Business Model Disclosures, Market Values, and Earnings Persistence

Evidence From the UK

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Published in:
Abacus

DOI (link to publication from Publisher):
10.1111/abac.12233

Publication date:
2022

Document Version
Accepted author manuscript, peer reviewed version

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Please cite as:

Bini, L., Schaper, S., Simoni, L., Giunta, F. & Nielsen, C. (2023), Mandatory non-financial disclosure: Is everybody on the same page about business model reporting? Accounting Forum (Accepted/In press)

This paper investigates consequences of business model (BM) disclosures. Following the mandatory introduction of BM disclosure in the UK, content analysis is used to assess such disclosures in 75 publicly listed companies' annual reports across a three-year period (2014-2016). This research applies a novel content analysis methodology which factors in that the relevance of BM disclosures will be dependent upon which particular BM a given company does business by. The empirical results show notably low levels of BM disclosure and no significant association between BM disclosures and market values. However, we find that BM disclosure provides insights into earnings quality by means of enhanced earnings persistence. These findings reveal that information about the BM itself does not make a difference to investors when it is not linked to financial outcomes. This emphasizes the role of the BM as a framework for organizing other disclosures and confirms that BM disclosures provide complementary information about value generation, which helps users understand how earnings are generated. These results are important for informing the policy-making process around extra-financial disclosures (e.g., the European Directive 2014/95/EU) and calls for research to inform future improvements of corporate and integrated reporting.

Keywords: Business models, Narrative reporting, Non-financial disclosure, Non-financial regulation, Value relevance, Earnings persistence

JEL classification: M1, M40, M41, M48

INTRODUCTION

The inability of traditional financial metrics to fully reflect and capture value creation has, over time, given weight to the importance of non-financial information (NFI). In modern economies, companies rely primarily on intangible resources to achieve and sustain their competitive advantage (Itami, 1987), and as financial measures are historically-oriented and accounting-based, they are not able to fully reflect the value of intangibles (Anderson & McAdam, 2004; Barth, 2018). On the contrary, NFI has the ability to capture intangible values that are not expressed through financial information (Johanson et al., 2001; Ittner & Larcker, 2003; Skoog, 2009; Ferenhof et al., 2015). Measures related to aspects like customers, product research pipeline, etc. – explaining their ability to sustain current levels of earnings over time – have become increasingly important (Gu, 2018) for external decision-makers and for capital allocation.

A recent study by Khan et al. (2017) finds that all of FASB's standards issued over the period 1973-2009 have surprisingly low market impacts. Similarly, several empirical studies show a decline in the ability of traditional accounting to predict market values (Francis & Schipper, 1999; Lev & Zarowin, 1999) and how non-financial measures have become more value relevant than financial measures (Davern et al., 2019). This corroborates Lev and Gu's (2016) concerns that market agents may neither care about financial measures nor a growing detachment of accounting information compared to prevailing economic realities, hence providing further evidence of compliance-driven reporting practices rather than value-driven reporting practices (cf. Dichev et al., 2013; Deloitte, 2018).

NFI is found to complement financial data, especially when earnings informativeness is low (AICPA, 1994; Amir & Lev, 1996; Coram et al., 2011; EFRAG, 2013). This is also recognized by standard-setters and professional bodies. Since the Jenkins Report (AICPA, 1994), numerous reporting guidelines aiming at improving disclosures have been published. Some of these have taken

voluntary perspectives to reporting (e.g., Intellectual Capital), while others have been based on mandatory approaches enforced by regulations (e.g., Nouvelle Régulations Economiques in 2001 in France; sustainability reporting in Sweden; ESG disclosure requirements in Denmark).

In response to investors' and regulators' demands, companies have started communicating NFI in corporate reports. However, a gap has emerged between non-financial items disclosed by companies and the information needs of investors. Studies have shown that financial professionals, such as analysts and institutional investors, are not entirely satisfied with companies' NFI disclosure practices (Amir et al., 2003; Sakakibara et al., 2010) and that this dissatisfaction may be related to the way non-financial items are communicated (Bukh, 2003). NFI often depicts key intangible factors in isolation and miss out on describing the interrelations among those factors and how they are combined to create value over time (Bukh et al., 2001; Nielsen & Bukh, 2013). Therefore, in order to be useful for the financial markets, NFI should help to explain the elements of value creation including the key interconnections driving these processes, hence ideally being disclosed 'within the framework of the firm's strategy for value creation, i.e. the value creation model should also be disclosed' (Bukh, 2003, p. 53).

