second study are excluded because of collinearity with the suggested variables in the third study such as liquidity. Therefore, the variables used in the study of KPI reporting relationship with firm value - especially the control ones – are, to some extent, different from those used in the study of KPI reporting determinants.

confidence in the firm's ability to cover debt costs in the future. Moreover, cross listing is considered as a control variable in the current study. Listing in foreign markets facilitates firms' access to alternative sources of finance. Cross listing also positively affects the liquidity of firms' shares (Hope, 2003). Thus, a positive association is expected between cross listing and firm value. Finally, investors usually consider the information related to firms' current operations and future growth opportunities before improving or lowering their valuation of these firms. A firm with higher possibilities of growth would attract more investors. Therefore, following many studies (e.g. Aggarwal et al., 2009), the study uses the cash to assets ratio, the capital expenditure to assets ratio, and the property, plant, and equipment to sales ratio as proxies for current operations, resources and future growth opportunities.

4.4 Data, regression models, and descriptive statistics

This section presents the data collected, the models employed, and the definition of all the variables used. It also shows the data descriptive statistics. Panel regressions are employed in order to examine the relationship between firm value and KPI reporting as well as other explanatory variables. Section 4.4.1 introduces the sample and the variables used in the current study. Then, section 4.4.2 introduces the regression models. Finally, descriptive statistics for the variables used in the current study are presented in 4.4.3.

4.4.1 The data

As mentioned earlier, the present study focuses on the annual reports for a sample of UK, FTSE 350, non-financial firms over a five year period (2006-2010). The study sample is the same sample used in the previous chapters. It consists of 515 annual

reports of 103 firms published between 2006 and 2010. [34]Various observations are excluded for the reasons illustrated in Panel (A) in Table 30, to come up with 485 observations as the final sample. Panel (B) in the same table provides a disaggregation of the sample across industries.

Table 30 Sample selection and its disaggregation across industries

PANEL A – SAMPLE SELECTION PROCESS

Starting point: Top 350 UK firms based on market capitalisation, according to the 2011 Financial Times ranking. Financial firms are then excluded. Subsequently, 103 firms are selected randomly following two criteria: 1) each sector is represented in the same proportion as in the starting sample; 2) as firms are arranged according to market capitalisation; systematic sampling is used by choosing the first company in every sector as a starting point. Then, selection is continued by selecting the third, the fifth and so on. Then, selection is continued by selecting the third, the fifth and so on. This process results in 515 observations [103 * 5 years (2006, 2007, 2008, 2009, and 2010)]. Thereafter, the following exclusions take place:

***n* observations excluded thereafter**	**Reason for exclusion**
2	KPI regulation not applicable in 2006 (because of year end date).
4	Missing data on directors' compensation.
6	Missing CG data.
3	Missing data on data stream.
15	Having negative book value of shareholders' equity.[35]
30	total number of observations excluded
485	***final sample***

PANEL B – SAMPLE CONSTITUENTS BY INDUSTRY

Industry	**Frequency**	**Percentage**
Basic Materials	40	8.25
Consumer Goods	62	12.78
Consumer Services	97	20.00
Health Care	24	4.95
Industrials	143	29.48
Oil & Gas	51	10.52
Technology	38	7.48
Telecommunications	10	2.06
Utilities	20	4.12
TOTAL	*485*	*100.0*

[34] For more details on the sample firms, please see section 2.4.

[35] Excluding firms with negative book value of equity is an essential step in the analyses to avoid capturing any effects of financial distress (Lins, 2003: p.163).

4.4.2 The models

According to the theoretical framework, a relationship is expected between KPI reporting (quantity and quality) and firm value. Empirical studies used different proxies in order to capture investors' reactions to the information disclosed. For instance, stock return has been used in many previous studies to investigate the effect of information released (e.g. Conover and Wallace, 1995; Healy et al., 1999; Bloomfield and Wilks, 2000; Lang and Lundholm, 2000; Bushee and Leuz, 2005; Hussainey and Mouselli, 2010; Roychowdhury and Sletten, 2012; Tsalavoutas et al., 2012). In addition, Tobin's Q has also been used to measure firm value in some studies (e.g. Morck et al., 1988; Laporta et al., 2002; Haniffa and Hudaib, 2006; Hassan et al., 2009; Aggarwal, 2009; Setia-Atmaja, 2009; Ezat, 2010). Other studies have used market-to-book value to reflect the market value of the firm compared with its book value (e.g. Hassan et al., 2009; Uyar and Kiliç, 2012).

Following previous studies (e.g. Morck et al., 1988; Laporta et al., 2002; Lins, 2003; Haniffa and Hudaib, 2006; Hassan et al., 2009; Aggarwal, 2009), Tobin's Q ratio is used as a measure of the dependent variable (firm value) in the main analysis. Additionally, market-to-book ratio is used as well to check the robustness of results (Haniffa and Hudaib, 2006; Hassan et al., 2009).

Tobin's *Q is equal to the ratio of the firm's market value to the replacement cost of its physical assets* (Morck et al., 1988: p. 296), or '*The ratio of the market value of assets to their replacement value at the end of the most recent fiscal year*' (La Porta et al., 2002: p.1156). This ratio implies investors' perception of the value of a firm by reflecting this perception on the ratio's value. If the ratio is larger than one, it will refer

to an improvement in that firm's value due to the efficient usage of its resources, and vice versa (Hassan et al., 2009).

Following Lins (2003), Tobin's Q ratio is computed as:

Tobin's Q (TQ) = (total assets + market value of equity − total common equity)/total assets.

Regarding market-to-book ratio (MB), it is measured as the ratio of the market value of equity to the book value of that equity. This ratio is a good indicator of how a firm is being valued by investors. If the ratio exceeds 1, it means that the firm is overvalued by investors and vice versa (Hassan et al., 2009).[36]

The market value of equity is calculated as the number of outstanding shares at the year end, multiplied by the market value of the share at three months after the year end. This procedure is to ensure that share prices are affected by the KPI information that is released in the annual reports.[37]

Regarding the explanatory variables, the variable of interest is KPI reporting, including KPI reporting quantity and KPI reporting quality. Additionally, CG attributes are used as explanatory variables. Finally, following previous studies (e.g. La Porta et al., 2002; Haniffa and Hudaib, 2006, Aggarwal et al., 2009; Hassan et al., 2009; Cheng et al., 2012), several firm characteristics, as well as other control variables, are included in the model.

Furthermore, the industry effect is considered in the analyses because it could have an effect on firm valuation. Political cost theory posits that different industries might be

[36] A logarithm transformation is used in order to bring the distribution of TQ and MB nearer to normality (see chapter three: sections 3.5.3 and 3.6.1 for more details on such procedures).
[37] Another procedure is followed to check for the robustness of the results by using the market value of equity six months after the year end in all regression models.

subject to different political costs (Ball and Foster, 1982). These costs may arise from the nature of the industries' activities or from following specific regulations. Moreover, being in the public eye could push firms within an industry to employ particular practices or incur extra expenditures, while firms in other industries may not be subject to these commitments.

Thus, the current study uses these two models:

The main analysis model:

$$TQ = \alpha + \beta 1\ QNTKSEC + \beta 2\ QLTKSEC + \beta 3\ EXCOMP + \beta 4\ NOEXCOMP + \beta 5\ BORSIZE + \beta 6\ BORCOMP + \beta 7\ BORMEET + \beta 8\ ROLEDUAL + \beta 9\ ACSIZE + \beta 10\ ACMEET + \beta 11 MANGOWN + \beta 12\ MAJORSHAR + \text{firm characteristics and other control variables} + \varepsilon$$

The model used for robustness purposes:

$$MB = \alpha + \beta 1\ QNTKSEC + \beta 2\ QLTKSEC + \beta 3\ EXCOMP + \beta 4\ NOEXCOMP + \beta 5\ BORSIZE + \beta 6\ BORCOMP + \beta 7\ BORMEET + \beta 8\ ROLEDUAL + \beta 9\ ACSIZE + \beta 10\ ACMEET + \beta 11 MANGOWN + \beta 12\ MAJORSHAR + \text{firm characteristics and other control variables} + \varepsilon$$

Whereas:

$TQ = TQ_{+3}$: which denotes Tobin's Q ratio three months after the year end.

$MB = MB_{+3}$: which represents market-to-book ratio three months after the year end.

QNTKSEC= KPI reporting quantity.

QLTKSEC= KPI reporting quality.

α = the intercept.

$\beta 1$ …….$\beta 12$= Regression coefficients.

ε = Error term

Table 31 illustrates the definition and measurement for each variable of the present study.

Table 31 Study variables: definitions & measurement

Variable	Definition	Measurement
Dependent Variables		
TQ+3	TobinsQ	The natural logarithm of: (total assets (WC02999) + market value of equity three months after the year end - total common equity (WC03501))/ total assets(WC02999)
MB+3	Market-to-book ratio	The natural logarithm of market value of equity (three months after the year end) to book value of equity (WC03501) ratio.
New explanatory Variables[38]		
CASH_ASSETS	Cash to total assets ratio	Cash (WC02003) to total assets (WC02999).
CAPEX_ASSETS	Capital expenditures to assets ratio	Capital expenditures (WC04601) / total assets (WC02999).
PRPLEQ_SALES	Property-plants-equipment to sales ratio	Property, plants, and equipment expenditures (WC02501) / sales (WC01001).

4.4.3 Descriptive statistics

Table 32 shows the descriptive statistics for the variables used in the current study. Panel A refers to the continuous variables used in the main analysis and further analyses, whereas Panel B illustrates descriptive statistics for categorical variables. The results indicate the variation in firm value for the sample firms when measured by

[38] Except these three new variables: CASH_ASSETS, CAPEX_ASSETS, and PRPLEQ_SALES, other variables are used in the previous study. Thus, more details about measurement and econometric considerations with regard to these variables can be found in chapter three: sections 3.5.3 and 3.6.1.

Tobin's Q (market-to-book ratio) after three months. Tobin's Q ratio (market-to-book ratio) three months after the year end ranges from a minimum of 0.54 (0.09) to a maximum of 34.00 (160.46) with a mean of 2.014 (5.103). The mean and median of TQ (MB) generally suggest that sample firms are over-valued by investors taking into account the book value of assets (equity).

Regarding the main explanatory variables, KPI quantity scores (QNTKSEC) is relatively small with a median of 6 KPIs. The majority of these KPIS are financial KPIS with median of 5 KPIs.

With regard to KPI reporting quality, a low level of KPI reporting quality scores (QLTKSEC) is observed with a mean of 0.36. Apparently, quality scores are mainly derived by financial KPI quality scores (QLFKS). The mean of QLFKS is 0.35, whereas a lower level of quality scores is shown for non-financial KPIs (0.27).

With respect to the main CG variables attributes, executive directors' compensation varies from £164,960 to £13,000,000, while it varies from £24,060 to £315,480 for non-executive directors. The median percentage of non-executive directors is 0.625 from 9 directors (the median of board size). This indicates that non-executive directors generally represent the majority of the board. The board meetings as a proxy of board activity show that the meetings median is 8 times per year. The audit committee size median is 4 directors; on average this committee has 4 meetings per year. The average of directors' share interests in ordinary shares is 0.05%. Finally, the major shareholders hold an average stake of 38.9 % in the firms represented in the sample.

With regard to firm characteristics, the natural logarithm of market capitalisation for sample firms varies from minimum of 8.00 (£17,000,000) to a maximum of 11.02 (£130 billion) with standard deviation of 0.69 (£18 billion). The mean profitability of

these firms as measured by ROE is around 0.08. The leverage ratio indicates that firms in the sample are not highly leveraged with a mean debt to total assets of 0.34. The figures show that these firms vary widely with regard to their dividend yield ratios which range from 0.0 to 0.219. Similarly, a wide variation is observed with respect to the ratios that are introduced to control for financial performance that affects firm growth. The variation in these ratios reflects the fact that firms vary in their ability to grow in the future. Firms vary in terms of generating cash from their assets. This affects their ability to meet their commitments, as well as their ability to invest in new projects in the future. Similarly, it is shown that firms also vary in their capital expenditure which also affects their future performance, and hence their value. This variation in these ratios between the sample firms is expected, as the sample is drawn from FTSE 350 firms. Hence, it is essential to control for the effects of this variation in order to ensure the robustness of the results.

Panel C shows the descriptive statistics for the categorical variables. It indicates that most of the firms included in the sample (89.9%) are traded on foreign financial markets. Similarly, it is noted that the majority of the sample firms (95.1%) make a distinction between chairman and CEO positions.

Table 32 Descriptive statistics for study variables

Panel (A) Descriptive statistics for continuous variables

Variable	Max	Min	Mean	Med	SD	N
TQ+3	34.00	0.54	2.01	1.58	2.35	485
MB+3	160.46	0.09	5.10	2.67	14.62	485
QNTKSEC	24.00	0.00	7.53	6.00	5.10	485
QLTKSEC	0.688	0.00	0.36	0.38	0.17	485
EXCOMP	13,000	164.960	1,700	1,100	2,000	485
NOEXCOMP	315,480	24,060	77,012	65,000	43,726	485
BORSIZE	16.00	5.00	9.38	9.00	2.45	485
BORCOMP	0.86	0.33	0.62	0.63	0.12	485
BORMEET	17.00	4.00	8.59	8.00	2.50	485
ACSIZE	6.00	2.00	3.64	4.00	0.87	485

ACMEET	8.00	1.00	4.00	4.00	1.25	485
MANGOWN	0.53	0.00	0.05	0.00	0.11	485
MAJORSHAR	0.77	0.04	0.38	0.39	0.17	485
SIZE	11.02	8.00	9.21	9.08	0.69	485
PROFITAB	0.52	-0.173	0.08	0.07	0.08	485
LEVERAGE	0.990	0.00	0.34	0.32	0.237	485
DIVYIELD	0.219	0.00	0.029	0.024	0.03	485
CASH_ASSETS	50.55	0.06	8.51	5.86	8.58	485
CAPEX_ASSETS	27.04	0.00	5.09	3.68	4.85	485
PRPLEQ_SALES	516.30	0.89	57.72	21.86	90.24	485
Variables used in further analyses:						
QNFKS	19.00	0.00	5.37	5.00	3.48	485
QNNFKSEC	15.00	0.00	2.18	1.00	2.94	485
QNNFKREP	16.00	0.00	2.90	2.00	3.43	485
QNTKREP	24.00	0.00	8.24	7.00	5.43	485
QLFKS	0.69	0.00	0.35	0.38	0.17	485
QLNFKSEC	0.79	0.00	0.27	0.29	0.25	485
QLNFKREP	0.82	0.00	0.31	0.33	0.25	485
QLTKREP	0.67	0.00	0.37	0.39	0.17	485

Panel (B) Descriptive statistics for the categorical variables

Variable	**Proportion**
CROSSLIST: Proportion of firms whom shares are traded in foreign financial markets.	89.9%
ROLEDUAL: Proportion of directors who are the chairmen and the CEO for a company at the same time.	4.9 %

Panel (A) displays descriptive statistics for continuous variables: **Dependent variables**: : **TQ_{+3}:** TobinsQ after three months from the financial year end respectively, **MB+3:** Market-to-book ratio after three months from the financial year end; **Explanatory variables: QNTKSEC:** the quantity of financial and non-financial KPIs disclosed in the KPI section; **QLTKSEC:** the aggregated quality of financial and non-financial KPIs that disclosed in KPI section; **EXCOMP**: Executive compensation (in thousands); **NOEXCOMP**: Non-executive compensation; **BORSIZE**: Board size; **BORCOMP**: Board composition; **BORMEET**: Board meetings; **ACSIZE**: Audit committee size; **ACMEET**: Audit committee meetings; **MANGOWN**: Managerial ownership; **MAJORSHAR**: Major shareholding; **SIZE**: Firm size; **PROFITAB**: Profitability; **LEVERAGE**: Leverage; **CASH_ASSETS**: Cash to total assets ratio; **CAPEX_ASSETS:** capital expenditures to assets ratio; **PRPLEQ_SALES:** property-plants-equipment to sales ratio. **Variables used in further analyses**: **QNFKS:** the quantity of financial KPIs disclosed in the KPI section; **QLFKS:** the aggregated quality score of financial KPIs disclosed in the KPI section; **QNNFKSEC:** the quantity of non-financial KPIs disclosed in the KPI section; **QLNFKSEC:** the aggregated quality score of non-financial KPIs disclosed in the KPI section; **QNNFKREP:** the quantity of non-financial KPIs disclosed in the whole report; **QLNFKREP:** the aggregated quality score of non-financial KPIs disclosed in the whole report; **; QNTKREP:** quantity of financial and non-financial KPIs disclosed in the whole report; **QLTKREP:** the aggregated quality score of financial and non-financial KPIs disclosed in the whole report. Panel (B) Descriptive statistics categorical variables: **CROSSLIST**: Cross listing; **ROLEDUAL**: Role duality (all variables are defined in Table 32).

As mentioned earlier, multicollinearity relationships among independent variables could affect the reliability of the results. The Pearson correlation matrix is illustrated in Table 33. It indicates that associations among the explanatory variables are below 0.80 as a threshold (Gujarati, 2003). As mentioned earlier, the relatively high correlation between both KPI reporting quantity proxies and KPI reporting quality proxies is a good motivation to test whether or not each of them has the same impact on firm value.

The highly significant associations between firm value proxies represent a good justification for using them for the purpose of checking the robustness of the results. The correlation results also show a negative but not statistically significant association between firm value (measured by Tobin's Q) and KPI reporting quantity (QNTKSEC). However, the association between firm value (measured by Tobin's Q) and quantity of financial KPIs (QNFKS) is negative and statistically significant. The correlation matrix also shows that KPI reporting quality (QLTKSEC) is not associated with firm value. However, it is obvious that there is a negative correlation between firm value (measured by Tobin's Q) and the quality of non financial KPI reporting quality (QLNFKSEC). This relationship does not hold when using the market-to-book ratio as a proxy of firm value. Thus, it might indicate that the relationship is weak, or it needs to be proved by further empirical analysis.

Table 33 Pearson correlation matrix

VARIABLE	TQ_{t+3}	MB_{t+3}	QNTKSEC	QLTKSEC	EXCOMP	NOEXCOMP	BORSIZE	BORCOMP	BORMEET	ACSIZE	ACMEET	MANGOWN	MAJORSHAR	SIZE	PROFITAB	LEVERAGE	DIVYIELD	CASH_ASSETS	CAPEX_ASSETS	PRPLEQ_SALES	QNFKS	QNNFKSE	QNNFKRE	QNTKREP	QLFKS	QLNFKSEC	QLNFKREP	QLTKREP
TQ_{t+3}	1																										
MB_{t+3}	0.8522*	1																									
QNTKSEC	-0.1245*	-0.017	1																								
QLTKSEC	-0.0541	0.021	0.7645*	1																							
EXCOMP	0.1425*	0.2346*	0.2656*	0.3233*	1																						
NOEXCOMP	0.0855	0.2164*	0.2769*	0.2866*	0.5655*	1																					
BORSIZE	-0.0844	-0.0125	0.2830*	0.2790*	0.4747*	0.3240*	1																				
BORCOMP	0.0296	0.1040*	0.2050*	0.2975*	0.5487*	0.2952*	0.1822*	1																			
BORMEET	-0.1432*	-0.0913*	-0.076	-0.0176	-0.1055*	-0.0827	-0.1387*	-0.0098	1																		
ACSIZE	-0.0021	0.0627	0.1188*	0.2542*	0.4080*	0.2438*	0.5208*	0.3606*	-0.0211	1																	
ACMEET	0.0282	0.0667	0.1641*	0.2763*	0.3307*	0.2300*	0.2892*	0.3778*	0.2168*	0.3483*	1																
MANGOWN	-0.0048	-0.0766	-0.1146*	-0.0958*	-0.3139*	-0.2271*	-0.1693*	-0.1892*	-0.1177*	-0.2416*	-0.1472*	1															
MAJORSHAR	0.0663	-0.0773	-0.1669*	-0.1323*	-0.4077*	-0.3377*	-0.3992*	-0.0559	-0.0647	-0.2867*	-0.1587*	0.3728*	1														
SIZE	0.0759	0.1714*	0.2827*	0.2827*	0.7749*	0.5562*	0.6956*	0.4310*	-0.1532*	0.4426*	0.3727*	-0.2488*	-0.4874*	1													
PROFITAB	0.3988*	0.3309*	-0.0408	0.0041	0.0817	-0.0255	-0.0495	0.0679	-0.0671	-0.0596	-0.0597	0.0926*	0.0234	0.0732	1												
LEVERAGE	0.0091	0.1919*	0.1073*	0.022	0.1671*	0.2469*	0.0964*	0.1250*	0.1787*	0.0417	0.1703*	-0.2808*	-0.1613*	0.1475*	-0.0659	1											
DIVYIELD	-0.1412*	-0.0769	0.1205*	0.0702	0.0403	0.1511*	0.0638	0.0188	0.1437*	0.047	0.0709	-0.1269*	-0.1682*	-0.0046	0.0436	0.3175*	1										
CASH_ASSETS	0.3094*	0.1631*	-0.0814	-0.0591	-0.1562*	-0.1549*	-0.2510*	-0.0266	-0.1206*	-0.1626*	-0.1511*	0.2239*	0.2896*	-0.2519*	0.3221*	-0.2038*	-0.2180*	1									
CAPEX_ASSETS	-0.0298	-0.0742	-0.1357*	-0.1527*	-0.0562	0.0388	-0.0047	-0.1200*	-0.0792	-0.1093*	-0.0826	0.057	-0.0203	0.0245	0.0523	-0.0045	-0.0125	-0.0312	1								
PRPLEQ_SALES	-0.2283*	-0.2615*	-0.001	-0.0866	-0.0755	-0.0366	0.1024*	0.0369	-0.0501	-0.0409	0.0414	-0.0288	0.1272*	0.0146	-0.1724*	0.1239*	-0.053	-0.0448	0.2887*	1							
QNFKS	-0.1570*	-0.0609	0.8915*	0.7041*	0.2721*	0.2146*	0.2452*	0.2164*	-0.0597	0.1225*	0.1742*	-0.0949*	-0.1496*	0.2452*	-0.08	0.0424	0.0769	-0.1300*	-0.1759*	-0.0781	1						
QNNFKSEC	-0.078	0.0136	0.6945*	0.4302*	0.1254*	0.2455*	0.2423*	0.0846	-0.1020*	0.0604	0.0621	-0.1014*	-0.1343*	0.2274*	-0.0221	0.1430*	0.1470*	-0.0121	0.0408	0.1409*	0.3399*	1					
QNNFKREP	-0.0812	0.0254	0.6321*	0.4659*	0.2357*	0.3160*	0.2344*	0.1706*	-0.0496	0.1198*	0.1289*	-0.1364*	-0.2634*	0.2935*	-0.0299	0.1169*	0.1188*	-0.012	-0.0248	0.0678	0.3575*	0.7972*	1				
QNTKREP	-0.1289*	-0.0128	0.9499*	0.7658*	0.3127*	0.3111*	0.2829*	0.2366*	-0.0491	0.1493*	0.1937*	-0.1324*	-0.2348*	0.3104*	-0.0474	0.0907*	0.1227*	-0.0792	-0.1585*	-0.0281	0.8655*	0.6192*	0.7458*	1			
QLFKS	-0.0894*	-0.005	0.7328*	0.9190*	0.2942*	0.2419*	0.2787*	0.2815*	-0.0371	0.2212*	0.2675*	-0.0586	-0.1248*	0.2787*	-0.0252	-0.0141	0.0682	-0.0968*	-0.1318*	-0.0758	0.7840*	0.3270*	0.3820*	0.7410*	1		
QLNFKSEC	-0.1033*	-0.0252	0.5963*	0.5292*	0.2013*	0.2266*	0.2396*	0.1647*	-0.087	0.1503*	0.1222*	-0.1481*	-0.1201*	0.2083*	-0.0299	0.0628	0.1070*	-0.0101	0.0541	0.0852	0.3545*	0.8348*	0.6443*	0.5286*	0.4220*	1	
QLNFKREP	-0.1127*	-0.012	0.5697*	0.5494*	0.2937*	0.2863*	0.2241*	0.2546*	-0.0457	0.1808*	0.1789*	-0.1764*	-0.2167*	0.2554*	-0.0309	0.0596	0.0856	-0.0075	0.0015	0.036	0.3835*	0.6840*	0.8160*	0.6407*	0.4531*	0.8354*	1
QLTKREP	-0.071	0.0156	0.7291*	0.9614*	0.3380*	0.2865*	0.2641*	0.3110*	0.0073	0.2515*	0.2865*	-0.1004*	-0.1508*	0.2682*	0.0004	0.0085	0.0958*	-0.0553	-0.1575*	-0.0875	0.6740*	0.4040*	0.4944*	0.7701*	0.8838*	0.5052*	0.5959*

*Significance at the 5% level or above. All variables are defined in Table 32.

4.5 The main analyses

The main analyses provide evidence of the effect of financial and non-financial KPI reporting upon firm valuation. The study achieves this aims by empirically testing the hypotheses developed in section 4.3. This section provides the empirical results with regard to KPIs reported in the KPI section in 4.5.1. Moreover, section 4.5.2 provides the results with respect to the separate influence of financial and non-financial KPIs disclosed in the KPI section.

4.5.1 The association between firm value and KPI reporting

The current study follows all the econometric procedures that have been applied in the previous chapter, in order to ensure a high degree of confidence in the empirical results.[39] Consequently, the study follows Aggarwal et al. (2009) by winsorising all data at 1% and 99% in order to deal with severe outliers and prevent their effect on the results. Additionally, dependent variables are transformed - by undertaking logs of the original values of the firm value ratios - in order to have the fewest possible outliers, and to bring their distributions more closely to normality. Furthermore, the study applies clustering by both firm and year, in order to address any unobserved cross sectional and time series dependence within the panel data set (Petersen, 2009; Gow et al., 2010). Moreover, the analyses include industry dummies to control for the industry effect. Finally, multicollinearity among explanatory variables is checked using the variance inflation factor (VIF). A correlation between independent variables is accepted as long as VIF is smaller than 10 as a threshold (Gujarati, 2003; Acock, 2008).

However, to avoid any concerns regarding hidden correlations that might exist between CG variables, these variables are grouped into groups: executive and non-executive

[39] For more details about econometric considerations, see chapter three: section 3.6.1.

directors' compensation, board characteristics, audit committee characteristics, and ownership structure. Then, these groups are included separately - together with KPI reporting variables and control variables - in different models (from model (1) to model (5)) beside the general model which includes all variables (model 6). [40]

Table 34 Firm value (TQ) & KPI reporting quantity in KPI section

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6
QNTKSEC	**-0.021***	**-0.021***	-0.016	-0.02	-0.02	**-0.017***
	0.011	0.011	0.011	0.013	0.012	0.01
EXCOMP	0.058					0.051
	0.061					0.059
NOEXCOMP		0.048				0.063
		0.073				0.056
BORSIZE			-0.011			**-0.015****
			0.008			0.007
BORCOMP			-0.039			-0.214
			0.126			0.132
BORMEET			-0.007			-0.009
			0.008			0.007
ROLEDUAL			**0.148****			**0.168****
			0.047			0.059
ACSIZE				0.013		0.025
				0.017		0.019
ACMEET				0.009		0.014
				0.018		0.013
MANGOWN					-0.139	-0.211
					0.181	0.146
MAJORSHAR					0.129	0.122
					0.122	0.113
SIZE	0.045	**0.064****	**0.101*****	**0.058****	**0.081****	**0.071****
	0.028	0.022	0.026	0.024	0.026	0.032
PROFITAB	**0.891****	**0.909****	**0.851****	**0.931****	**0.896****	**0.904****
	0.297	0.309	0.303	0.283	0.302	0.282
LEVERAGE	0.071	0.067	0.075	0.069	0.071	0.054
	0.077	0.083	0.059	0.068	0.077	0.063
CROSSLIST	-0.003	-0.008	-0.006	0.001	-0.005	0.008
	0.041	0.043	0.044	0.047	0.042	0.043
CASH_ASSETS	**0.006****	**0.006****	**0.006****	**0.006****	**0.006****	**0.006****
	0.002	0.002	0.002	0.002	0.002	0.002
CAPEX_ASSETS	0.003	0.003	0.002	0.003	0.003	0.003
	0.003	0.003	0.003	0.003	0.003	0.003
PRPLEQ_SALES	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

[40] The researcher thanks the external examiner Dr Basil Al-Najjar for this suggestion.

	0	0	0	0	0	0
Constant	-0.64** 0.253	-0.69** 0.332	-0.634** 0.212	-0.51** 0.197	-0.66** 0.271	-1.02*** 0.251
F	11.9***	11.8***	11.4***	11.2***	11.4***	9.8***
Adj R-squared	0.276	0.274	0.301	0.276	0.279	0.321
Mean VIF	2.05	1.89	1.91	1.85	1.87	2.16
Max VIF	3.89	3.9	3.89	3.91	4.09	5.53
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ_{+3} Tobins Q three months after the year end. **Explanatory variables: QNTKSEC :** the total number of financial and non-financial KPIs disclosed in the KPI section in addition to executives' compensation in **Mo1**; non-executives' compensation in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

Table 34 shows the association between firm value (measured by Tobin's Q) and the aggregated quantity (QNTKSEC) scores for KPIs reported in the KPI section. Regression models are significant at the 1% level, indicating that, on average, the proposed models can explain about 27.4% - 32.1% of the total variation in Tobin's Q. Moreover, VIF values indicate that there are no concerns regarding multicollinearity among the explanatory variables.

The results in the general model (model 6) show that the quantity of KPIs reported in the KPI section (QNTKSEC) has a negative and statistically significant relationship with Tobin's Q at a level of 10%. This result holds only in model (1) and model (2) that include executives' compensation and non-executives' compensation respectively. This finding suggests that there is a weak negative association between firm value and the amount of KPIs disclosed in the KPI section. Consequently, H1a - which expects an association between KPI reporting quantity and firm value - is partially confirmed.

With respect to the negative effect of QNTKSEC on firm value, this finding adds to the contradictory evidence on the relationship between accounting disclosure and firm value. This result is inconsistent with the findings of some studies that are based on

agency theory framework (e.g. Healy et al., 1999). These studies suggest a positive impact in terms of enhanced disclosure upon firm valuation, thanks to the reduction in information asymmetry between managers and shareholders. The negative effect of QNTKSEC can be explained from different angles. First, consistent with Chung et al.'s (2012) assertion that extra information could have a negative effect on firm value, the excessive KPIs disclosed cause extra noise from the investors' point of view, which negatively affects their valuation of the firm. Second, the negative effect on firm value could be driven by the content of the KPIs disclosed, and how it is perceived by investors. There is a possibility that KPI information itself might raise concerns about a firm's performance which might lead investors to lower their valuation. In terms of this proposition, and in accordance with the efficient market hypothesis, the more KPIs disclosed will be reflected inversely on share price, and in turn, firm value will go down. In contrast, KPI information could offer positive news for investors, but this news might be less positive than their own expectations, or might make them suspicious because it may be very different from the information gained from other sources rather than the annual reports. Accordingly, the greater the amount of KPIs disclosed, the more there may be a drop in firm value. Third, investors might misinterpret this practice on the part of firms to disclose more KPI. They might perceive providing enhanced disclosure as a way of misleading them about the actual firm performance. Investors might also consider that a company's rivals would benefit from this excessive critical information, which could have a negative effect on their expectations about the firm performance, and hence lower their valuation (Hassan et al., 2009).

However, this finding is important for UK firms. It indicates that firms have to be aware that more KPI disclosure might have an adverse impact on their value. Therefore,

companies have to study carefully the cost-benefit trade-off before increasing the number of KPIs disclosed.

Regarding board characteristics variables, Table 34 shows that only board size (BORSIZE) and role duality (ROLEDUAL) has a statically significant relationship with firm value. The coefficient on BORSIZE is significantly negatively related to Tobin's Q at the level of 5% in model (6). However, this result becomes insignificant in model (3) that focuses on the relationship between QNTKSEC as well as board characteristics on the one hand, and firm value on the other. Thus, H4, which expects an association between board size and firm value, is partially confirmed. This result is consistent with several studies (e.g. Goodstein et al., 1994; Yermack, 1996; Haniffa and Hudaib, 2006; Ujunwa, 2012). It is in line with the interpretation that big boards are not efficient because of the free-rider problem (Ujunwa, 2012). In contrast, ROLEDUAL is significantly positively associated with firm value at a level of 5% in models (3) and (6). Thus, H7, which expects a significant relationship between role duality and firm value, is confirmed. This finding can be explained by signalling theory rather than by agency theory. CEO duality seems to be perceived by investors as a signal of effective control and leadership. They might consider that the CEO leads the firm to achieve a better performance due to the use of his technical knowledge.

On the other hand, the results presented in Table 34 suggest that better governance does not lead to a higher firm valuation. Therefore, the findings do not lead us to accept the hypotheses related to directors' compensation, other board characteristics, audit committee characteristics, and ownership structure.

The weak effect of CG attributes on firm value is documented in many studies (Klein, 1998; Laing and Weir, 1999; Vafeas and Theodorou, 1998; Weir et al., 2002). This

finding agrees with a number of UK studies that question the need to impose certain CG structures on UK firms in order to increase shareholders' wealth (Laing and Weir, 1999; Weir et al., 2002).

Meanwhile, it is apparent that investors pay more attention to other aspects in order to shape their perception of firms. The results emphasise the importance of firm characteristics in firm valuation. In particular, the results indicate that the coefficients of size (SIZE), profitability (PROFITAB), and cash to assets (CASH_ASSETS) ratios are statistically significant and positively related to firm value.

These results are in line with previous studies which found a positive and significant relationship between firm value and SIZE (e.g. Hassan et al., 2009), PROFITAB (e.g. Setia-Atmaja, 2009), and CASH_ASSETS (e.g. Aggarwal, 2009). These results are in line with the view that firm characteristics could play a role as substitutes of board monitoring mechanisms. For instance, large firms are subjected to more pressure and intervention from a range of different stakeholders (e.g. shareholders, politicians, fund suppliers, financial analysts). Therefore, one can expect that the agency problem would be mitigated as managers of large firms are better monitored if compared with those of small ones.

Table 35 Firm value (TQ) & KPI reporting quality in the KPI section

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6
QLTKSEC	-0.043 0.054	-0.038 0.058	0.008 0.066	-0.046 0.065	-0.037 0.062	-0.021 0.059
EXCOMP	0.056 0.06					0.048 0.057
NOEXCOMP		0.035 0.078				0.052 0.058
BORSIZE			-0.013 0.008			**-0.016**** 0.008
BORCOMP			-0.061 0.129			**-0.228*** 0.133

BORMEET			-0.006 0.008			-0.008 0.007
ROLEDUAL			**0.156**** 0.048			**0.170**** 0.058
ACSIZE				0.015 0.017		0.028 0.02
ACMEET				0.009 0.019		0.013 0.013
MANGOWN					-0.14 0.182	-0.211 0.145
MAJORSHAR					0.129 0.125	0.123 0.116
SIZE	0.041 0.027	**0.061**** 0.022	**0.099***** 0.026	**0.052**** 0.025	**0.076**** 0.027	**0.073**** 0.032
PROFITAB	**0.916**** 0.286	**0.932**** 0.3	**0.877**** 0.295	**0.955***** 0.273	**0.920**** 0.293	**0.925***** 0.278
LEVERAGE	0.075 0.078	0.073 0.085	0.08 0.059	0.072 0.068	0.074 0.077	0.059 0.062
CROSSLIST	-0.007 0.04	-0.012 0.042	-0.01 0.043	-0.003 0.046	-0.009 0.041	0.004 0.044
CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.003 0.003	0.003 0.003	0.004 0.003	0.003 0.003	0.003 0.003
PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0
Constant	-0.61** 0.262	-0.630* 0.358	-0.641** 0.217	-0.486** 0.202	-0.64** 0.271	-0.99*** 0.261
F	11.5***	11.4***	11.2***	10.9***	11.1***	9.6***
Adj R-squared	0.269	0.267	0.297	0.27	0.273	0.316
Mean VIF	2.06	1.89	1.91	1.85	1.88	2.16
Max VIF	3.9	3.9	3.89	3.90	4.09	5.56
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ_{+3}: TobinsQ three months after the year end. **Explanatory variables: QLTKSEC** is the aggregated quality score of financial and non-financial KPIs disclosed in the KPI section in addition to executives' compensation in **Mo1**; non-executives' compensation in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

With respect to KPI reporting quality; Table 35 shows the association between firm values measured by Tobin's Q and the aggregated quality of KPIs reported in the KPI section (QLTKSEC). Regression models are significant at the 1% level, indicating that,

on average, the proposed models can explain about 26.7% - 32.1% of the total variation in Tobin's Q. Moreover, VIF values indicate that there are no concerns regarding multicollinearity among the explanatory variables.