According to recent scholarly literature, this line of thought is best represented by the business model (BM) (Bukh, 2003; Nielsen & Roslender, 2015). The BM illustrates the process of value creation, value delivery and value capture that characterizes a business, and how it uses its resources to generate value (Dane-Nielsen & Nielsen, 2017).

The aim of this study is, therefore, to investigate the value relevance of BM disclosures under a mandatory disclosure regime and the relationship between BM disclosure and earnings quality. As the knowledge of a company's BM is supposed to allow investors to better understand how value is created, this information should be value relevant to investors. Moreover, BM disclosure can contextualize other information within the value creation process and offer complementary

information about how value is ultimately turned into profits. Several studies have demonstrated the positive association between NFI and the relevance and the persistence of earnings, which are attributed to the capability of NFI to offer complementary information about how profits are generated (e.g. Mahjoub and Khamoussi, 2013; Reverte, 2016; Baboukardos and Rimmel, 2016). Thus, BM disclosure should offer information that allows users to better assess the quality of earnings, i.e. the persistence of earnings.

Among scholars, there is a rising consensus that a BM description in the annual report is important in assisting investors in understanding what the core elements of a company's value creation process are (e.g. CIMA, 2010; IASB, 2010; EFRAG, 2013). Along these lines, recent non-financial regulations have introduced requirements to disclose the BM (Companies Act Regulation 2013 in the UK; EU Directive 95/2014).

At the time of our study, EU countries had not implemented the requirements of the EU 2014/95 Directive yet. For this reason, we have focused on the UK context, which represents a pioneering implementation and therefore is expected to provide relevant early insights for the rollout of the Directive.

Content analysis has been applied to the annual reports from three years of a sample of 75 UK listed companies that operate in different, non-financial industries to assess BM disclosure. Prior studies on BM disclosures rely on a BM framework to define a list of aspects that characterizes BM *a priori* and subsequently search for descriptions of those elements in the annual reports (e.g., Bini et al., 2016; Mechelli et al., 2017; Bini et al., 2019). A limitation of this kind of approach is that all information items are assigned equal importance while companies rely on vastly different value creation patterns, i.e., different BMs. Thus, we argue that not all the elements that are part of such a framework can have the same importance for all the companies. To overcome this limitation, the companies in our study have been analyzed and classified according to the taxonomy developed by

Taran et al. (2016), allowing for the identification of the main value drivers (cfr. Amit and Zott, 2001) of a company's value creation process on the basis of its BM configuration.

Our BM disclosure assessment considers the configuration of a company and assesses BM disclosure based on the specific drivers that characterize that configuration. Similar to other studies that investigate the value relevance of non-financial information (e.g. Baboukardos, 2017 and 2018; Clacher et al., 2013), an adaptation of the model developed by Ohlson (1995) was applied to examine the value relevance of BM disclosure.

Our findings show that BM disclosure is not directly priced by investors, but that it provides insights into earnings quality. This result is in line with previous research, which shows that non-financial disclosures shed light on how earnings are generated (Baboukardos and Rimmel, 2016; Reverte, 2016; Mechelli et al., 2017) and that companies with more extensive (non-financial) disclosure have more persistent earnings (Gregory et al., 2016; Coulton et al., 2014; Mahjoub and Khamoussi, 2013; Choi and Wang, 2009; Li, 2008; Lim and Tan, 2007). The findings of this research support the view expressed by the regulators that the BM acts as a framework providing a relevant context for other pieces of information.

This research makes an important and timely contribution to the BM reporting research strand which plays into the improvement of corporate reporting through standard-setting (EU Directive 95/2014, EFRAG, 2013) as well as through trends like Integrated Reporting (IIRC, 2013). As national standard-setters and large companies across EU countries have to stick to the EU Directive 2014/95, we believe that early evidence about the impact of BM disclosure can be useful for both regulators at the national level and managers.

THE ROLE OF THE BUSINESS MODEL CONCEPT IN REPORTING

Accounting scholars, professional bodies and regulators are currently quite attentive towards the concept of BMs in reporting. This interest originates from the capability of the BM to provide the market with a clearer picture of the role that different kinds of assets play in a given firm's value creation and thereby also a better understanding of the drivers of financial results (Leisenring et al., 2012; Sort & Nielsen, 2018). The BM is seen by many scholars as a tool that allows companies to frame NFI disclosures in the most relevant communicative fashion (Beattie & Smith, 2013; IIRC, 2013) and is a concept that holds promise of improving reporting practices (Nielsen & Roslender, 2015).