All models report that there is no significant relationship between QLTKSEC and firm value. Hence, the hypothesis H1b which predicts a significant association between those variables cannot be accepted. This result is not in line with several studies which suggest that disclosure quality is value relevant to market participants (e.g. Healy et al., 1999; Baek et al., 2004). However, the current study uses different measures of disclosure quality. This result can be explained by the low level of KPI reporting by UK firms in general. One can argue that investors could not perceive the differences between these companies in terms of KPI reporting quality. Therefore, the effect of KPI reporting quality on firm value could not be observed.

Despite the above findings with regard to the weak negative association between KPI reporting quantity and firm value, it can be concluded that the results do not provide strong evidence of the KPI reporting effect on firm value. Thus, the main hypothesis of the study (H1) cannot be accepted. Accordingly, Q3 has been answered. Furthermore, the results indicate - to some extent - that QNTKSEC and QLTKSEC may have a different impact on firm value. Taking into consideration chapter three's findings which indicate that neither of them is derived from the same factors, it can be argued that quantity of disclosure should not be used as a proxy for its quality in accounting studies. Thus, research question (Q4) is answered.

Indeed, the findings presented -in Table 34 and Table 35- suggest that companies might prevent the potential decline in their value by controlling the number of KPIs disclosed in the KPI section. On the other hand, the insignificant association between the quality

of KPI reporting and firm value will not motivate these companies to increase that quality by following ASB (2006) guidance. However, it is recommended that they consider the quality of disclosure together with its quantity to avoid the noise caused by excessive information (Chung et al., 2012). Therefore, this finding is important for regulators, in that they should reflect on ways to encourage more firms to be more compliant.

Looking at the impact of board characteristics, Table 35 indicates that the positive and significant impact of ROLEDUAL remains unchanged (at the 5% level in models (3) and (6)). Similarly, the BORSIZE effect remains negative and significant, but at the 5% level in the general model. Yet, it is shown that board composition (BORCOMP) has a limited negative relationship with firm value at the level of 10%, based upon the results obtained from model (6).

This result suggests that NEDs' dominance is perceived as a signal of a non-efficient board. Investors consider that firm performance might be influenced by NEDs' lack of experience. Arguably, this result indicates that investors are satisfied with a smaller percentage of NEDs on the board. They may rely on alternative mechanisms to mitigate the agency problem. This finding is in line with previous studies which showed that CG can be achieved by alternative mechanisms that are adapted to firms' own characteristics and the surrounding environment (Vafeas and Theodorou, 1998; Weir et al., 2002). Likewise in terms of the results reported for KPI quantity regressions, the findings do not support the hypotheses related to directors' compensation, other board characteristics, audit committee characteristics, or ownership structure.

Finally, the results remain unchanged with respect to the association between firm characteristics and firm value. In particular, the results indicate that the coefficients of

size (SIZE), profitability (PROFITAB), and the cash to assets (CASH_ASSETS) ratios are statistically significant and positively related to firm value.

It is worth mentioning that the models in Table 34 and Table 35 are re-estimated using Tobin's Q after six months from the year end, as well as market-to-book ratio (after three and six months from the year end) as measures for firm value. It is found that the results are not substantially different from those reported above.[41]

4.5.2 The association between firm value and reporting on KPI subcategories

This section reports the empirical findings with regard to the influence of reporting on KPI subcategories. Section 4.5.2.1 presents the results with regard to financial KPI reporting, while section 4.5.2.2 shows the results with regard to reporting on non-financial KPIs disclosed in the KPI section. These analyses provide a clear picture with regard to the value relevance of KPI reporting. They also give evidence of the accuracy of using quantity and quality of disclosure as substitutes.

4.5.2.1 Firm value and financial KPI reporting

Table 36 and Table 37 show the influence of financial KPI reporting on firm value measured by Tobin's Q. Whereas, the results report that QNFKS has a negative and statistically significant influence on firm value at a level of 5% in all models except model (3), Table 37 indicates that financial KPI reporting quality (QLFKS) does not have a significant association with firm value. These findings indicate that QNFKS and QLFKS have different relationships with firm value, which raises more concerns about using the quantity of disclosure as an alternative for its quality in accounting research (Q4).

[41] Results are not reported.

Table 36 Firm value (TQ) & financial KPI reporting quantity

Variables	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6
QNFKS	**-0.029**** 0.011	**-0.03**** 0.012	**-0.024*** 0.013	**-0.028**** 0.013	**-0.03**** 0.013	**-0.03**** 0.012
EXCOMP	0.063 0.062					0.056 0.059
NOEXCOMP		0.046 0.074				0.061 0.056
BORSIZE			-0.011 0.008			**-0.02**** 0.007
BORCOMP			-0.031 0.126			-0.209 0.13
BORMEET			-0.007 0.008			-0.009 0.008
ROLEDUAL			**0.149**** 0.048			**0.167**** 0.06
ACSIZE				0.013 0.017		0.025 0.019
ACMEET				0.01 0.018		0.016 0.012
MANGOWN					-0.136 0.18	-0.205 0.145
MAJORSHAR					0.129 0.121	0.121 0.112
SIZE	**0.044*** 0.027	**0.066**** 0.021	**0.102***** 0.026	**0.059**** 0.025	**0.082**** 0.025	**0.070**** 0.032
PROFITAB	**0.873**** 0.283	**0.893**** 0.297	**0.834**** 0.29	**0.916***** 0.271	**0.880**** 0.289	**0.887**** 0.269
LEVERAGE	0.062 0.08	0.058 0.086	0.066 0.06	0.058 0.07	0.062 0.079	0.044 0.064
CROSSLIST	0 0.039	-0.005 0.042	-0.004 0.042	0.005 0.045	-0.002 0.04	0.012 0.042
CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.002 0.003	0.002 0.003	0.003 0.003	0.003 0.003	0.002 0.003
PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0
Constant	-0.654** 0.256	-0.69** 0.34	-0.639** 0.21	-0.511** 0.197	-0.67** 0.262	-1.0*** 0.246
F	12.1***	11.9***	11.6***	11.5***	11.6***	9.9***
Adj R-squared	0.281	0.278	0.305	0.28	0.283	0.325
Mean VIF	2.05	1.89	1.9	1.85	1.87	2.16

Max VIF	3.91	3.93	3.91	3.94	4.12	5.53
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ $_{+3 \text{ are}}$ TobinsQ three months after the year end. **Explanatory variables: : QNFKS:** the quantity of financial KPIs disclosed in the KPI section in addition to executives' compensation in **Mo1**; non-executives' compensation in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

Table 37 Firm value (TQ) & financial KPI reporting quality

Variables	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6
QLFKS	-0.051 0.045	-0.045 0.048	-0.008 0.056	-0.053 0.054	-0.045 0.053	-0.025 0.054
EXCOMP	0.056 0.061					0.048 0.057
NOEXCOMP		0.034 0.079				0.051 0.058
BORSIZE			-0.012 0.008			**-0.016**** 0.008
BORCOMP			-0.055 0.129			**-0.226*** 0.136
BORMEET			-0.006 0.008			-0.008 0.007
ROLEDUAL			**0.154**** 0.048			**0.170**** 0.058
ACSIZE				0.014 0.017		0.028 0.02
ACMEET				0.009 0.019		0.014 0.013
MANGOWN					-0.137 0.182	-0.21 0.145
MAJORSHAR					0.13 0.125	0.122 0.115
SIZE	0.042 0.027	**0.061**** 0.021	**0.099***** 0.026	**0.053**** 0.025	**0.077**** 0.026	**0.073**** 0.033
PROFITAB	**0.909**** 0.279	**0.925**** 0.294	**0.873**** 0.291	**0.948***** 0.268	**0.913**** 0.287	**0.921***** 0.273
LEVERAGE	0.073 0.079	0.071 0.086	0.078 0.06	0.069 0.068	0.072 0.078	0.058 0.064
CROSSLIST	-0.007 0.04	-0.011 0.042	-0.01 0.043	-0.002 0.046	-0.009 0.041	0.004 0.044
CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.003 0.003	0.002 0.003	0.004 0.003	0.003 0.003	0.003 0.003

PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0
Constant	-0.615** 0.262	-0.629* 0.359	-0.639** 0.218	-0.487** 0.202	-0.643** 0.269	-0.983*** 0.26
F	11.5***	11.4***	11.2***	10.9***	11.1***	9.6***
Adj R-squared	0.27	0.268	0.297	0.271	0.273	0.316
Mean VIF	2.05	1.88	1.91	1.85	1.87	2.16
Max VIF	3.9	3.89	3.89	3.9	4.09	5.54
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ_{+3} is TobinsQ three months after the year end. **Explanatory variables: QLFKS is the quality of financial KPIs disclosed in the KPI section.** in addition to executives' compensation in **Mo1**; non-executives' compensation in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

The importance of this analysis is that the majority of UK companies place emphasis on disclosing financial KPIs. Indeed, the results reveal that the findings discussed in the previous section are greatly derived from the effect of financial KPI reporting. These results suggest that companies can avoid decreases in their values by controlling the number of financial KPIs disclosed.

When looking at the impact of CG variables, it is clear that the majority of the results discussed in 4.5.1 are confirmed. In particular, board size (BORSIZE) is negatively associated with firm value at a level of (5%) in the general model (model 6) in Table 36 and Table 37. Moreover, role duality (ROLEDUAL) has a positive and highly significant effect on firm value. The coefficient of ROLEDUAL is significant at the 5% level in model (3) and model (6), either in Table 36 or in Table 37.

Notably, Table 37 reports that board composition (BORCOMP) has a weak and negative impact on firm value in model (3). This result suggests that NEDs' dominance is perceived as a signal of a non-efficient board. Investors may be of the opinion that firm performance might be influenced by NEDs' lack of experience.

The rest of the results add to the robustness of the findings presented in 4.5.1. They also highlight the relative importance of firm characteristics in terms of affecting its valuation. In particular, firm size (SIZE), profitability (PROFITAB), and cash to assets ratio (CASH_ASSETS) are positively and significantly associated with firm value.[42]

4.5.2.2 Firm value and non-financial KPI reporting

Table 38 and Table 39 illustrate the relationship between non-financial KPIs - disclosed in the KPI section - and firm value (measured by Tobin's Q). It is obvious that neither the quantity (QNNFKSEC) nor the quality (QLNFKSEC) of non-financial KPI reporting has a significant effect on firm value. It was expected that non-financial KPI information would affect investors' perceptions, as usually this information is not clearly presented in the financial statement. Thus, this non-significant effect of non-financial KPI reporting can be explained by companies' focus on providing more financial KPIs with a higher degree of reporting quality rather than on non-financial ones.[43] In fact, these results indicate that the key findings discussed in 4.5.1 are derived from the impact of financial KPI reporting.

With respect to the impact of CG variables, Table 38 and Table 39 show that the board size (BORSIZE), board composition (BORCOMP) and role duality (ROLEDUAL) variables continue to show the same influence on firm value illustrated in 4.5.2.1. Similarly, for control variables, only firm size (SIZE), profitability (PROFITAB), and cash to assets ratio (CASH_ASSETS) have a positive and significant association with

[42] It is worth mentioning that the models in Table 36 and Table 37 are re-estimated using Tobin's Q after six months from the year end, as well as the market-to-book ratio (three and six months from the year end) as measures for firm value. It is found that the results are not substantially different from those reported in 4.5.2.1.
[43] For more detail, please see their statistical results at Table 33.

firm value.[44]

Table 38 Firm value (TQ) and quantity of non-financial KPIs reported in the KPI section

Variables	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6
QNNFKSEC	-0.011 0.015	-0.011 0.015	-0.007 0.014	-0.01 0.015	-0.011 0.015	-0.007 0.012
EXCOMP	0.049 0.063					0.045 0.061
NOEXCOMP		0.035 0.076				0.053 0.055
BORSIZE			-0.012 0.008			**-0.016**** 0.007
BORCOMP			-0.053 0.124			**-0.225*** 0.13
BORMEET			-0.007 0.008			-0.008 0.007
ROLEDUAL			**0.153**** 0.048			**0.172**** 0.059
ACSIZE				0.014 0.017		0.027 0.02
ACMEET				0.007 0.017		0.013 0.012
MANGOWN					-0.141 0.182	-0.215 0.143
MAJORSHAR					0.129 0.124	0.122 0.115
SIZE	0.043 0.028	**0.060**** 0.022	**0.099***** 0.026	**0.052**** 0.025	**0.075**** 0.026	**0.073**** 0.032
PROFITAB	**0.915**** 0.299	**0.928**** 0.311	**0.867**** 0.306	**0.951***** 0.284	**0.916**** 0.303	**0.921**** 0.286
LEVERAGE	0.08 0.08	0.077 0.086	0.081 0.061	0.078 0.072	0.078 0.08	0.061 0.064
CROSSLIST	-0.007 0.041	-0.01 0.043	-0.009 0.044	-0.003 0.047	-0.008 0.042	0.004 0.044
CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.003 0.003	0.003 0.003	0.004 0.003	0.004 0.003	0.003 0.004
PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0

[44] The majority of these results are confirmed when using Tobin's Q after six months from the year end as well as the market-to-book ratio (three and six months from the year end) as measures for firm value in the analyses.

Constant	-0.604** 0.255	-0.634* 0.337	-0.637** 0.216	-0.490** 0.199	-0.643** 0.276	-0.982*** 0.267
F	11.5***	11.4***	11.3***	10.9***	11.1***	9.6***
Adj R-squared	0.27	0.268	0.297	0.27	0.274	0.316
Mean VIF	2.06	1.9	1.92	1.86	1.88	2.16
Max VIF	3.9	3.9	3.9	3.91	4.1	5.52
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ $_{+3}$: is Tobin's Q three months after the year end. **Explanatory variables: : QNNFKSEC:** the quantity of non-financial KPIs disclosed in the KPI section in addition to executives' compensation in **Mo1**; non-executives' compensation in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

Table 39 Firm value (TQ) & quality of non-financial KPIs reported in KPI section

	Mo1	**Mo2**	**Mo3**	**Mo4**	**Mo5**	**Mo6**
QLNFKSEC	-0.053 0.042	-0.05 0.043	-0.03 0.044	-0.053 0.047	-0.053 0.044	-0.046 0.037
EXCOMP	0.06 0.06					0.051 0.059
NOEXCOMP		0.04 0.075				0.057 0.054
BORSIZE			-0.012 0.008			**-0.015**** 0.007
BORCOMP			-0.041 0.127			**-0.213*** 0.129
BORMEET			-0.007 0.008			-0.008 0.007
ROLEDUAL			**0.151**** 0.048			**0.169**** 0.059
ACSIZE				0.015 0.017		0.028 0.02
ACMEET				0.009 0.018		0.014 0.013
MANGOWN					-0.155 0.178	-0.222 0.143
MAJORSHAR					0.131 0.124	0.124 0.114
SIZE	0.041 0.027	**0.061**** 0.022	**0.09***** 0.026	**0.053**** 0.024	**0.077**** 0.027	**0.069**** 0.03
PROFITAB	**0.900**** 0.299	**0.917**** 0.311	**0.862**** 0.308	**0.941***** 0.284	**0.904**** 0.302	**0.911**** 0.288

LEVERAGE	0.071 0.076	0.069 0.083	0.076 0.058	0.069 0.067	0.069 0.075	0.053 0.06
CROSSLIST	-0.004 0.041	-0.009 0.043	-0.008 0.044	-0.0004 0.047	-0.006 0.041	0.006 0.044
CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.003 0.003	0.003 0.003	0.004 0.003	0.004 0.003	0.003 0.004
PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0
Constant	-0.638** 0.255	-0.663** 0.332	-0.638** 0.217	-0.502** 0.199	-0.654** 0.28	-1.001*** 0.269
F	11.7***	11.6***	11.3***	11.1***	11.3***	9.7***
Adj R-squared	0.273	0.271	0.298	0.274	0.277	0.319
Mean VIF	2.05	1.88	1.91	1.84	1.87	2.16
Max VIF	3.89	3.9	3.89	3.91	4.09	5.57
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ_{+3}: is TobinsQ three months after the year end. **Explanatory variables: : QLNFKSEC:** the aggregated quality of non-financial KPIs disclosed in the KPI section in addition to executives' compensation in **Mo1**; non-executives' compensation in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

4.6 Further analyses

This section would examine whether the KPIs reported outside the KPI section could affect the findings discussed above. Section 4.6.1 illustrates the results with regard to reporting on non-financial KPIs disclosed in the whole report, and section 4.6.2 that displays the results with regard to KPI reporting over the whole report after considering KPIs disclosed outside the KPI section. These analyses provide an overall picture about the value relevance of KPI reporting.

4.6.1 Firm value and total non-financial KPI reporting

These analyses aim at investigating whether considering non-financial KPIs disclosed outside the KPI section could affect the findings in 4.5.2.2. Table 67 and Table 68 in

Appendix (3) indicate that regression models are significant at the 1% level, with high R^2, and with no multicollinearity concerns. In general, the results reported in Table 67 confirm the finings discussed above with regard to the impact of non-financial KPI reporting quantity (QNNFKREP) upon firm value. However, Table 68 shows that the quality of non-financial KPI reporting (QLNFKREP) has a negative and statically significant relationship with firm value in all models except in models (3) and (4). Hence, this indicates that the impact of the quality of non-financial KPI reporting becomes stronger when the scores of these KPIs are aggregated with those reported outside the KPI section.

As mentioned earlier, financial performance is one of the key drivers to improving firm valuation. Non-financial KPIs that are reported outside the KPI section are generally related to social and environmental aspects. Therefore, this result can be explained by investors' negative expectations with regard to the financial consequences of those issues. By following the ASB (2006) guidance, firms with high QLNFKREP shall provide additional information which is not included in financial statements. This information covers operational, social and environmental aspects, including their targets and management commentary on these targets. In accordance with the efficient market hypothesis, investors may reflect this information on the financial commitments in the future, and hence they can incorporate this information in share prices, and hence lower their valuation of these firms. Indeed, this explanation might need to be confirmed by analysing the content of these KPI disclosures.

It is worth mentioning that the results presented in Table 67 and Table 68 indicate that, from CG attributes, only board size (BORSIZE) and role duality (ROLEDUAL) variables continue to show the same influence on firm value as illustrated in 4.5.2.1.

Likewise, firm size (SIZE), profitability (PROFITAB) and cash to assets ratio (CASH_ASSETS) from the control variables show a positive and significant association with firm value.[45]

4.6.2 Firm value and total KPI reporting

These analyses aim at investigating whether considering non-financial KPIs disclosed outside the KPI section could affect the findings of the main analyses which are reported in section 4.5.1. In general, it observed that KPIs reported outside the KPI section do not affect the results discussed earlier in section 4.5.1. Table 69 and Table 70 in Appendix (3) document that the results, with regard to the effect of quantity QNTKREP and quality QLTKREP of KPI reporting on firm value, are still as same as reported in Table 34 and Table 35. However, it seems that the effect of KPI reporting quantity on firm value has been maximised. Hence, Table 69 illustrates that the quantity of KPIs reported in the whole report (QNTKREP) has a negative and statistically significant association with firm value in all models except model (3). This association becomes significant at the level of 5% - as reported in model (1) and (2) - instead of the level of 10% which is reported in Table 34 .

On the other hand, Table 70 shows that the quality of KPIs reported in the whole report (QLTKREP) does not have a significant association with firm value. This finding is the same as the finding reported in Table 35 without considering KPIs reported outside the KPI section. Arguably, these findings are important as they show different relationships between KPI reporting quantity and KPI reporting quality on the one hand, and firm

[45] The models in Table 67 and Table 68 are re-estimated using Tobin's Q after six months from the year end as well as market-to-book ratio (three and six months from the year end) as measures for firm value. It is found that the results are not substantially different from those reported in 4.6.1.

value on the other. These findings could contribute to answering Q4. Hence, it indicates that reporting quantity and its quality should not be used interchangeably.

Similarly, when looking at the impact of CG and other variables upon firm value, it is clear that the results have not been changed at all from those reported in Table 34 and Table 35.

To conclude with regard to the results of the main and further analyses conducted in this chapter, it can be claimed that firm value measured by Tobin's Q is negatively associated with the quantity of KPI reporting. Panel (A) of Table 40 indicates that this finding becomes more significant after including KPIs reported outside the KPI section in the analyses. Panel (B) shows that, whereas the effect of KPI reporting quality on firm value is not significant, this effect is statistically significant for the quality of non-financial KPI reporting if KPIs reported outside the KPI section are considered in the tests. Finally, one can argue that the relationship between KPI reporting and firm value seems to be derived from the effect of financial KPI reporting.

Table 40 Firm value (TQ) and quantity and quality of KPI reporting

Panel (A) Firm value (TQ) & quantity of KPI reporting

Variables	**Mo1**	**Mo2**	**Mo3**	**Mo4**	**Mo5**	**Mo6**
QNFKS	**(-)****	**(-)****	**(-)***	**(-)****	**(-)****	**(-)****
QNNFKSEC						
QNNFKREP						
QNTKSEC	**(-)***	**(-)***				**(-)***
QNTKREP	**(-)****	**(-)****		**(-)***	**(-)***	**(-)***

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. (+) positive relationship; (-) Negative relationship. **QNFKS** is the number of financial KPIs disclosed in the KPI section; **QNNFKSEC** is the number of non-financial KPIs disclosed in the KPI section; **QNNFKREP** is the number of non financial KPIs disclosed in the whole report; **QNTKSEC** is the total number of financial and non-financial KPIs disclosed in the KPI section. **QNTKREP** is the total number of financial and non-financial KPIs disclosed in the whole report in addition to **executives' compensation in Mo1; non-executives' compensation in Mo2; board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31.

Panel (B) Firm value (TQ) and quality of KPI reporting

Variables	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6
QLFKS						
QLNFKSEC						
QLNFKREP	**(-)****	**(-)***			**(-)***	**(-)***
QLTKSEC						
QLTKREP						

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. (+) positive relationship; (-) Negative relationship. **QLFKS** is the quality score of financial KPIs disclosed in the KPI section; **QLNFKSEC** the quality score of non-financial KPIs disclosed in the KPI section; **QLNFKREP** the quality score of non-financial KPIs disclosed in the whole report; **QLTKSEC** the aggregated quality score of financial and non-financial KPIs disclosed in the KPI section. **QLTKREP** the aggregated quality score of financial and non-financial KPIs disclosed in the whole report in addition to **executives' compensation in Mo1; non-executives' compensation in Mo2; board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. .

4.7 Conclusion

Generally, there is a limited empirical literature on corporate disclosure impact on firm value. Furthermore, most of the previous studies focused only on disclosure quantity rather than its quality. KPI reporting offers good tools for evaluating the current and future performance of a firm. Thus, KPI disclosure would mitigate the information asymmetry problem, so that it might have effects on firm valuation. The current study provides answers to Q3 and Q4 of the research questions; it investigates KPI reporting (quantity and quality) effect on firm valuation in the UK (Q3). The analyses findings contribute also in providing some evidence with regard to using quantity of disclosure as a proxy for quality in accounting studies (Q4).

The study mainly draws upon agency theory to explain how KPI reporting could affect firm value. It is also in line with the view that investors would incorporate KPI information in their share prices' valuation in accordance with the efficient market hypothesis. The study sample is identified as 103 firms of the FTSE 350 non-financial UK firms over a five year period (2006-2010). Panel data regressions are conducted to test the hypotheses of the study. After controlling for firm characteristics as well as

growth opportunities, the results show that the quantity of KPIs disclosed in the KPI section has a negative and significant association with firm value. Moreover, the results indicate that the quality of KPIs disclosed in the KPI section has no impact upon firm value.

The findings indicate that investors may perceive that higher amounts of KPI disclosed is a signal of noise caused by the management to hide some threats or problems. In addition, KPI information disclosed might raise their concerns about firm performance, or lead them to correct their overvaluation of share prices based on KPI disclosures. The above findings suggest that the quantity and quality of KPI reporting have different relationships with firm value. This evidence questions again the validity of using quantity of disclosure as a proxy for its quality in accounting research. Therefore, it can be argued that quantity of disclosure and its quality should not be considered as substitutes.

The analyses are extended in order to investigate the impact of KPI subcategories' reporting upon firm value. These analyses provide evidence of the influence of financial KPIs disclosed on the findings gained from the main analyses. It is indicated that the association between firm value and KPI reporting is greatly derived from the effects of financial KPI reporting. Furthermore, the study finds a negative effect of non-financial KPIs disclosed when considering non-financial KPIs that are disclosed outside the KPI section. This suggests that firm value might be lowered due to investors' negative expectations with regard to the financial consequences of social and environmental aspects.

The findings of the current study agree with Hassan et al.'s (2009) assertion that the relationship between corporate disclosure and firm value is complex and varied, based upon disclosure type which makes it more complex to study.

It is noteworthy that those CG mechanisms proposed in the literature do not have a significant effect on firm value. The findings with respect to CG attributes can be explained by signalling theory rather than agency theory. These findings suggest that clear leadership and effective control are essential factors for investors. Accordingly, firms with smaller number of members serving on board, as well as firms chaired by CEOs, are conveying good signals to investors that they have effective leadership. Consequently, investors improve their valuations for these firms. Furthermore, it is reported that there is a weak - and in some models statically significant - negative effect of board composition on firm value. This result suggests that investors might have concerns about NEDs' potential lack of experience.

On the other hand, it is apparent that firm size, profitability, and cash to assets ratios have positive and significant impact on firm value. This may indicate that investors might place more emphasis on such attributes to act a role in board monitoring.

The study findings are important for UK firms, suggesting that investors pay more attention to financial KPIs disclosed in the annual report than to non-financial ones. In sum, these firms have to study carefully the cost-benefit trade off before increasing the number of KPIs disclosed.

Chapter 5 - Concluding remarks

5.1 Overview

Directors of UK firms are asked to analyse business performance from the point of view of different aspects using KPIs (CA, 2006; ASB, 2006). However, these regulations in reality allow those directors to control the number of KPIs disclosed and the reporting quality. This situation has resulted in a variation between firms in practice. Firms could use reporting on KPIs to affect the perceptions of different stakeholders. Moreover, it could be anticipated that the valuation of UK firms could be influenced by the level of KPI disclosure and/or its quality. Therefore, the present research has explored the practices of UK firms with regard to KPI reporting. In addition, it has investigated the potential drivers of KPI reporting in terms of quantity and quality. Finally, the research has been extended to examine whether or not KPI reporting quantity and quality could have an impact on UK firms' values.

This chapter provides the concluding remarks of this thesis. The remainder of this chapter is organised as follows: section 5.2 provides a summary of the research questions, objectives and approach. Section 5.3 presents a summary of the key findings of the research and discusses their implications. Section 5.4 shows the contributions and implications of the study. Section 5.5 illustrates the limitations of this research. Section 5.6 highlights several opportunities for future research.

5.2 Summary of research questions, objectives and approach

To contribute to the literature, this research has adopted different approaches which have provided answers to the research questions. Hence it has achieved its objectives.

5.2.1 Research questions

This research has provided answers to the following four research questions:

Q1. What are the main features of KPI reporting in the UK?

Q2. What are the factors affecting the level of quantity and quality of KPI reporting in the UK?

Q3. What is the impact of KPI reporting quantity and quality on firm value?

Q4. Can KPI reporting quantity be used as a proxy for KPI reporting quality?

5.2.2 Research objectives

Taking into consideration the limited literature that addresses KPI reporting (Hussainey and Walker, 2006; Boesso and Kumar, 2007; Giunta et al., 2008; Tauringana and Mangena, 2009), the present study has provided answers to the above research questions by pursuing the following objectives

1. Providing a proper measure for KPI reporting quality and quantity.
2. Exploring the main features of KPI reporting in the UK.
3. Identifying the determinants of KPI reporting in terms of quantity and quality.
4. Investigating the impact of KPI reporting in terms of quantity and quality upon firm value.
5. Examining the extent to which KPI reporting quantity can be used as a proxy for KPI reporting quality.

5.2.3 Research approach

The following subsections shows the approaches followed in order to provide answers to the research questions.

5.2.3.1 Research question 1

To provide an answer to Q1, first an index has been developed to measure KPI reporting in terms of quantity and quality in the annual reports. The quantity of KPI disclosure has been measured by counting the number of KPIs disclosed in the annual reports. With regard to KPI reporting quality, a review of the previous attempts to assess disclosure quality in general has been conducted. Then, the research instrument has been constructed based upon the ASB (2006) guidance for best practice that enhances information quality through eight dimensions. Manual content analysis has been used to code the text and to classify the KPIs disclosed into financial KPIs and non-financial KPIs. The research instrument was employed to obtain the KPI reporting quantity and quality scores for a sample of FTSE 350 non-financial UK firms. The study sample was identified as 103 firms with 515 annual reports published between 2006 and 2010. Descriptive statistics have been used to explore the variation between firms in KPI reporting, including its subcategories. In addition, descriptive results were presented to show changes in KPI reporting in terms of quantity and quality among different industries and to illustrate this variation across the period 2006-2010.

5.2.3.2 Research question 2

To provide an answer to Q2, the study has reviewed the relevant theories that explain directors' motivations with regard to controlling corporate disclosure. Consequently, the determinants of KPI reporting in terms of quantity and quality have been proposed,

drawing on agency theory, signalling theory, capital need theory, political need theory, stakeholder theory and information cost theory. In addition to firm characteristics variables, the main variables tested are directors' compensation, board size, board composition, board meetings, role duality, audit committee (AC) size, AC meetings, managerial ownership, major shareholding, and the issuance of shares, bonds and loans.

In addition to the Pearson correlation matrix, panel data regressions have been conducted to assess the significance of the association between determinants, variables and KPI reporting quantity and quality scores. The study has employed clustering by firm and time effects to determine any unobserved cross sectional and time series dependence within the panel data set.

5.2.3.3 Research question 3

To provide an answer to Q3, the relevant literature has been reviewed. Agency theory as well as the efficient market hypothesis is used to explain how KPI reporting could affect firm value. Following previous studies, the study has controlled for firm characteristics as well as growth opportunities. Additionally, the following variables have been included in the analyses: KPI reporting quantity and quality scores, directors' compensation, board size, board composition, board meetings, role duality, audit committee (AC) size, AC meetings, managerial ownership, and major shareholding. Following previous studies (e.g. Haniffa and Hudaib, 2006; Hassan et al., 2009; Aggarwal, 2009), Tobin's Q ratio has been used in the main and further analyses as a measure of firm value. Moreover, tests have been re-estimated using the market-to-book ratio as a proxy for firm value, in order to check the robustness of the results. Panel data regressions have also been conducted to test the hypotheses of the study. The

study has applied clustering by both firm and year in order to address firm and time effects within the panel data set.

5.2.3.4 Research question 4

This thesis consists of three studies which are integrated to provide an answer to Q4. First, the research approach is to make a distinction between disclosure quantity and its quality. Therefore, the research instrument has been developed to measure the quantity of KPI reporting separate from the quality of KPI disclosure. To test the reliability of the measure, a pilot study was conducted on a sample of 10 annual reports for the year 2009-2010. Then, the measure has been used to come up with KPI reporting quantity and quality scores. Regression results in the second study have been employed to indicate whether each of the quantity and quality of KPI reporting is identically derived from the same factors. Finally, the findings of the third study have used the sign and the significance of the relationship between KPI reporting quantity and quality and firm value, in order to examine whether the quantity and quality of KPI reporting have different effects on firm valuation.

5.3 Research findings

This section includes a summary of the findings of the studies that were conducted to achieve the research objectives. These findings will be linked with the key research questions.

5.3.1 The attributes of KPI reporting in the UK (Q1)

The analyses in chapter (2) have revealed that the majority of firms introduce their KPIs within the business review. However, it is apparent that directors take advantage of allowing them to report on KPIs if they consider them as necessary and appropriate to

analysing the firm's performance, and to avoid reporting on KPIs when they consider such disclosure against the firm's competitive position. As a result, many companies do not disclose KPIs at all, while, a large number of companies limit their disclosure to providing financial KPIs.

The most popular financial KPIs disclosed by UK firms were: *revenues* followed by *underlying earnings per share*, and *free cash flow*. In contrast, the most popular non-financial KPIs disclosed were: *accident incident rate, employee turnover\ retention*, and *accident numbers*. Despite the increasing trend in the KPI reporting quantity and quality levels across the sample period (2006-2010), descriptive statistics have documented the low number of non-financial KPIs disclosed, as well as the low quality of KPI reporting in general. The number of non-financial KPIs disclosed is not enough to analyse environmental and people aspects. The overall quality level of KPIs reported is slightly improved if KPIs disclosed outside the KPI section are considered. Furthermore, it has been noted that the quality of non-financial KPI reporting is usually lower than the corresponding value for financial ones during the sample period. The study has found that firms do not comply with most of the qualitative attributes included in the ASB (2006) guidance for best practice with regard to KPI reporting.

The analyses have revealed that the industries with the highest quantity of KPI disclosure do not appear to be the highest in terms of quality of KPI disclosure. While, Utilities firms were the highest in KPI reporting quantity, the highest level of KPI reporting quality was provided by Basic Materials industry. In contrast, Healthcare firms showed the lowest level of KPI reporting quantity, but Oil & Gas and Technology firms provided the lowest level of total KPI reporting quality.

5.3.2 Factors explaining the variation in KPI reporting (Q2)

The analyses in chapter (3) have revealed that board size, board composition, non-executives' compensation, and firm's plans to acquire loans have significant and positive relationships with KPI reporting quantity as well as its quality. In contrast, role duality has a negative influence on both of them. However, it has been observed that other variables have different effects on the two main dimensions in terms of disclosure (i.e. quantity and quality). Whereas, executive compensation and audit committee meetings have a positive influence on the quality of KPI disclosures rather than its quantity, those firms intent to issue bonds have been found to have a positive influence on the quantity of KPI rather than on its quality. Moreover, board meetings show a negative association only with KPI reporting quantity.

These findings are important for many reasons. First, with regard to directors' compensation, there are a few previous studies that have examined the directors' compensation effect on corporate disclosures (e.g. Aboody and Kasznic, 2000; Nagar et al., 2003; Grey et al., 2012). The findings of this study add to the literature by providing strong evidence that highly compensated directors tend to publish more information with a higher level of quality. Therefore, it can be argued that shareholders could use managerial remunerations to increase the quantity and quality of KPI information which is disseminated by the directors. These findings are in line with disclosure agency and signalling theories. Highly compensated directors tend to disclose high levels of KPI information quantity and quality that might include their private information, and hence mitigate information asymmetry between directors and shareholders. Accordingly, it can be argued that highly compensated directors - especially non-executive ones - are keen to improve KPI reporting in order to signal their competence in the employment

market. Second, with regard to board characteristics variables, it has been found that the larger the board size and the higher the percentage of NEDs on the board, the higher the possibility of providing high quantity and quality KPI reporting. In contrast, combining the CEO and the chairman roles results in a negative effect on the number of KPIs disclosed and its quality.

These results can be interpreted in terms of the propositions of agency and signalling theories. The results illustrate that an effective board monitoring role leads to the disclosure of more KPIs and improved reporting quality. Arguably, the results might also indicate that board directors - especially NEDs - have the incentive to attract different employers through reporting on more KPIs with a higher quality. These findings are in line with the previous literature that examines the relationship between disclosure quantity and board size (e.g. Laksamana, 2008; Hussainey and Al-Najjar, 2011), board composition (e.g. Li et al., 2008; Wang and Hussainey, 2013), and role duality (e.g. Haniffa and Cooke, 2002; Abdelsalam and Street, 2007).

Additionally, the study has shown that audit committee meetings have a positive influence on the quality of KPIs. The results suggest that active ACs are of great importance when it comes to oversight and the control of financial reporting. Therefore, UK firms should be encouraged to follow the FRC (2012) recommendation that asks for many AC meetings, with a minimum of three meetings per year.

The findings of the study have documented a positive and statistically significant association between corporate tendency to issue bonds or get loans, and the number of KPIs reported in the KPI section. These findings are interpreted as being in line with the premises of capital need theory. Directors are driven by the need to obtain finance to

increase the volume of KPI disclosure. Meanwhile, those directors do not show the same concern with reporting quality.

However, the study has found no significant relationship between the plans to issue equity and KPI reporting. This result can be interpreted in line with Lang and Lundholm's (2000) findings that there is a trade-off between managers' incentives to mitigate information asymmetry through increasing KPI quantity and quality, and the motivation to maintain a steady level of disclosure so that they avoid any major decline or correction in the share price after the announcement date. The results with regard to capital need variables show that directors affect KPI reporting based upon the source of finance.