The ability of the BM to function as a reporting framework is supported by several influential professional bodies such as IASB and EFRAG. As EFRAG's (2013) research paper explains, the BM has the potential to provide investors with valuable information that improves their capacity to link financial and non-financial information, enhances comparability and represents economic realities. Further, the International Integrated Reporting Framework (IIRC, 2013) is based on the idea that 'at the core of the organization is its business model, which draws on various capitals as inputs and, through its business activities, converts them to outputs (products, services, by-products and waste)' (p. 13).

Holland (2004) argues that the BM is a construct that essentially connects information about market transactions and their financial effects; effects that may then be measured and represented in the accounts and the financial statements. Therefore, the BM also connects financial effects with non-financial information about the competitive environment, the opportunities and risks of that environment, and the strategies a company applies to cope with those conditions (Singleton-Green, 2012). Many empirical studies use the concept of BM as a framework to assess intellectual capital

(Bini et al., 2016), sustainability disclosures (Bini et al., 2018), financial performance (Mechelli et al., 2017) and performance indicators (Bukh, 2003).

Many BM definitions can be found in the literature (Novak, 2014; Massa et al., 2017). However, it is possible to identify several common traits. At a very abstract level, BM can be defined as the way a company generates and captures value. While the strategy sets out how a company can obtain a competitive advantage, the BM illustrates how the competitive advantage will be achieved (Casadesus-Masanell & Ricart, 2010). The latter implies that the BM depicts how different resources, skills, capabilities and activities are combined to obtain and defend a competitive advantage (Nielsen, 2010; Teece, 2010). The factors that a company relies upon to create value are defined as its value drivers (Amit & Zott., 2001). Thus, the BM clarifies which value drivers define a company's operating model and ultimately contribute to profitability.

Starting from the value drivers that characterize different value creation patterns, some scholars have developed BM taxonomies. In opposition to definitions and ontologies, which are theoretically derived, taxonomies are inductively built from empirical observation (Steininger et al., 2013). The aim of these taxonomies is not to offer a widely accepted definition of BMs, but to offer a map of the possible value creation patterns.

While early BM taxonomies consider e-business only (e.g., Timmers, 1998; Weill & Vitale, 2001; Amit & Zott, 2001), Taran et al. (2016) have developed a taxonomy of BM that comprises all the types of industrial and service industries. The research aimed to identify all the BM configurations seen to date in practice. This exercise has been integrated with the study of the most important reviews of BM conceptualizations (e.g., Zott et al., 2011; Fielt, 2014; Haslam et al., 2015). Once BM configurations have been identified, they have been mapped using the BM ontology developed by Osterwalder & Pigneur (2010). As the authors state, this ontology has been selected 'as a mapping tool because of its popularity amongst business developers, entrepreneurs and academics alike. As

such, it provided a shared language from which we could describe, visualize and assess BM configurations' (Taran et al., 2016, p.499).

The authors used a value driver approach (Amit & Zott, 2001) to group similar configurations. According to the definition of Amit & Zott (2001), value drivers are defined as any factor, like resources, activities, competencies, which contribute to value creation and represent critical success factors for a business (Amit & Zott, 2001; Zott et al., 2011). Resorting to value drivers identified in the literature (Amit & Zott, 2001; Westerlund et al., 2014) and BM classification categories (Afuah & Tucci, 2003; Gassmann et al., 2014a), the authors have narrowed down the list of potential BM configurations to 71.

Independently from the definition adopted, we can see the BM as a mapping tool that allows identifying the value creation pattern of a company and the role that different elements play in the value creation process.

Regulation calling for business model disclosures

The potential of the BM concept has led standard-setters to regulate its disclosure. Recent regulations have introduced the requirement for large companies to disclose their BM in the annual report. The EU Directive 2014/95 requires disclosing BM as part of the forward-looking information set. The directive became effective in all member countries from 2018. To support companies in the process of adaptation to the new requirements, the EU published a document in 2017 that contains some non-financial reporting guidelines (European Commission, 2017).

The UK acted as first movers in this context by introducing a revision of the Companies Act in 2013. This revision requires companies to disclose BM in a section of the annual report called Strategic Report. Also, in the UK, some guidelines were published to assist companies in the preparation of Strategic Report (FRC, 2014).

These regulations share common features with previous non-financial regulatory attempts, like Intellectual Capital statements (Nielsen et al., 2017a). For instance, the regulation does not provide a definition of BM or a detailed framework for disclosure. The EU Directive requires only a 'brief description of the (…) business model'. Even when read together with the earlier mentioned guidance documents issued in connection with the regulation, it becomes clear how loose and general the actual reporting requirement is. In fact, the EU Guidelines on non-financial reporting only state 'A company's business model describes how it generates and preserves value through its products or services over the longer term.' (European Commission, 2017, p. 7, § 4.1-a.). Similarly, the FRC guidance recommends that 'The description of the entity's business model should set out how it generates or preserves value over the longer term, and how it captures that value' (FRC, 2014, p. 21, § 7.12).

The main challenge that standard-setters face in relation to NFI regulation is finding an adequate level of specification for narrative and subjective disclosures (Rutherford, 2003). Some authors claim that the lack of well-defined requirements makes NFI regulations ineffective (Beattie & McInness, 2006; Huefner, 2007). The lack of a shared and accepted definition of BM in the academic and professional contexts makes it hard for standard-setters to define the ideal amount of information companies should disclose for that information to fulfill the informative purpose and, at the same time, not to impose too stringent requirements.

In a critical analysis of the aforementioned European Directive 2014/95/EU, De Villiers et al. (2018) predict that the directive will be ineffective in contributing to overcome the fundamental information asymmetry problem (p. 19) as ascertained by agency theory. The features of how BM regulation is created mean that companies have to offer a description of their BM, but have extensive freedom in deciding what information to report and how to disclose it, making BM disclosure mostly voluntary in nature. However, there are also scholars that argue that non-financial regulations, even

if broad and generic like the ones concerning BM and therefore seemingly ineffective, can ensure some degree of uniformity, reduce information asymmetries (KPMG & UNEP, 2006) and result in relevant disclosures (Berthelot et al., 2003; Moneva & Cuellar, 2009).

Applied to the case of BM regulations, two elements contribute to the alignment of BM reporting practices. First, standard setters emphasize the function of the BM in depicting value creation and the value drivers that underpin the achievement of competitive advantage (Nielsen & Roslender, 2015). Second, regulations recognize the BM as providing context to other types of information disclosed. The EU claims that the BM 'provides context for the management report as a whole.' (EU guidelines on non-financial reporting, 2017, p. 10). The FRC is on the same wavelength when it points out that BM disclosure 'should provide context for the strategic report and the annual report more broadly' (FRC, 2014, p. 22, § 7.16).

The FRC also states that BM information, which is presented in the SR, should be strictly coordinated with the information showed in other sections of the Annual Report (see FRC, 2014, paragraph 6.63). Holland (2004, p. 101) argues that mandatory communication should form the basis of 'a continuing durable standard for enhanced public disclosure of information on BM and its role in corporate value creation processes. The existence of such a standard would create a level playing for disclosure for those investors not privy to direct one-to-one contact with companies.

Value relevance of business model disclosures

As the literature review points out, non-financial disclosure is supposed to allow investors to make more informed decisions. In other words, NFI is deemed to be value relevant. This assertion is supported by the findings of studies on non-financial information in both voluntary (e.g. Amir & Lev, 1996; Clarkson et al., 2004; Bonacchi et al., 2015; Cahan et al., 2016; Gregory et al. 2016) and

mandatory (e.g. Johanston et al., 2008; Baboukardos, 2017 and 2018) regimes. The studies mentioned above document a positive relationship between non-financial disclosures and market values.

The BM has emerged as a concept that has the potential to provide investors with useful information about the value creation process of a company. The concise and schematic representation of a business that this concept can offer allows users to have a picture of the main resources, activities and relationships that characterize a business. In light of this, the BM should enrich the information environment and help users evaluate the performance of a business. Hence, capital market actors are supposed to appreciate BM disclosures. The research question that underlies this discussion is whether information about the BM has incremental value for investors, i.e. whether it is value relevant. Thus, we state the following hypothesis:

Hp1: BM disclosure is positively associated with market values.