Finally, the analyses findings have shown that KPI reporting is not associated with the majority of firm characteristics. These results highlight the importance of CG mechanisms as drivers of financial reporting. However, similar findings have been provided by previous studies with respect to profitability (e.g. Mangena and Pike, 2005), liquidity (e.g. Anis et al., 2012), leverage (e.g. Ho and Wong, 2001; Abraham and Cox, 2007), dividend yield (Naser et al., 2006), and cross listing (e.g. Oyelere et al., 2003).

5.3.3 KPI reporting and firm value (Q3)

The analyses in chapter (4) have revealed the following. While the number of KPIs disclosed in the KPI section has a negative and significant association with firm value, KPI reporting quality has no statistical and significant relationship with firm value. Notably, when considering the quantity of KPIs disclosed outside the KPI section in the analyses, the negative association between KPI reporting quantity and firm value becomes more significant. The analyses have indicated that the association between

firm value and KPI reporting is largely derived from the effects of financial KPI reporting. In contrast, neither the quantity nor the quality of non-financial KPI reporting has a significant association with firm value.

These results are consistent with Hassan et al.'s (2009) assertion that the association between corporate disclosure and firm value is as complex as it is varied, based upon disclosure type. The findings with regard to KPI quantity suggest that market participants might perceive that directors in firms with extra amounts of KPIs disclosure are causing such noise in order to hide some potential threats or problems.

The findings could also be related to the content of the KPI information disclosed. This content might reflect the real position of the business, which raises concerns about the firm's prospects. In line with the efficient market hypothesis, market participants' incorporate this information and correct their overvaluation of share prices.

On the other hand, it has been concluded that investors could not assign higher values for firms with a higher quality of KPI reporting. This finding might be explained by the low level of quality scores for the majority of UK companies. Therefore, investors could not perceive any differences between these companies in terms of disclosure quality. Hence, these differences have not been reflected on their valuation of UK firms.

In addition, the analyses illustrated that the majority of corporate governance (CG) mechanisms do not have a significant effect on firm value. Whereas, board size has a significant and negative association with firm valuation, a positive and highly significant effect of role duality on firm value is documented. These findings can be explained by signalling theory, suggesting that firms with smaller board size, and firms

chaired by CEOs, are conveying good signals to investors that they have an effective type of leadership and control.

5.3.4 Quantity and quality of financial reporting (Q4)

The answers to Q1, Q2 and Q3 are integrated to give an answer to Q4. More specifically, the analyses in chapter (2) regarding Q1 (i.e. the attributes of KPI reporting in the UK) have indicated that industries with the highest quantity of KPI disclosure did not appear to be the highest in terms of quality of KPI disclosure.

In addition, the analyses in chapter (3) regarding Q2 (i.e. the factors affecting KPI reporting quantity and quality) have revealed that there is a positive correlation between KPI reporting quantity and its quality. This suggests that the larger the quantity of KPIs disclosed, the higher the quality of KPI reporting.

However, the empirical analyses have revealed the following. The quantity and quality of KPI reporting are not identically influenced by the same factors. The study results indicated in 5.3.2, question the proposition of using quantity of disclosure as a proxy for its quality in accounting studies that examine the determinants of accounting disclosure.

Furthermore, the findings regarding Q3 (i.e. the impact of KPI reporting on firm value) in chapter (4) facilitate answering Q4. The findings suggest that the quantity of KPI reporting and its quality have different associations with firm value. The evidence indicates that, whereas the quantity of KPIs has a significant and negative effect on firm value, KPI reporting quality has no impact upon firm value. Even when quantity and quality of KPIs reported outside the KPI section were considered in the analyses, the above findings hold.

These findings are important as they provide evidence suggesting that it is not appropriate to use the quantity of disclosure as a proxy for its quality in accounting research while investigating the value relevance of accounting information. Overall, the present study findings are in line with the recent literature (Anis et al., 2012) suggesting that disclosure quantity and disclosure quality should not be used as substitutes for one another.

5.4 Contributions and implications

This section indicates how this thesis contributes to the extant literature. Then, the implications of the present study are provided.

5.4.1 Contributions

This thesis makes a contribution to the literature by answering the four research questions. Furthermore, the thesis could add to the methodologies applied in the literature.

5.4.1.1 Contributions to the literature

The answer to Q1 extends the limited literature that explores KPI reporting in practice: Giunta et al. (2008) (Italy) and Tauringana and Mangena (2009) (UK). However, the present study is distinguished by investigating the level of quantity as well as quality of KPI reporting for a relatively large sample of UK listed companies from different sectors over a five year period.

The answer to Q2 contributes to the academic studies testing the role of CG mechanisms and firm characteristics as determinants of corporate disclosure (e.g. Forker, 1992; Cooke, 1992; Ho and Wong, 2001; Haniffa and Cooke, 2002; Ajinkya et al., 2005; Li et al., 2008; Tauringana and Mangena, 2009; Hussainey and Al-Najjar,

2011; Wang and Hussainey, 2013).

The answer builds on, and contributes to, the literature suggesting that the quantity and quality of disclosure are not derived from the same factors. Furthermore, the study highlights the importance of directors' compensation as a driver of financial reporting. The findings provide strong support for the proposition of agency, signalling, and capital need theories, when testing the effect of different factors on KPI reporting in terms of quantity and quality.

The answer to Q3 contributes to the previous literature examining the impact of financial reporting on market participants (e.g. Hussainey and Walker, 2009; Hassan et al., 2009; Mouselli et al., 2012). To the best of the author's knowledge, this is the first study which illustrates that the quantity and quality of reporting have different relationships with firm value. Moreover, the study also builds on, and contributes to, the literature investigating the relationship between CG mechanisms and firm value (e.g. Klein, 1998; Dalton et al., 1999; Laporta et al., 2002; Haniffa and Hudaib, 2006; Aggarwal et al., 2009; Ammann et al., 2011). As investors do not assign higher value to firms with most of the CG variables, the findings are in favour of allowing UK firms to select a CG structure which is appropriate to their own characteristics.

To provide an answer to Q4, the study has to address a number of issues. First, the call for financial reporting quality measures which are directly derived from a proper definition of disclosure quality (Beyer et al., 2010). Second, the call for solving the difficulty in measuring disclosure quality, by using a comprehensive measure rather than earning quality (Berger, 2011). The study builds on, and contributes to, the literature focusing on the qualitative attributes of the information disclosed (e.g. Beattie et al., 2004; Beretta and Bozzolan, 2004; Botosan, 1997; Boesso and Kumar, 2007; Giunta et al., 2008; Beest and Braam, 2011; Anis et al., 2012). The study introduces

reporting quality measures based on the ASB (2006) framework. Employing this measure in accounting research would also contribute to knowledge. For instance, it might lead to different inferences with regard to the drivers and impacts of either narrative disclosure in general, or specific types of disclosure (e.g. risk reporting, social responsibility reporting).

5.4.1.2 Methodological contributions

The study introduces a valid and reliable measure of disclosure quality. Hence, it enables researchers to distinguish between disclosure quantity and quality when exploring firms' practices. In addition, the results of applying this measure provide strong evidence that using the quantity of disclosure as a proxy for its quality in accounting studies might lead to misleading inferences with regard to factors affecting financial reporting. This might also have implications with respect to the economic consequences of accounting disclosure.

In addition, the study employs clustering by both firm and time in order to consider any unobserved firms and times within the data set. Compared with other methods applied in accounting research, Gow et al. (2010) found that clustering by firm and time (CL-2) would produce well specified tests statistics if compared with OLS standard errors, White standard errors, Newey-West standard errors, Fama-MacBeth, Z2, as well as robust standard errors clustered by time, firm and both.

5.4.2 Implications

The findings of this thesis should be relevant to the regulatory bodies. As the UK Minister for Employment Relations, Consumer and Postal Affairs stated, companies have to disclose relevant information of a high quality within their narratives. The findings of the study inform policy makers about the relatively low level of KPI

reporting quality in the annual report narratives (especially for firms in some sectors such as Oil & Gas). The weak performance with regard to several attributes of KPI reporting quality confirms the concerns regarding the role of enforcement mechanisms. This suggests that firms might need clear guidance that indicates best practice in detail. More specifically, this guidance should show firms how to indicate the link between firms' KPIs and their strategies, quantify their KPI targets, provide commentary on these targets, and disclose any changes in KPIs.

Accordingly, the present study has revealed that there is a variation between companies from different industries in terms of the amount of KPIs disclosed. Furthermore, it has shown that disclosure on KPIs - especially non-financial ones - was absent in many annual reports. Therefore, regulatory bodies should identify a minimum number of KPIs to be issued by each firm in accordance with its sector. The definition and the assumptions used to drive each of these KPIs should be unified and generalised for each sector to enhance comparability between firms in the same sector.

This thesis has provided evidence that disclosure quality can be assessed based upon the qualitative characteristics that are provided by the ASB (2006). This measure is reliable and valid and can be used to evaluate disclosure quality for any type of narrative disclosure. This measure of disclosure quality can be adopted by policy makers to detect those areas of narrative disclosure which need more focus. Subsequently, regulators could identify whether or not low disclosure quality is due to non-compliance with the existing rules, or because of the absence of explicit guidance.

The empirical results have shown the weak impact of CG mechanisms upon firm value, suggesting that investors might look at other firm attributes and board monitoring mechanisms as substitutes. The results support the argument that firms with a

concentration of power could achieve better performance. The positive impact of role duality upon firm value suggests that a firm's performance could be improved when it is controlled by a CEO who has enough experience and knowledge about operating and financial activities. The findings support the view that boards that are dominated by NEDs might suffer from a lack of strategic decision making ability (Goodstein et al., 1994), in addition to a lack of local experience and training in contrast to insider directors (Dalton et al., 1999). These findings are in line with Laing and Weir (1999) and Weir et al.'s (2002) studies that recommend to the regulators not to impose certain CG structures on UK firms. Each firm would have a CG structure that is adapted to its own characteristics and its surrounding environment. This also is in line with the orientation of the CG code in the UK, which is dominated by *comply or explain* rule.

In line with this argument, this thesis provides strong evidence that particular CG mechanisms affect the quantity and quality of KPI reporting. More specifically, it informs regulatory bodies as well as information users, that firms with larger board size, NED dominance, and higher NED compensation are more likely to report larger numbers of KPIs with a higher level of quality. The results confirm that UK boards perform a strong monitoring role, supporting the view that soft regulations in the UK do not lead to a weakness in performing this role.

Moreover, firms which intend to issue bonds or loans tend to increase the quantity of KPIs disclosed. Therefore, users should consider these attributes before taking any decisions based on KPI analyses. This should be of interest to regulators as they could encourage firms to improve these dominant mechanisms in particular, in order to enhance KPI reporting.

Rather, the findings might be important for shareholders and UK firms. The study provides strong evidence that shareholders could improve KPI reporting and get better firm value at the same time by offering higher compensation to non-executive directors on the board.

KPI reporting quality has no statistical and significant relationship with firm value. Notably, when considering the quantity of KPIs disclosed outside the KPI section in the analyses, the negative association between KPI reporting quantity and firm value becomes more significant

Moreover, the findings have potential managerial implications with regard to the negative effect of the quantity of KPI reported upon firm value. In particular, the results suggest that market participants should pay more attention to financial KPIs disclosed in the annual report rather than non-financial ones. Hence, managers should be careful about disclosing the basic KPIs. In other words, managers have to study carefully the cost-benefit trade-off before increasing the number of KPIs disclosed.

5.5 Limitations of the study

The present study is one of the first to investigate the determinants as well as the value and relevance of corporate reporting, distinguishing between disclosure quantity and its quality. However, this thesis suffers from a number of limitations which represent good avenues for future research.

One potential limitation is the relatively small sample size. This is a common limitation of labour-intensive studies which employ manual content analysis to code the text. In addition, CG data is collected by the researcher by reading firms' annual reports. This has reduced the ability to increase sample size due to time and effort considerations. In

this regard, any firm without complete data time series was excluded following several previous studies (e.g. Elshandidy et al., 2013). However, this may have caused survival-ship bias because firms with missing data for more than one year were not allowed to enter the sample. Data collection has led to another constraint with regard to the variables included in the analyses. For instance, it was planned to examine the impact of equity linked compensation on KPI reporting, but this variable has been excluded during the analyses because of missing data problem.

In addition, small sample size has led to the selection of a very few firms with a low number of observations in several sectors. Similarly, the sample period could not be extended to longer than five years. As a result, the researcher could not draw conclusions about industry effects based on empirical tests. In particular, this has limited his ability to study in detail the impact of industry on KPI reporting quantity and quality. This also has not enabled the researcher to conduct extensive analyses, testing to what extent industry could affect firm value. Furthermore, the number of observations has restricted the opportunity to obtain reliable results that could be generalised with regard to the impact of financial crises periods on the results.

Furthermore, the descriptive statistics in chapter two showed that sample firms did not consider most of the qualitative attributes recommended by the ASB (2006). Hence, the resultant quality scores were heavily driven by two dimensions of the eight dimensions suggested to measure reporting quality (providing the definition of each KPI and quantifying the data). Therefore, caution should be exercised with regard to the conclusions of KPI reporting quality. In particular, one might argue that UK firms do not provide annual report users with useful information that could be incorporated in his evaluation of a firm's value. On the other hand, the descriptive statistics in chapter two

showed that sample firms provided a limited number of non-financial KPIs with a relatively low degree of reporting quality. Therefore, caution should be exercised with regard to the conclusions with regard to non-financial KPI reporting determinants or impacts.

Despite following different procedures to avoid multicollinearity among the dependent variables, there is a high possibility that there is a circular causality between the independent and dependent variables of the models. Therefore, the models employed might suffer from the endogeneity problem.

The study focused on two types of KPI reporting (i.e. financial and non-financial KPI information). One might argue that firms will not provide KPI information unless they represent good news. In contrast, firms with disagreeable performance indicators will not provide such information. The study has indirectly considered such news by controlling for the impact of the main drivers for good and bad news, such as profitability, liquidity and leverage. However, it might be helpful to study the tone of KPI disclosures. It is expected that KPIs with good or bad news could have an influence on investors' valuation of the firm. More specifically, the analyses of the tone of KPI disclosures could provide an extra explanation to the negative effect of KPI reporting quantity on firm value.

Finally, there is another common limitation in studies that investigate the market participants' perceptions of information disclosed in the annual report. Market participants could get similar information from other sources (e.g. online reporting, analysts' reports) before reading the annual report. That makes for a difficulty in capturing the individual impact of that information as disclosed in the annual report.

5.6 Suggestions for future research

The present study can provide good avenues for potential research. These opportunities can be highlighted as follows:

Previous literature showed that the different indices used to measure disclosure quality might lead to different results. Therefore, future studies could employ the instrument used in this thesis to measure disclosure quality for other parts of narrative reporting (e.g. risk disclosures). Then they could test whether the quantity and quality of such disclosures are driven by the same factors. Future studies can also explore the separate impact of each dimension on stock market participants.

In this regard, future research could improve disclosure measure used in this study. It is suggested that future researchers consider the extent or richness of the KPI information provided. Therefore, KPI quantity measures could be enhanced by considering the level and range of relevant topics covered by KPI reporting. In addition, the study has avoided any subjectivity that may be caused by weighting the type of KPI disclosed (i.e. non-financial KPIs) or one attribute of those used to measure disclosure quality. However, future studies could calculate weighted scores and compare the results with the results produced using un-weighted scores. Arguably, quality measures might be improved if weighting was given to particular dimensions such as quantifying KPI targets and providing management commentary on it. As a result, KPI quality measures could consider the depth of the KPI information disclosed, as it reflects the importance of forward-looking (outlook) in this information.

Future research could explore firms' practices with respect to other types of KPI disclosures (e.g. KPI disclosures that include good news and ones that contain bad

news, changes in KPI used from one year to another). This research opportunity will show how firms could use KPI reporting content to send specific signals to investors. On that basis, research could be extended to examine the determinants and impacts of the tone of KPI disclosures.

Current research could be extended by many means. New variables could be introduced to examine the extent to which these variables could affect KPI reporting. For example, as audit committee meetings display their influence on KPI reporting quality, further study could examine the effect of other audit committee characteristics such as the financial expertise of the audit committee members. Moreover, some industries show a remarkably low/high level of KPI reporting. Thus, a study could be conducted into such sectors as Utilities, Basic Materials, Healthcare, Technology or Oil and Gas, to examine the factors affecting the low/high level of quantity/quality in such sectors. In this regard, sample size could be increased and the sample period can be extended, both of which would add to the richness of the analysis.

Similarly, the impact of KPI reporting could be investigated from other perspectives. More specifically, future research could study whether or not the quantity and quality of KPI information have different effects on stock returns, cost of capital or on analyst report accuracy. As mentioned above, the research could be extended by focusing on some sectors in order to study the impact of KPI reporting by firms in these sectors upon firms' values.

Using qualitative research tools in measuring KPI disclosure quality represents another direction for research. For example, undertaking interviews with investors might reveal great insights into their perceptions with regard to the variation between firms in terms of KPI quantity and quality.

Finally, this research can be conducted in different contexts. There are new narrative regulations that apply for periods ending on or after the end of September 2013. The new regulations ask all UK firms with the exception of small ones, to replace the business review with a strategic report. Therefore, future studies could address the same research questions for periods beyond September 2013. Additionally, a comparative study could be conducted among different European countries, to explore the variations between EU countries in terms of KPI reporting quantity and quality after introducing the business review regulation in 2003. It would be interesting to compare these countries in terms of KPI reporting drivers and also their consequences. This would confirm whether or not the findings of the present study are applicable to other countries.

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Appendix 1

Table 41 Anova test to compare financial KPI reporting quantity across sample period

year	Summary of QNFKS Mean	Std. Dev.	Freq.
2006	1.7010386	1.1249368	96
2007	2.0307538	1.0312948	101
2008	2.1861296	.90325218	102
2009	2.2399414	.85659085	102
2010	2.308016	.81160632	102
Total	2.0979776	.97022215	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	22.9303773	4	5.73259432	6.35	0.0001
Within groups	449.617798	498	.902846985		
Total	472.548176	502	.941331027		

Bartlett's test for equal variances: chi2(4) = 14.5021 Prob>chi2 = 0.006

Comparison of QNFKS by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.329715 0.153			
2008	.485091 0.004	.155376 1.000		
2009	.538903 0.001	.209188 1.000	.053812 1.000	
2010	.606977 0.000	.277262 0.382	.121886 1.000	.068075 1.000

QNFKS: is the numberof financial KPIs disclosed in the KPI' section.