Business model disclosure and earnings persistence

Accounting research has documented that NFI disclosures can also impact the quality of earnings (Cormier & Magnan, 2007; Reverte, 2016). The main reason for this is that NFI provides complementary information about the way earnings are generated (Cormier & Magnan, 2007; Hussainey & Salama, 2010). Several studies have investigated the relationships between different types of non-financial information and earnings. Findings suggest that sustainability disclosures (Mahjoub and Khamoussi, 2013; Reverte, 2016), integrated reporting adoption (Baboukardos and Rimmel, 2016) and firms' level of diversification (Chou and Chang, 2020) offer information helpful in assessing the quality of earnings. Further, good stakeholder relationships of firms increase the persistence of superior financial performance (Choi and Wang, 2009). Gregory et al. (2016) show that an underlying economic effect (e.g. higher competitive advantage) drives the relationship

between firm value and corporate social performance (CSP). The value relevance of CSP is associated with a higher coefficient on earnings, which is attributable to either greater earnings persistence or lower cost of capital. Other studies have not found any significant impact of different kinds of NFI, like sustainability disclosures, on earnings (Cardamone et al., 2012; Carnevale and Mazzucca, 2014; Dal Maso et al., 2017).

An important characteristic of earnings quality is earnings persistence (Lev, 1983; Dechow et al., 1999; Cheng, 2005; Hanlon, 2005; Dechow et al., 2010). Textbooks refer to it as a measure of earnings quality (Penman, 2013). Earnings persistence is defined as the capability of past earnings to offer information that allows investors to assess future earnings, providing a good predictor of future earnings (see Sloan, 1996). Several studies have demonstrated that enhanced financial and non-financial disclosure is positively associated with the capability of earnings to predict future earnings, thus providing information about earnings persistence. Coulton et al. (2014) show that companies that pay dividends have more persistent earnings than companies that do not and that this effect is enhanced when dividends carry full tax credits, hence showing that dividends and associated tax credits are informative. Another factor is good communication, as Li (2008) finds that companies with annual reports that are easier to read have more persistent earnings. Lim and Tan (2007) assess the effects of value-at-risk disclosures on earnings and find that companies with higher value-at-risk, which is the probability of an investment loss, are associated with weaker earnings-return relations. Thereby, value-at-risk is also associated with earnings persistence.

The quality of accruals has been shown to be a powerful determinant of the persistence of earnings, where low quality to the former corresponds to less of the latter (Dechow and Dichew, 1997). Sloan (1996) shows a difference in persistence between the accrual and the cash flow components of earnings, with the accrual component being less persistent due to the higher degree of subjectivity of accruals. In an extension of Sloan's (1996) study, Richardson et al. (2005) demonstrate that lower

earnings persistence can be caused by less reliable accruals and resulting in significantly mispriced securities due to investors' inability to anticipate such lower persistence of earnings fully. More recently, it has been demonstrated that analysts' understanding of accruals improve, enabling them to correct their mispricing, based on persistence and other properties of accruals, rather than solely focusing on earnings (Fedyk et al., 2020). However, Li (2019) still finds that real earnings management, i.e. which alters the operations of firms, has a negative effect on the persistence of earnings and, in turn, makes them less informative regarding future cash flows.

The BM sheds light on how a company makes use of its resources and capabilities to gain a competitive advantage and it should allow investors to understand how value is generated. As Nielsen & Roslender (2015) point out, the value that a company generates ultimately turns into profits through pricing mechanisms. Thus, the BM concept can offer useful information about earnings generation (Stewart & Zhao, 2000; Leisenring et al., 2012; Van Ewjik & Arnold, 2014), which can be used to better understand the quality and reliability of earnings and thereby enable more informed predictions. Hence, our second research question analyses if BM disclosures are associated with the persistence of earnings. Accordingly, we state the following hypothesis:

Hp2: Firms with more extensive BM disclosure have more persistent earnings.

RESEARCH METHODOLOGY

The research methodology is in line with previous studies (e.g., Baboukardos 2018; Schneider et al., 2017; Venter et al., 2014) in relation to the selection of the research sample, the number of years covered (three years after the regulation to cover potential implementation effects) and the variables selected for the value relevance analysis. It further encompasses some methodological novelties in relation to the content analysis, as explained in further detail in the following paragraphs.

Sample

Because all UK-based listed companies are required to disclose information about their BM in the annual report to comply with the Companies Act, we base our sample on companies listed in the Main Market of the London Stock Exchange. We identified 75 companies operating in five different industries of varying technological intensity (Gu & Li, 2003). See Table 1 for a breakdown of the sample. Due to their particularities in terms of nature of financial statement items and different regulations, we have excluded financial companies and utility firms in line with previous studies (Tsalavoutas et al., 2012; Baboukardos & Rimmel, 2014). Further, following, e.g., Venter et al. (2014), we excluded development firms and real estate holdings as their stock listings usually refer to linked units rather than ordinary shares.

Based on this sample, we analyze BM disclosure over a three-year period starting from the effectuation of The UK Companies Act in 2013. Hence, 2014 was the first year that saw all UK listed companies face the requirement to disclose their BM, and 2014, 2015 and 2016 were selected as the period of analysis.

< INSERT TABLE 1 HERE >

Quantifying company-specific business model disclosures in annual reports

Content analysis as a research method has been adopted in varying formats for assessing corporate disclosures (Bukh et al., 2005; Rimmel et al., 2009; White et al., 2010; Bryman & Bell, 2015), including BM disclosure (e.g. Bini et al., 2016, Sukhari & De Villiers, 2018). Following a top-down approach, prior studies typically assess disclosure based on a pre-defined disclosure index, which is taken as a reference for all companies in the sample (see, for example, Bukh et al., 2005). By applying lists of items that are derived from a disclosure index, scholars implicitly assume that all the items have the same importance for all the companies under investigation. We argue that this assumption

is not realistic because each company relies on a different set of value drivers (VDs) (Hamel, 2000; Amit & Zott, 2001). Even within a single industry, companies often base their competitive advantage on different business concepts (Hamel, 2000; Taran et al. 2016).

In order to overcome this limitation, the assessment of BM disclosure should take into consideration what the main VDs of a given company's specific BM are. This would induce a more tailored assessment, reflecting the unique combination of factors that characterize each company's value creation process. Therefore, this study proposes a more granular and accurate content analysis methodology to investigate BM disclosure by inserting an additional 'layer' of analysis based on the BM taxonomy developed by Taran et al. (2016). By classifying the sample of companies according to this taxonomy, it is possible to identify the main VDs of each company according to its BM configuration. The taxonomy developed by Taran et al. (2016) boils the companies' BM down to one of 71 potential BM configurations each having a predefined set of VDs. Hence, the applied research method takes into consideration whether and to what extent a company discloses information related to the VDs that the BM taxonomy predicts it should disclose.

The data collection phase involved four researchers and followed these main steps:

1. Mapping of each company according to the BM taxonomy to identify the specific BM configuration(s);
    a. Creation of an *ad hoc* disclosure catalogue (coding instrument) for each company based on the value drivers characterizing its configuration(s)
2. Content analysis of the company's annual reports using the *ad hoc* created disclosure catalogue
3. Calculation of the disclosure index
4. Testing the value relevance of BM disclosures

The advantage of having several researchers coding the annual reports arguably reduces individual subjectivity biases, but it requires strict coding rules to address inter-rater reliability as outlined in the following section.