Table 42 Anova test to compare non-financial KPI reporting quantity across sample period

year	Summary of QNNFKSEC Mean	Std. Dev.	Freq.
2006	.74005562	.9370861	96
2007	.96479811	1.0049152	101
2008	1.1198459	1.0344857	102
2009	1.208721	1.0291649	102
2010	1.272564	.99910395	102
Total	1.0652193	1.0160555	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	17.9587417	4	4.48968541	4.47	0.0015
Within groups	500.290372	498	1.00459914		
Total	518.249114	502	1.03236875		

Bartlett's test for equal variances: chi2(4) = 1.1714 Prob>chi2 = 0.883

Comparison of QNNFKSEC by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.224742 1.000			
2008	.37979 0.080	.155048 1.000		
2009	.468665 0.011	.243923 0.836	.088875 1.000	
2010	.532508 0.002	.307766 0.292	.152718 1.000	.063843 1.000

QNNFKSEC: is the numberof non-financial KPIs disclosed in the KPI' section.

Table 43 Anova test to compare total non-financial KPI reporting quantity across sample period

year	Summary of QNNFKREP Mean	Std. Dev.	Freq.
2006	.86966009	1.0069933	96
2007	1.1134123	1.0328102	101
2008	1.3248344	1.0712718	102
2009	1.4957837	1.0890472	102
2010	1.6603572	1.0751321	102
Total	1.2982137	1.0877437	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	38.5113285	4	9.62783214	8.63	0.0000
Within groups	555.448221	498	1.11535787		
Total	593.95955	502	1.18318635		

Bartlett's test for equal variances: chi2(4) = 0.8134 Prob>chi2 = 0.937

Comparison of QNNFKREP by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.243752 1.000			
2008	.455174 0.026	.211422 1.000		
2009	.626124 0.000	.382371 0.102	.170949 1.000	
2010	.790697 0.000	.546945 0.002	.335523 0.237	.164574 1.000

QNNFKREP: is the numberof non-financial KPIs disclosed in the whole report.

Table 44 Anova test to compare total KPI reporting quantity across sample period

year	Summary of QNTKREP Mean	Std. Dev.	Freq.
2006	2.0599803	1.267246	96
2007	2.4398667	1.2070279	101
2008	2.7045298	1.0710509	102
2009	2.8556587	1.0105928	102
2010	2.9956839	.9625605	102
Total	2.6180589	1.1509722	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	54.1725846	4	13.5431461	11.04	0.0000
Within groups	610.845357	498	1.2265971		
Total	665.017942	502	1.32473694		

Bartlett's test for equal variances: chi2(4) = 10.7514 Prob>chi2 = 0.030

Comparison of QNTKREP by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.379886 0.165			
2008	.64455 0.000	.264663 0.893		
2009	.795678 0.000	.415792 0.077	.151129 1.000	
2010	.935704 0.000	.555817 0.004	.291154 0.610	.140025 1.000

QNTKREP: is the total number of financial and non-financial KPIs disclosed in the whole report.

Table 45 Anova test to compare financial KPI reporting quality across sample period

year	Summary of QLFKS Mean	Std. Dev.	Freq.
2006	.43454118	.2755	96
2007	.51872639	.24069706	101
2008	.56482616	.20792088	102
2009	.57910255	.19790911	102
2010	.61114569	.1685289	102
Total	.54299186	.22775073	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	1.84399654	4	.460999135	9.49	0.0000
Within groups	24.1949419	498	.048584221		
Total	26.0389385	502	.051870395		

Bartlett's test for equal variances: chi2(4) = 27.6755 Prob>chi2 = 0.000

Comparison of QLFKS by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.084185 0.076			
2008	.130285 0.000	.0461 1.000		
2009	.144561 0.000	.060376 0.516	.014276 1.000	
2010	.176605 0.000	.092419 0.030	.04632 1.000	.032043 1.000

QLFKS: is the quality of financial KPIs disclosed in the KPI' section.

Table 46 Anova test to compare non-financial KPI reporting quality across sample period

year	Summary of QLNFKSEC Mean	Std. Dev.	Freq.
2006	.28961094	.3293495	96
2007	.3715047	.33941936	101
2008	.40810578	.33626389	102
2009	.43002065	.32808533	102
2010	.46470652	.32394336	102
Total	.39406279	.33541326	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	1.75980614	4	.439951536	4.00	0.0033
Within groups	54.7162259	498	.10987194		
Total	56.476032	502	.112502056		

Bartlett's test for equal variances: chi2(4) = 0.2889 Prob>chi2 = 0.991

Comparison of QLNFKSEC by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.081894 0.837			
2008	.118495 0.123	.036601 1.000		
2009	.14041 0.030	.058516 1.000	.021915 1.000	
2010	.175096 0.002	.093202 0.457	.056601 1.000	.034686 1.000

QLNFKSEC: is the quality of non- financial KPIs disclosed in the KPI' section.

Table 47 Anova test to compare total non-financial KPI reporting quality across sample period

year	Summary of QLNFKREP Mean	Std. Dev.	Freq.
2006	.32438554	.3327659	96
2007	.41457245	.3360613	101
2008	.45963429	.32755073	102
2009	.49521657	.31681598	102
2010	.53843836	.30214305	102
Total	.44796885	.32998493	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	2.65526187	4	.663815467	6.36	0.0001
Within groups	52.0075469	498	.104432825		
Total	54.6628087	502	.108890057		

Bartlett's test for equal variances: chi2(4) = 1.4644 Prob>chi2 = 0.833

Comparison of QLNFKREP by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.090187 0.508			
2008	.135249 0.034	.045062 1.000		
2009	.170831 0.002	.080644 0.761	.035582 1.000	
2010	.214053 0.000	.123866 0.065	.078804 0.822	.043222 1.000

QLNFKREP: is the quality of non financial KPIs disclosed in the whole report.

Table 48 Anova test to compare total KPI reporting quality across sample period

year	Summary of QLTKREP Mean	Std. Dev.	Freq.
2006	.46692433	.26621597	96
2007	.54194692	.23430768	101
2008	.59394324	.18671721	102
2009	.60716629	.17814543	102
2010	.63411513	.15538007	102
Total	.57008805	.21454021	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	1.71810846	4	.429527115	10.00	0.0000
Within groups	21.387698	498	.042947185		
Total	23.1058065	502	.046027503		

Bartlett's test for equal variances: chi2(4) = 37.5015 Prob>chi2 = 0.000

Comparison of QLTKREP by year (Bonferroni)

Row Mean-Col Mean	2006	2007	2008	2009
2007	.075023 0.114			
2008	.127019 0.000	.051996 0.745		
2009	.140242 0.000	.065219 0.254	.013223 1.000	
2010	.167191 0.000	.092168 0.016	.040172 1.000	.026949 1.000

QLTKREP: is the aggregated quality of financial and non-financial KPIs disclosed in the whole report.

Table 49 Anova test to compare financial KPI reporting quantity across industries

Industry	Summary of QNFKS Mean	Std. Dev.	Freq.
Basic Materials	1.973926	.8029555	40
Consumer Goods	2.2758417	.87798965	65
Consumer Services	2.174395	1.0755071	107
Health Care	1.5173691	.74431542	24
Industrials	2.1346336	.90537442	143
Oil & Gas	1.7538544	1.1565705	54
Technology	2.1617423	.90688077	40
Telecommunication	2.27556	.95558252	10
Utilities	2.5066405	.83776523	20
Total	2.0979776	.97022215	503

Source	Analysis of Variance SS	df	MS	F	Prob > F
Between groups	21.792218	8	2.72402725	2.99	0.0028
Within groups	450.755958	494	.912461453		
Total	472.548176	502	.941331027		

Bartlett's test for equal variances: chi2(8) = 14.4654 Prob>chi2 = 0.070

Comparison of QNFKS by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	.301916 1.000					
Consumer	.200469 1.000	-.101447 1.000				
Health C	-.456557 1.000	-.758473 0.034	-.657026 0.088			
Industri	.160708 1.000	-.141208 1.000	-.039761 1.000	.617264 0.128		
Oil & Ga	-.220072 1.000	-.521987 0.113	-.420541 0.310	.236485 1.000	-.380779 0.464	
Technolo	.187816 1.000	-.114099 1.000	-.012653 1.000	.644373 0.333	.027109 1.000	.407888 1.000
Telecomm	.301634 1.000	-.000282 1.000	.101165 1.000	.758191 1.000	.140926 1.000	.521706 1.000
Utilitie	.532714 1.000	.230799 1.000	.332246 1.000	.989271 0.024	.372007 1.000	.752786 0.099

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.113818 1.000	
Utilitie	.344898 1.000	.23108 1.000

QNFKS: is the numberof financial KPIs disclosed in the KPI' section.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 50 Anova test to compare non-financial KPI reporting quantity across industries

Industry	Summary of QNNFKSEC Mean	Std. Dev.	Freq.
Basic Materials	1.317367	1.2565892	40
Consumer Goods	.79464214	.86562251	65
Consumer Services	1.1183446	.92234103	107
Health Care	.54462708	.74836347	24
Industrials	1.0709777	.93815756	143
Oil & Gas	1.1612109	.89216394	54
Technology	.42116074	.69623409	40
Telecommunication	.99281998	.89088426	10
Utilities	2.8047565	1.0429371	20
Total	1.0652193	1.0160555	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	91.7752828	8	11.4719103	13.29	0.0000
Within groups	426.473831	494	.86330735		
Total	518.249114	502	1.03236875		

Bartlett's test for equal variances: chi2(8) = 17.2452 Prob>chi2 = 0.028

Comparison of QNNFKSEC by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	-.522725 0.191					
Consumer	-.199022 1.000	.323702 0.979				
Health C	-.77274 0.049	-.250015 1.000	-.573717 0.233			
Industri	-.246389 1.000	.276336 1.000	-.047367 1.000	.526351 0.379		
Oil & Ga	-.156156 1.000	.366569 1.000	.042866 1.000	.616584 0.254	.090233 1.000	
Technolo	-.896206 0.001	-.373481 1.000	-.697184 0.002	-.123466 1.000	-.649817 0.004	-.74005 0.005
Telecomm	-.324547 1.000	.198178 1.000	-.125525 1.000	.448193 1.000	-.078158 1.000	-.168391 1.000
Utilitie	1.48739 0.000	2.01011 0.000	1.68641 0.000	2.26013 0.000	1.73378 0.000	1.64355 0.000

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.571659 1.000	
Utilitie	2.3836 0.000	1.81194 0.000

QNNFKSEC: is the numberof non-financial KPIs disclosed in the KPI' section.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 51 Anova test to compare total non-financial KPI reporting quantity across industries

Industry	Summary of QNNFKREP Mean	Std. Dev.	Freq.
Basic Materials	1.4023	1.2738112	40
Consumer Goods	1.0213269	1.0015459	65
Consumer Services	1.2993035	.94351609	107
Health Care	1.2278917	1.1761164	24
Industrials	1.3283105	1.005718	143
Oil & Gas	1.2012531	.93240813	54
Technology	.80753223	1.0242654	40
Telecommunication	1.526404	1.5881824	10
Utilities	2.9823485	.85621959	20
Total	1.2982137	1.0877437	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	73.0503259	8	9.13129074	8.66	0.0000
Within groups	520.909224	494	1.05447211		
Total	593.95955	502	1.18318635		

Bartlett's test for equal variances: chi2(8) = 13.3216 Prob>chi2 = 0.101

Comparison of QNNFKREP by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	-.380973 1.000					
Consumer	-.102996 1.000	.277977 1.000				
Health C	-.174408 1.000	.206565 1.000	-.071412 1.000			
Industri	-.07399 1.000	.306984 1.000	.029007 1.000	.100419 1.000		
Oil & Ga	-.201047 1.000	.179926 1.000	-.09805 1.000	-.026639 1.000	-.127057 1.000	
Technolo	-.594768 0.355	-.213795 1.000	-.491771 0.362	-.420359 1.000	-.520778 0.172	-.393721 1.000
Telecomm	.124104 1.000	.505077 1.000	.2271 1.000	.298512 1.000	.198094 1.000	.325151 1.000
Utilitie	1.58005 0.000	1.96102 0.000	1.68304 0.000	1.75446 0.000	1.65404 0.000	1.7811 0.000

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.718872 1.000	
Utilitie	2.17482 0.000	1.45594 0.010

QNNFKREP: is the numberof non-financial KPIs disclosed in the whole report.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 52 Anova test to compare KPI reporting quantity across industries

Industry	Summary of QNTKSEC Mean	Std. Dev.	Freq.
Basic Materials	2.5741225	1.0729199	40
Consumer Goods	2.5185249	.98984638	65
Consumer Services	2.5688111	1.1848418	107
Health Care	1.7385404	.81984871	24
Industrials	2.5433927	.96398247	143
Oil & Gas	2.1271547	1.4252527	54
Technology	2.3400865	.81586733	40
Telecommunication	2.551615	1.1495194	10
Utilities	3.7435715	1.1376884	20
Total	2.4966587	1.1187863	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	54.4137255	8	6.80171569	5.85	0.0000
Within groups	573.931049	494	1.16180374		
Total	628.344774	502	1.25168282		

Bartlett's test for equal variances: chi2(8) = 24.0947 Prob>chi2 = 0.002

Comparison of QNTKSEC by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	-.055598 1.000					
Consumer	-.005311 1.000	.050286 1.000				
Health C	-.835582 0.101	-.779985 0.093	-.830271 0.025			
Industri	-.03073 1.000	.024868 1.000	-.025418 1.000	.804852 0.028		
Oil & Ga	-.446968 1.000	-.39137 1.000	-.441656 0.520	.388614 1.000	-.416238 0.575	
Technolo	-.234036 1.000	-.178438 1.000	-.228725 1.000	.601546 1.000	-.203306 1.000	.212932 1.000
Telecomm	-.022508 1.000	.03309 1.000	-.017196 1.000	.813075 1.000	.008222 1.000	.42446 1.000
Utilitie	1.16945 0.003	1.22505 0.000	1.17476 0.000	2.00503 0.000	1.20018 0.000	1.61642 0.000

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.211529 1.000	
Utilitie	1.40348 0.000	1.19196 0.161

QNTKSEC: is the number of financial and non-financial KPIs disclosed in the the KPI'section.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 53 Anova test to compare total KPI reporting quantity across industries

Industry	Summary of QNTKREP Mean	Std. Dev.	Freq.
Basic Materials	2.612092	1.0979982	40
Consumer Goods	2.6155183	1.070477	65
Consumer Services	2.661444	1.1814895	107
Health Care	2.1033025	1.1387787	24
Industrials	2.6870862	.96223914	143
Oil & Gas	2.1522334	1.4463092	54
Technology	2.4939952	.9766443	40
Telecommunication	2.912526	1.5337671	10
Utilities	3.8889245	.83993432	20
Total	2.6180589	1.1509722	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	52.7463998	8	6.59329997	5.32	0.0000
Within groups	612.271542	494	1.23941608		
Total	665.017942	502	1.32473694		

Bartlett's test for equal variances: chi2(8) = 21.0081 Prob>chi2 = 0.007

Comparison of QNTKREP by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	.003426 1.000					
Consumer	.049352 1.000	.045926 1.000				
Health C	-.508789 1.000	-.512216 1.000	-.558142 0.968			
Industri	.074994 1.000	.071568 1.000	.025642 1.000	.583784 0.642		
Oil & Ga	-.459859 1.000	-.463285 0.873	-.509211 0.229	.048931 1.000	-.534853 0.100	
Technolo	-.118097 1.000	-.121523 1.000	-.167449 1.000	.390693 1.000	-.193091 1.000	.341762 1.000
Telecomm	.300434 1.000	.297008 1.000	.251082 1.000	.809223 1.000	.22544 1.000	.760293 1.000
Utilitie	1.27683 0.001	1.27341 0.000	1.22748 0.000	1.78562 0.000	1.20184 0.000	1.73669 0.000

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.418531 1.000	
Utilitie	1.39493 0.000	.976399 0.863

QNTKREP: is the numberof financial and non-financial KPIs disclosed in the whole report.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 54 Anova test to compare financial KPI reporting quality across industries

Industry	Summary of QLFKS Mean	Std. Dev.	Freq.
Basic Materials	.62746595	.20321097	40
Consumer Goods	.56192752	.21609557	65
Consumer Services	.52178751	.22027122	107
Health Care	.54114475	.26520962	24
Industrials	.56001952	.20450029	143
Oil & Gas	.44747301	.29989981	54
Technology	.52244032	.21905217	40
Telecommunication	.5811282	.26060354	10
Utilities	.58635065	.16717525	20
Total	.54299186	.22775073	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	.960120561	8	.12001507	2.36	0.0167
Within groups	25.0788179	494	.050766838		
Total	26.0389385	502	.051870395		

Bartlett's test for equal variances: chi2(8) = 18.6024 Prob>chi2 = 0.017

Comparison of QLFKS by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	-.065538 1.000					
Consumer	-.105678 0.421	-.04014 1.000				
Health C	-.086321 1.000	-.020783 1.000	.019357 1.000			
Industri	-.067446 1.000	-.001908 1.000	.038232 1.000	.018875 1.000		
Oil & Ga	-.179993 0.005	-.114455 0.217	-.074314 1.000	-.093672 1.000	-.112547 0.067	
Technolo	-.105026 1.000	-.039487 1.000	.000653 1.000	-.018704 1.000	-.037579 1.000	.074967 1.000
Telecomm	-.046338 1.000	.019201 1.000	.059341 1.000	.039983 1.000	.021109 1.000	.133655 1.000
Utilitie	-.041115 1.000	.024423 1.000	.064563 1.000	.045206 1.000	.026331 1.000	.138878 0.681

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.058688 1.000	
Utilitie	.06391 1.000	.005222 1.000

QLFKS: is the quality of financial KPIs disclosed in the KPI' section.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 55 Anova test to compare non-financial KPI reporting quality across industries

Industry	Summary of QLNFKSEC Mean	Std. Dev.	Freq.
Basic Materials	.4569346	.38782524	40
Consumer Goods	.33483771	.34206707	65
Consumer Services	.42070183	.30735701	107
Health Care	.21280383	.28297486	24
Industrials	.42013434	.341711	143
Oil & Gas	.45059245	.308087	54
Technology	.18333413	.28765049	40
Telecommunication	.3602144	.38041737	10
Utilities	.63513256	.18565513	20
Total	.39406279	.33541326	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	4.47033182	8	.558791478	5.31	0.0000
Within groups	52.0057002	494	.105274697		
Total	56.476032	502	.112502056		

Bartlett's test for equal variances: chi2(8) = 15.4184 Prob>chi2 = 0.052

Comparison of QLNFKSEC by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	-.122097 1.000					
Consumer	-.036233 1.000	.085864 1.000				
Health C	-.244131 0.134	-.122034 1.000	-.207898 0.171			
Industri	-.0368 1.000	.085297 1.000	-.000567 1.000	.207331 0.142		
Oil & Ga	-.006342 1.000	.115755 1.000	.029891 1.000	.237789 0.106	.030458 1.000	
Technolo	-.2736 0.007	-.151504 0.740	-.237368 0.003	-.02947 1.000	-.2368 0.002	-.267258 0.003
Telecomm	-.09672 1.000	.025377 1.000	-.060487 1.000	.147411 1.000	-.05992 1.000	-.090378 1.000
Utilitie	.178198 1.000	.300295 0.012	.214431 0.249	.422329 0.001	.214998 0.206	.18454 1.000

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.17688 1.000	
Utilitie	.451798 0.000	.274918 1.000

QLNFKSEC: is the quality of non- financial KPIs disclosed in the KPI' section.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 56 Anova test to compare total non-financial KPI reporting quality

industries

Industry	Summary of QLNFKREP Mean	Std. Dev.	Freq.
Basic Materials	.47839703	.38589218	40
Consumer Goods	.39331554	.34491248	65
Consumer Services	.47575582	.29229158	107
Health Care	.35393666	.31060165	24
Industrials	.47548339	.33356834	143
Oil & Gas	.45229182	.30948373	54
Technology	.291632	.3508671	40
Telecommunication	.3733682	.39457427	10
Utilities	.670487	.10975838	20
Total	.44796885	.32998493	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	2.65886943	8	.332358679	3.16	0.0017
Within groups	52.0039393	494	.105271132		
Total	54.6628087	502	.108890057		

Bartlett's test for equal variances: chi2(8) = 31.0898 Prob>chi2 = 0.000

Comparison of QLNFKREP by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	-.085081 1.000					
Consumer	-.002641 1.000	.08244 1.000				
Health C	-.12446 1.000	-.039379 1.000	-.121819 1.000			
Industri	-.002914 1.000	.082168 1.000	-.000272 1.000	.121547 1.000		
Oil & Ga	-.026105 1.000	.058976 1.000	-.023464 1.000	.098355 1.000	-.023192 1.000	
Technolo	-.186765 0.372	-.101684 1.000	-.184124 0.083	-.062305 1.000	-.183851 0.059	-.16066 0.648
Telecomm	-.105029 1.000	-.019947 1.000	-.102388 1.000	.019432 1.000	-.102115 1.000	-.078924 1.000
Utilitie	.19209 1.000	.277171 0.032	.194731 0.507	.31655 0.049	.195004 0.437	.218195 0.378

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.081736 1.000	
Utilitie	.378855 0.001	.297119 0.664

QLNFKREP: is the quality of non financial KPIs disclosed in the whole report.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 57 Anova test to compare KPI reporting quality across industries

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Industry	Summary of QLTKSEC Mean	Std. Dev.	Freq.
Basic Materials	.64526657	.20918528	40
Consumer Goods	.5703995	.21945245	65
Consumer Services	.53355371	.21027657	107
Health Care	.54187358	.26200302	24
Industrials	.59328489	.17844292	143
Oil & Gas	.45196858	.29774119	54
Technology	.55666935	.18279447	40
Telecommunication	.5770025	.25635769	10
Utilities	.613934	.17850628	20
Total	.56171643	.21866956	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	1.22924756	8	.153655945	3.33	0.0010
Within groups	22.7745743	494	.046102377		
Total	24.0038219	502	.047816378		

Bartlett's test for equal variances: chi2(8) = 28.4288 Prob>chi2 = 0.000

Comparison of QLTKSEC by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	-.074867 1.000					
Consumer	-.111713 0.187	-.036846 1.000				
Health C	-.103393 1.000	-.028526 1.000	.00832 1.000			
Industri	-.051982 1.000	.022885 1.000	.059731 1.000	.051411 1.000		
Oil & Ga	-.193298 0.001	-.118431 0.104	-.081585 0.837	-.089905 1.000	-.141316 0.002	
Technolo	-.088597 1.000	-.01373 1.000	.023116 1.000	.014796 1.000	-.036616 1.000	.104701 0.713
Telecomm	-.068264 1.000	.006603 1.000	.043449 1.000	.035129 1.000	-.016282 1.000	.125034 1.000
Utilitie	-.031333 1.000	.043534 1.000	.08038 1.000	.07206 1.000	.020649 1.000	.161965 0.149

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.020333 1.000	
Utilitie	.057265 1.000	.036931 1.000

QLTKSEC: is the aggregated quality of financial and non-financial KPIs disclosed in the KPI' section

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Table 58 Anova test to compare total KPI reporting quality across industries

Industry	Summary of QLTKREP Mean	Std. Dev.	Freq.
Basic Materials	.64646052	.20931095	40
Consumer Goods	.56825123	.21693682	65
Consumer Services	.55117247	.19955523	107
Health Care	.53000158	.25248115	24
Industrials	.60441149	.17808972	143
Oil & Gas	.45379989	.29890189	54
Technology	.56773741	.1867596	40
Telecommunication	.57173629	.25095208	10
Utilities	.6450576	.10519763	20
Total	.57008805	.21454021	503

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	1.32174367	8	.165217959	3.75	0.0003
Within groups	21.7840628	494	.044097293		
Total	23.1058065	502	.046027503		

Bartlett's test for equal variances: chi2(8) = 39.5008 Prob>chi2 = 0.000

Comparison of QLTKREP by Industry (Bonferroni)

Row Mean-Col Mean	Basic Ma	Consumer	Consumer	Health C	Industri	Oil & Ga
Consumer	-.078209 1.000					
Consumer	-.095288 0.529	-.017079 1.000				
Health C	-.116459 1.000	-.03825 1.000	-.021171 1.000			
Industri	-.042049 1.000	.03616 1.000	.053239 1.000	.07441 1.000		
Oil & Ga	-.192661 0.000	-.114451 0.116	-.097373 0.204	-.076202 1.000	-.150612 0.000	
Technolo	-.078723 1.000	-.000514 1.000	.016565 1.000	.037736 1.000	-.036674 1.000	.113938 0.345
Telecomm	-.074724 1.000	.003485 1.000	.020564 1.000	.041735 1.000	-.032675 1.000	.117936 1.000
Utilitie	-.001403 1.000	.076806 1.000	.093885 1.000	.115056 1.000	.040646 1.000	.191258 0.020

Row Mean-Col Mean	Technolo	Telecomm
Telecomm	.003999 1.000	
Utilitie	.07732 1.000	.073321 1.000

QLTKREP: is the aggregated quality of financial and non-financial KPIs disclosed in the whole report.

Rows: Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, Utilities.

Columns: Basic materials, Consumer Goods, Consumer Services, Health Care, Industrials, Oil & Gas, Technology, Telecommunications.

Appendix 2

Table 59 Determinants of financial KPI reporting quantity

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	**0.51** 0.233						**0.44** 0.206
NOEXCOMP		**0.462*** 0.26					0.271 0.2
BORSIZE			**0.06** 0.033				**0.08** 0.038
BORCOMP			**1.36** 0.534				0.973 0.61
BORMEET			-0.022 0.021				-0.032 0.022
ROLEDUAL			-0.362 0.221				-0.417 0.263
ACSIZE				-0.024 0.084			-0.116 0.103
ACMEET				0.106 0.066			0.108 0.072
MAJORSHAR					0.013 0.31		-0.183 0.338
MANGOWN					0.068 0.568		0.506 0.46
FUT_EQUITY						0.144 0.189	0.111 0.199
FUT_BONDS						0.111 0.117	0.075 0.076
FUT_LOANS						**0.268** 0.109	**0.22** 0.107
SIZE	0.225 0.138	**0.37** 0.109	0.165 0.121	**0.38** 0.105	**0.46** 0.118	**0.37** 0.099	-0.194 0.183
PROFITAB	**-1.35** 0.559	**-1.17** 0.58	**-1.16*** 0.642	**-1.122*** 0.624	**-1.30** 0.575	**-1.077*** 0.552	-0.881 0.617
LIQUIDITY	0.079 0.06	0.067 0.058	**0.089*** 0.052	0.069 0.056	0.07 0.059	0.073 0.058	0.084 0.057
LEVERAGE	-0.289 0.273	-0.31 0.268	-0.233 0.244	-0.356 0.27	-0.27 0.263	-0.274 0.248	-0.318 0.254
DIVYIELD	1.805 2.143	1.687 2.203	1.526 1.96	1.828 2.256	2.1 2.184	1.73 2.192	0.524 2.151
CROSSLIST	0.279 0.234	0.245 0.241	0.23 0.228	0.347 0.237	0.273 0.233	0.223 0.233	0.266 0.264
Constant	-3.60** 1.208	-4.07** 1.341	-1.224 0.9	-2.36** 0.98	-2.66** 1.123	-1.93** 0.933	-1.753 1.364
F	8.4***	7.3***	6.8***	6.7***	6.0***	6.4***	4.9***

Adj R-squared	0.125	0.117	0.144	0.123	0.109	0.126	0.172
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.
Dependent variables**:** **QNFKS** is the total number of financial KPIs disclosed in the KPI' section. **Explanatory variables: executives' compensations in Mo1; non-executives' compensations in Mo2; board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industries dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Table 60 Determinants of financial KPI reporting quality

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	**0.14**** 0.067						**0.108**** 0.048
NOEXCOMP		**0.127*** 0.067					**0.090*** 0.054
BORSIZE			**0.021**** 0.007				**0.024**** 0.01
BORCOMP			**0.42***** 0.121				**0.286**** 0.121
BORMEET			-0.002 0.003				-0.004 0.004
ROLEDUAL			**-0.16***** 0.036				**-0.2***** 0.056
ACSIZE				0.01 0.021			-0.011 0.028
ACMEET				**0.037**** 0.014			**0.036**** 0.015
MAJORSHAR					0.058 0.069		0.03 0.073
MANGOWN					0.037 0.151		**0.222**** 0.111
FUT_EQUITY						-0.006 0.045	-0.018 0.042
FUT_BONDS						-0.005 0.021	-0.021 0.015
FUT_LOANS						**0.05***** 0.015	**0.032*** 0.018
SIZE	0.041 0.032	**0.1***** 0.016	0.012 0.026	**0.06***** 0.019	**0.11***** 0.022	**0.09***** 0.02	**-0.066*** 0.038
PROFITAB	**-0.21*** 0.114	-0.164 0.118	-0.143 0.13	-0.113 0.133	**-0.208*** 0.115	**-0.170*** 0.099	-0.081 0.122

LIQUIDITY	-0.002 0.015	-0.005 0.014	0.003 0.013	-0.004 0.014	-0.004 0.015	-0.003 0.015	0.001 0.012
LEVERAGE	-0.098 0.075	-0.104 0.07	-0.086 0.06	-0.118 0.075	-0.091 0.072	-0.088 0.067	-0.098 0.067
DIVYIELD	0.589 0.643	0.553 0.682	0.456 0.643	0.537 0.693	0.715 0.694	0.638 0.654	0.278 0.692
CROSSLIST	0.037 0.067	0.027 0.069	0.021 0.064	0.06 0.065	0.034 0.066	0.027 0.067	0.04 0.067
Constant	-0.6** 0.263	-0.72** 0.36	0.067 0.172	-0.206 0.182	-0.440** 0.216	-0.248 0.21	-0.394 0.345
F	8.8***	8.4***	9.6***	9.5***	6.5***	6.0***	6.6***
Adj R-squared	0.119	0.11	0.169	0.135	0.101	0.104	0.208
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.
Dependent variables**: QLFKS** is the quality score of KPIs disclosed in the KPI' section. **Explanatory variables: executives'' compensations in Mo1; non-executives' compensations in Mo2; board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industries dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Table 61 Determinants of non-financial KPI reporting quantity

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	0.091 0.311						-0.071 0.337
NOEXCOMP		**0.666**** 0.274					**0.672**** 0.282
BORSIZE			**0.07**** 0.026				**0.10***** 0.025
BORCOMP			**0.86**** 0.436				**1.059**** 0.431
BORMEET			**-0.04**** 0.022				-0.038 0.025
ROLEDUAL			**-0.47**** 0.221				-0.375 0.282
ACSIZE				-0.021 0.08			-0.114 0.084
ACMEET				-0.003 0.061			0.004 0.067
MAJORSHAR					0.268 0.388		0.193 0.38

MANGOWN					-0.168 0.809		-0.018 0.885
FUT_EQUITY						-0.126 0.077	**-0.17***** 0.05
FUT_BONDS						0.119 0.107	0.084 0.089
FUT_LOANS						**0.233*** 0.12	**0.193*** 0.11
SIZE	0.203 0.175	0.124 0.116	-0.035 0.152	**0.258*** 0.145	**0.27**** 0.124	0.149 0.114	-0.191 0.162
PROFITAB	-0.442 0.99	-0.257 0.977	-0.31 0.913	-0.465 1.033	-0.449 0.974	-0.245 0.992	-0.039 0.923
LIQUIDITY	-0.008 0.066	-0.014 0.063	0.006 0.058	-0.009 0.066	-0.007 0.066	-0.007 0.068	0 0.055
LEVERAGE	0.067 0.232	0.017 0.236	0.161 0.207	0.067 0.233	0.066 0.235	0.08 0.205	0.091 0.201
DIVYIELD	**2.304*** 1.379	1.783 1.433	1.908 1.257	2.403 1.479	**2.58**** 1.262	**2.376*** 1.315	**1.623*** 0.957
CROSSLIST	0.185 0.193	0.144 0.203	0.153 0.186	0.182 0.206	0.181 0.189	0.155 0.197	0.087 0.216
Constant	-1.326 1.375	-3.24** 1.563	0.609 1.278	-1.189 1.194	-1.558 1.238	-0.333 1.106	-0.878 1.819
F	7.3***	7.5***	6.5***	6.0***	5.8***	6.2***	4.8***
Adj R-squared	0.196	0.207	0.228	0.194	0.195	0.203	0.24
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Dependent variable**: QNNFKSEC** is the total number of non-financial KPIs disclosed in the KPI' section. **Explanatory variables:** executives'' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industries dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Table 62 Determinants of non-financial KPI reporting quality

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	**0.20**** 0.079						**0.125*** 0.068
NOEXCOMP		**0.24**** 0.084					**0.194**** 0.062
BORSIZE			**0.03**** 0.01				**0.037***** 0.01

BORCOMP			**0.56**** 0.179				**0.427**** 0.174
BORMEET			-0.007 0.009				-0.008 0.01
ROLEDUAL			**-0.24**** 0.072				**-0.209**** 0.092
ACSIZE				0.026 0.033			-0.014 0.035
ACMEET				0.027 0.021			0.026 0.022
MAJORSHAR					0.097 0.133		0.071 0.118
MANGOWN					-0.274 0.239		-0.072 0.261
FUT_EQUITY						-0.022 0.045	-0.04 0.036
FUT_BONDS						0.026 0.038	-0.002 0.031
FUT_LOANS						**0.055*** 0.033	0.035 0.03
SIZE	-0.002 0.051	0.043 0.033	-0.043 0.047	0.049 0.042	**0.09**** 0.04	**0.065*** 0.035	**-0.15***** 0.045
PROFITAB	-0.186 0.237	-0.102 0.235	-0.092 0.21	-0.081 0.249	-0.149 0.23	-0.121 0.234	0.019 0.208
LIQUIDITY	-0.012 0.019	-0.017 0.018	-0.006 0.016	-0.015 0.019	-0.012 0.018	-0.014 0.019	-0.006 0.015
LEVERAGE	-0.082 0.086	-0.095 0.082	-0.058 0.077	-0.09 0.081	-0.087 0.081	-0.074 0.077	-0.09 0.08
DIVYIELD	**0.89**** 0.423	**0.795*** 0.441	**0.721*** 0.436	**0.874** 0.531	**1.07**** 0.422	**0.99**** 0.448	0.509 0.33
CROSSLIST	0.072 0.083	0.056 0.087	0.051 0.07	0.088 0.079	0.069 0.081	0.063 0.082	0.058 0.078
Constant	-0.75* 0.384	-1.11** 0.488	0.253 0.367	-0.256 0.361	-0.429 0.405	-0.184 0.351	-0.476 0.501
F	5.1***	6.0***	6.4***	4.6***	4.8***	4.3***	4.1***
Adj R-squared	0.128	0.124	0.174	0.122	0.115	0.111	0.18
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Dependent variable**: QLNFKSEC** is the quality score of non-financial KPIs disclosed in the KPI' section. **Explanatory variables:** executives'' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5;**

capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7. All variables are defined in Table 5 and Table 18. All regressions include industries dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Table 63 The determinants of total non-financial KPI reporting quantity

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	**0.472*** 0.281						0.154 0.333
NOEXCOMP		**1.1***** 0.288					**0.91***** 0.256
BORSIZE			0.039 0.026				**0.066**** 0.026
BORCOMP			**1.1**** 0.551				**1.396**** 0.507
BORMEET			-0.024 0.024				-0.02 0.025
ROLEDUAL			**-0.69**** 0.25				**-0.507*** 0.258
ACSIZE				0.002 0.078			-0.084 0.088
ACMEET				0.005 0.061			0.004 0.067
MAJORSHAR					-0.552 0.395		**-0.646*** 0.386
MANGOWN					-0.071 0.726		0.381 0.787
FUT_EQUITY						-0.221 0.154	**-0.241*** 0.129
FUT_BONDS						0.092 0.08	0.048 0.069
FUT_LOANS						**0.321*** 0.17	0.269 0.165
SIZE	0.219 0.181	**0.232*** 0.131	0.217 0.159	**0.42**** 0.147	**0.35**** 0.138	**0.32**** 0.136	-0.216 0.17
PROFITAB	-0.799 0.941	-0.459 0.924	-0.687 0.858	-0.736 0.979	-0.671 0.966	-0.523 0.949	-0.26 0.944
LIQUIDITY	-0.013 0.067	-0.028 0.063	0.003 0.061	-0.02 0.065	-0.02 0.062	-0.015 0.067	-0.005 0.057
LEVERAGE	-0.05 0.251	-0.123 0.245	0.014 0.239	-0.039 0.222	-0.048 0.231	-0.008 0.219	-0.057 0.204
DIVYIELD	1.913 1.349	1.228 1.476	1.763 1.224	2.152 1.431	1.685 1.384	2.257 1.466	0.448 1.202
CROSSLIST	-0.069 0.215	-0.141 0.21	-0.109 0.225	-0.071 0.234	-0.069 0.213	-0.112 0.222	-0.19 0.235

Constant	-3.4** 1.514	-5.95*** 1.634	-1.376 1.356	-2.489* 1.31	-1.497 1.394	-1.554 1.297	-2.61 1.805
F	8.3***	10.9***	7.0***	7.3***	8.2***	7.7***	5.5***
Adj R-squared	0.184	0.202	0.201	0.173	0.178	0.187	0.233
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Dependent variable**: QNNFKREP** is the number of non financial KPIs disclosed in the whole report. **Explanatory variables:** executives'' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industries dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Table 64 The determinants of total non-financial KPI reporting quality

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	**0.304*** 0.063						**0.180**** 0.061
NOEXCOMP		**0.33*** 0.075					**0.24*** 0.044
BORSIZE			**0.019**** 0.009				**0.026**** 0.009
BORCOMP			**0.711*** 0.171				**0.623*** 0.168
BORMEET			-0.002 0.009				-0.004 0.009
ROLEDUAL			**-0.26*** 0.07				**-0.204**** 0.074
ACSIZE				0.025 0.029			-0.015 0.031
ACMEET				**0.030*** 0.017			0.025 0.018
MAJORSHAR					-0.096 0.124		-0.157 0.113
MANGOWN					-0.243 0.223		0.024 0.235
FUT_EQUITY						-0.034 0.06	-0.05 0.054
FUT_BONDS						0.018 0.026	-0.011 0.02
FUT_LOANS						**0.078*** 0.046	0.054 0.043

SIZE	-0.004 0.049	**0.071*** 0.037	0.022 0.049	**0.09**** 0.042	**0.11**** 0.042	**0.11**** 0.042	**-0.155**** 0.047
PROFITAB	-0.261 0.226	-0.14 0.224	-0.186 0.19	-0.14 0.235	-0.191 0.228	-0.175 0.218	-0.049 0.188
LIQUIDITY	-0.009 0.02	-0.016 0.019	-0.002 0.016	-0.013 0.019	-0.011 0.018	-0.013 0.02	-0.003 0.016
LEVERAGE	-0.087 0.089	-0.104 0.085	-0.075 0.086	-0.094 0.077	-0.09 0.08	-0.071 0.079	-0.106 0.073
DIVYIELD	0.635 0.485	0.515 0.527	0.552 0.473	0.67 0.564	0.702 0.508	0.796 0.534	0.084 0.443
CROSSLIST	-0.008 0.066	-0.032 0.07	-0.033 0.057	0.008 0.069	-0.01 0.071	-0.022 0.07	-0.03 0.058
Constant	-1.272** 0.419	-1.73*** 0.48	-0.276 0.395	-0.573 0.38	-0.422 0.432	-0.483 0.406	-0.851* 0.501
F	7.8***	8.6***	7.9***	6.0***	6.3***	5.3***	5.7***
Adj R-squared	0.146	0.131	0.178	0.116	0.11	0.108	0.216
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Dependent variable**:** **QLNFKREP** is the quality score of non financial KPIs disclosed in the whole report. **Explanatory variables:** executives'' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industries dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Table 65 The determinants of total KPI reporting quantity

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	**0.74**** 0.305						**0.52**** 0.258
NOEXCOMP		**1.023**** 0.324					**0.75**** 0.276
BORSIZE			**0.08**** 0.034				**0.11**** 0.038
BORCOMP			**1.66**** 0.604				**1.42**** 0.548
BORMEET			-0.029 0.02				**-0.03*** 0.021
ROLEDUAL			**-0.7**** 0.242				**-0.7**** 0.269
ACSIZE				-0.009 0.096			-0.13 0.113

ACMEET				0.091 0.069			0.094 0.076
MAJORSHAR					-0.294 0.336		-0.458 0.315
MANGOWN					0.034 0.73		0.692 0.605
FUT_EQUITY						-0.019 0.238	-0.051 0.225
FUT_BONDS						**0.167**** 0.082	0.113 .
FUT_LOANS						**0.383**** 0.159	**0.311*** 0.159
SIZE	0.277 0.175	**0.420**** 0.137	**0.252*** 0.14	**0.53***** 0.128	**0.56***** 0.135	**0.47***** 0.125	**-0.32*** 0.18
PROFITAB	**-1.25*** 0.708	-0.904 0.693	**-1.02*** 0.602	-1.011 0.752	-1.141 0.71	-0.87 0.648	-0.542 0.581
LIQUIDITY	0.069 0.075	0.05 0.073	0.086 0.062	0.057 0.07	0.057 0.071	0.062 0.071	0.076 0.065
LEVERAGE	-0.222 0.298	-0.281 0.293	-0.139 0.241	-0.268 0.261	-0.203 0.272	-0.189 0.245	-0.251 0.222
DIVYIELD	2.55 2.464	2.073 2.639	2.246 2.201	2.708 2.576	2.697 2.579	2.738 2.429	0.688 2.136
CROSSLIST	0.11 0.25	0.04 0.261	0.049 0.257	0.166 0.261	0.105 0.254	0.043 0.256	0.039 0.297
Constant	-4.7** 1.549	-6.5*** 1.571	-1.509 1.138	-3.03** 1.179	-2.76** 1.22	-2.13* 1.136	-2.9** 1.468
F	10.9***	11.7***	9.2***	9.0***	8.8***	9.1***	6.8***
Adj R-squared	0.177	0.178	0.201	0.161	0.155	0.172	0.241
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18
N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Dependent variables**: QNTKREP** is the total number of financial and non-financial KPIs disclosed in the whole report. All variables are defined in

Table 20. **Explanatory variables:** executives'' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industries dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Table 66 The determinants of total KPI reporting quality

Variable	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6	Mo7
EXCOMP	**0.2***** 0.046						**0.16***** 0.034

NOEXCOMP		**0.2***** 0.05					**0.15***** 0.038
BORSIZE			**0.019**** 0.006				**0.023**** 0.009
BORCOMP			**0.48***** 0.106				**0.308**** 0.109
BORMEET			0.0001 0.003				-0.001 0.004
ROLEDUAL			**-0.2***** 0.037				**-0.12***** 0.055
ACSIZE				0.023 0.021			-0.001 0.027
ACMEET				**0.035***** 0.01			**0.033**** 0.011
MAJORSHAR					0.038 0.062		0.022 0.057
MANGOWN					-0.034 0.151		**0.186*** 0.101
FUT_EQUITY						-0.018 0.047	-0.03 0.044
FUT_BONDS						0.01 0.007	-0.01 0.011
FUT_LOANS						**0.038**** 0.013	0.019 0.016
SIZE	0.013 0.026	**0.07***** 0.017	0.016 0.022	**0.06***** 0.017	**0.1***** 0.021	**0.1***** 0.021	**-0.1**** 0.036
PROFITAB	-0.146 0.14	-0.072 0.141	-0.071 0.114	-0.028 0.147	-0.125 0.137	-0.097 0.129	0.011 0.102
LIQUIDITY	0.004 0.014	-0.001 0.014	0.008 0.011	0.001 0.012	0.001 0.014	0.001 0.014	0.006 0.011
LEVERAGE	-0.07 0.063	-0.079 0.059	-0.061 0.045	-0.084 0.06	-0.065 0.058	-0.061 0.054	-0.079 0.056
DIVYIELD	0.591 0.634	0.534 0.673	0.487 0.593	0.561 0.664	0.734 0.673	0.704 0.644	0.242 0.578
CROSSLIST	-0.007 0.054	-0.021 0.058	-0.025 0.052	0.014 0.051	-0.01 0.056	-0.014 0.056	-0.007 0.051
Constant	-0.7** 0.226	-0.95** 0.298	0.018 0.149	-0.201 0.17	-0.38* 0.211	-0.223 0.21	-0.68** 0.263
F	10.5***	9.4***	10.6***	10.0***	6.0***	5.6***	8.1***
Adj R-squared	0.169	0.145	0.211	0.164	0.121	0.123	0.273
Mean VIF	1.59	1.31	1.42	1.27	1.29	1.29	1.79
Max VIF	2.61	1.64	2.62	1.55	1.49	1.73	5.18

N	498	498	498	498	498	498	498

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Dependent variable**: QLTKREP** is the aggregated quality score of financial and non-financial KPIs disclosed in the whole report. **Explanatory variables:** executives'' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; capital need variables in Mo6; and all explanatory variables used in the analyses in Mo7.** All variables are defined in Table 5 and Table 18. All regressions include industries dummies. Standard errors in the second line for each variable and are corrected for firm and time clustering.

Appendix 3

Table 67 Firm value (TQ) & total non-financial KPI reporting quantity

Variables	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6
QNNFKREP	-0.017 0.012	-0.017 0.013	-0.012 0.012	-0.016 0.013	-0.015 0.012	-0.012 0.011
EXCOMP	0.056 0.061					0.047 0.06
NOEXCOMP		0.046 0.078				0.059 0.058
BORSIZE			-0.012 0.008			**-0.016**** 0.007
BORCOMP			-0.046 0.125			-0.217 0.132
BORMEET			-0.007 0.008			-0.008 0.007
ROLEDUAL			**0.149**** 0.048			**0.170**** 0.059
ACSIZE				0.014 0.017		0.027 0.02
ACMEET				0.007 0.017		0.013 0.012
MANGOWN					-0.14 0.181	-0.212 0.145
MAJORSHAR					0.116 0.122	0.111 0.116
SIZE	0.045 0.029	**0.063**** 0.022	**0.103***** 0.026	**0.057**** 0.024	**0.077**** 0.026	**0.074**** 0.033
PROFITAB	**0.896**** 0.299	**0.912**** 0.31	**0.853**** 0.309	**0.934**** 0.284	**0.904**** 0.3	**0.909**** 0.286
LEVERAGE	0.077 0.079	0.073 0.086	0.079 0.06	0.076 0.071	0.076 0.079	0.059 0.064
CROSSLIST	-0.011 0.041	-0.015 0.042	-0.012 0.044	-0.007 0.046	-0.012 0.041	0.001 0.043

CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.003 0.003	0.002 0.003	0.004 0.003	0.003 0.003	0.003 0.004
PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0
Constant	-0.65** 0.25	-0.71** 0.342	-0.661** 0.223	-0.52** 0.198	-0.65** 0.273	-1.01*** 0.268
F	11.7***	11.6***	11.3***	11.1***	11.2***	9.67***
Adj R-squared	0.273	0.272	0.299	0.273	0.276	0.318
Mean VIF	2.05	1.9	1.91	1.86	1.88	2.16
Max VIF	3.89	3.9	3.89	3.9	4.09	5.52
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ $_{+3}$: is TobinsQ three months after the year end. **Explanatory variables: : QNNFKREP is** the quantity of non-financial KPIs disclosed in the whole report in addition to executives'' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

Table 68 Firm value (TQ) & total non-financial KPI reporting quality

Variables	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6
QLNFKREP	**-0.082**** 0.041	**-0.075*** 0.044	-0.053 0.047	-0.076 0.048	**-0.072*** 0.043	**-0.068*** 0.038
EXCOMP	0.074 0.059					0.057 0.058
NOEXCOMP		0.053 0.076				0.064 0.056
BORSIZE			-0.012 0.008			**-0.015**** 0.007
BORCOMP			-0.019 0.13			-0.19 0.132
BORMEET			-0.006 0.008			-0.008 0.007
ROLEDUAL			**0.146**** 0.047			**0.167**** 0.058
ACSIZE				0.016 0.017		0.027 0.019
ACMEET				0.009 0.018		0.014 0.012
MANGOWN					-0.159 0.177	-0.22 0.144

MAJORSHAR					0.118 0.12	0.109 0.111
SIZE	0.041 0.028	**0.065**** 0.023	**0.101***** 0.027	**0.058**** 0.024	**0.081**** 0.027	**0.067**** 0.031
PROFITAB	**0.875**** 0.298	**0.899**** 0.309	**0.844**** 0.311	**0.922**** 0.284	**0.888**** 0.299	**0.894**** 0.288
LEVERAGE	0.066 0.076	0.062 0.083	0.071 0.058	0.064 0.068	0.065 0.076	0.046 0.061
CROSSLIST	-0.009 0.04	-0.015 0.042	-0.012 0.043	-0.005 0.046	-0.011 0.041	0.002 0.043
CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.003 0.003	0.003 0.003	0.004 0.003	0.003 0.004	0.003 0.004
PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0
Constant	-0.704** 0.255	-0.745** 0.334	-0.663** 0.224	-0.537** 0.2	-0.664** 0.281	-1.045*** 0.274
F	12.1***	11.9***	11.4***	11.4***	11.5***	9.9***
Adj R-squared	0.28	0.276	0.301	0.279	0.281	0.323
Mean VIF	2.05	1.89	1.91	1.84	1.87	2.16
Max VIF	3.9	3.92	3.9	3.92	4.09	5.57
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ_{+3}; is TobinsQ three months after the year end. **Explanatory variables: QLNFKREP is** the aggregated quality of non-financial KPIs disclosed in the whole report in addition to executives' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

Table 69 Firm value (TQ) & total KPI reporting quantity

	Mo1	**Mo2**	**Mo3**	**Mo4**	**Mo5**	**Mo6**
QNTKREP	**-0.024**** 0.011	**-0.024**** 0.011	-0.018 0.012	**-0.022*** 0.012	**-0.021*** 0.012	**-0.019*** 0.01
EXCOMP	0.065 0.06					0.054 0.059
NOEXCOMP		0.056 0.074				0.067 0.058
BORSIZE			-0.011 0.008			**-0.015*** 0.008
BORCOMP			-0.036 0.127			-0.21 0.133

BORMEET			-0.007 0.008			-0.009 0.007
ROLEDUAL			**0.145**** 0.047			**0.166**** 0.059
ACSIZE				0.013 0.017		0.025 0.019
ACMEET				0.009 0.018		0.014 0.013
MANGOWN					-0.138 0.181	-0.206 0.147
MAJORSHAR					0.118 0.121	0.112 0.114
SIZE	**0.046*** 0.028	**0.067**** 0.021	**0.104***** 0.026	**0.061**** 0.024	**0.083**** 0.026	**0.071**** 0.033
PROFITAB	**0.876**** 0.294	**0.897**** 0.306	**0.841**** 0.301	**0.918**** 0.281	**0.886**** 0.298	**0.895**** 0.279
LEVERAGE	0.067 0.078	0.062 0.084	0.072 0.059	0.065 0.069	0.067 0.078	0.05 0.064
CROSSLIST	-0.006 0.041	-0.012 0.042	-0.009 0.043	-0.002 0.046	-0.009 0.041	0.004 0.043
CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.002 0.003	0.002 0.003	0.003 0.003	0.003 0.003	0.002 0.004
PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0
Constant	-0.674** 0.251	-0.747** 0.333	-0.650** 0.213	-0.528** 0.197	-0.665** 0.267	-1.040*** 0.248
F	12.0***	11.9***	11.5***	11.4***	11.5***	9.9***
Adj R-squared	0.279	0.277	0.303	0.278	0.281	0.322
Mean VIF	2.05	1.9	1.91	1.86	1.88	2.16
Max VIF	3.9	3.92	3.90	3.92	4.1	5.53
N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ_{+3}: TobinsQ three months after the year end. **Explanatory variables: QNTKREP is** the quantity of financial and non-financial KPIs disclosed in the whole report in addition to executives' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.

Table 70 Firm value (TQ) & total KPI reporting quality

	Mo1	Mo2	Mo3	Mo4	Mo5	Mo6

QLTKREP	-0.066 0.056	-0.057 0.063	-0.006 0.074	-0.066 0.071	-0.052 0.066	-0.036 0.065
EXCOMP	0.062 0.059					0.051 0.055
NOEXCOMP		0.041 0.078				0.055 0.059
BORSIZE			-0.012 0.008			**-0.016**** 0.008
BORCOMP			-0.056 0.134			-0.224 0.137
BORMEET			-0.006 0.008			-0.008 0.007
ROLEDUAL			**0.154**** 0.048			**0.169**** 0.058
ACSIZE				0.015 0.017		0.028 0.02
ACMEET				0.009 0.019		0.014 0.013
MANGOWN					-0.141 0.181	-0.209 0.145
MAJORSHAR					0.128 0.125	0.122 0.116
SIZE	0.041 0.026	**0.062**** 0.022	**0.099***** 0.026	**0.054**** 0.025	**0.077**** 0.027	**0.071**** 0.032
PROFITAB	**0.907**** 0.286	**0.927**** 0.299	**0.874**** 0.295	**0.950***** 0.273	**0.915**** 0.292	**0.921***** 0.277
LEVERAGE	0.071 0.077	0.069 0.084	0.079 0.058	0.068 0.066	0.072 0.076	0.056 0.062
CROSSLIST	-0.01 0.04	-0.014 0.042	-0.01 0.043	-0.005 0.045	-0.011 0.041	0.003 0.043
CASH_ASSETS	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002	**0.006**** 0.002
CAPEX_ASSETS	0.003 0.003	0.003 0.003	0.003 0.003	0.003 0.003	0.003 0.003	0.003 0.003
PRPLEQ_SALES	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0	0.0001 0
Constant	-0.628** 0.262	-0.652* 0.359	-0.639** 0.218	-0.487** 0.202	-0.639** 0.268	-0.997*** 0.26
F	11.6***	11.5***	11.2***	11.0***	11.1***	9.6***
Adj R-squared	0.271	0.268	0.297	0.271	0.274	0.316
Mean VIF	2.06	1.89	1.92	1.85	1.88	2.17
Max VIF	3.89	3.9	3.89	3.91	4.09	5.6

N	485	485	485	485	485	485

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Dependent variable: TQ_{+3}: TobinsQ three months after the year end. **Explanatory variables: QLTKREP is** the aggregated quality of financial and non-financial KPIs disclosed in the whole report in addition to executives' compensations in **Mo1**; non-executives' compensations in **Mo2**; **board characteristics in Mo3; audit committee characteristics in Mo4; Ownership structure variables in Mo5; and all explanatory variables used in the analyses in Mo6.** All variables are defined in Table 31. All regressions include industries dummies. Standard errors in the second line for each variable are corrected for firm and time clustering.