Mapping business model configurations to create a disclosure catalogue

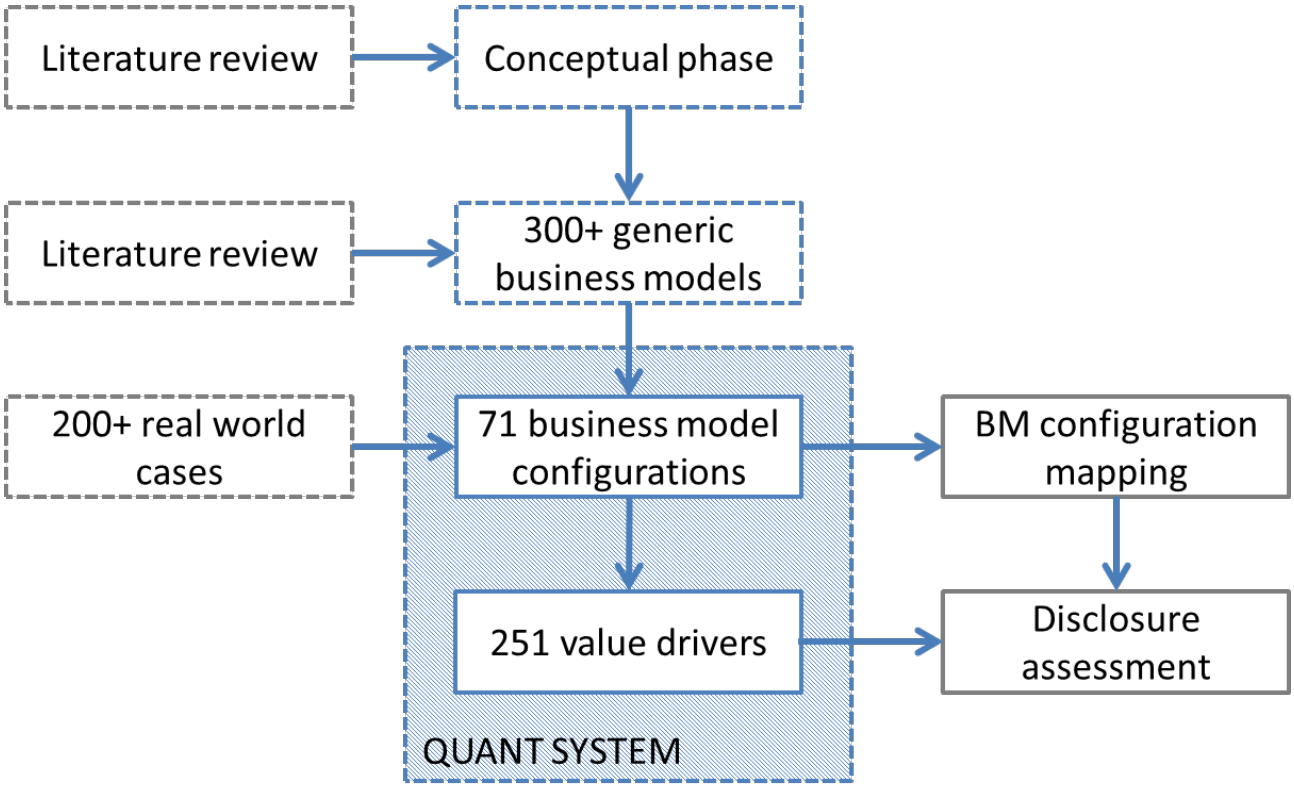
In reference to Anderson and Widener (2007), desk research, here in the form of document analysis (Bowen, 2009), is used to identify case companies' BM configurations. Data for this exercise was mainly collected from annual reports. In some cases, it was necessary to complement this data using integrated reports, sustainability reports, company websites and other external sources. Once gathered, the data were analyzed through the so-called BM QUANT system (Nielsen et al., 2017b), based on the '5-V framework' (Taran et al., 2016) and Dillmann's (2011) survey methodology. The BM QUANT system contains a questionnaire of approximately 80 questions which lead to the identification of the company's BM configuration(s) and from there to its VDs. These questions are related to aspects such as the main intangible resources, the structure of the market and the competitive environment, strategic partners, and distribution channels. Content validity of the questionnaire is provided by developing these questions, as well as BM configuration-specific VDs, from the literature on BM configurations (e.g. Gassmann et al., 2014b; Linder & Cantrell, 2000; Timmers, 1998). Finally, the questions have then been tested against well-known real-life companies (e.g. Gillette) to ensure criterion validity of the questionnaire. The research process and its background are summarized in Figure 1 below.

The questionnaire was applied as a mapping tool without direct contact with company respondents. The application of this kind of expert mapping procedure had the advantage of avoiding potential distortions relating to the subjective understandings of individual respondents as opposed to the information provided in the annual reports. The research team was composed of four experts that

conducted the mapping process. To further ensure a high standard of inter-rater reliability, the researchers individually mapped a pilot case by filling in the questionnaire and then compared the mapping outcomes during preparatory alignment meetings. During these meetings, mismatches were highlighted and their reasons were discussed in order to reach a common understanding. This process was repeated until a satisfactory level of alignment was established, which took three iterations.

At this point, the actual mapping process took place. The 75 companies in the sample were divided among the members of the research team ensuring that each member was assigned companies from different industry segments (in order to avoid personal perception biases and improve consistency). Internal consistency of answers was ensured by a number of connected questions, which would highlight potential incoherent answering patterns for an individual company. A cross-validation of the individual mappings was done in a series of 'challenging meetings', de facto representing a kind of quality stage gate. In these meetings, all 75 individual mappings were again challenged by the entire research team and validated. By answering the questionnaire for each case company, the research team could eventually determine the BM configurations of the 75 companies and derive from it an overview of their relevant VDs. The latter then created the *ad hoc* tailored disclosure catalogues for each company.

Figure 1. *Overview of research steps (solid lines) and background (dashed lines)*



Content analysis to quantify business model disclosure

After having classified the sample companies, we analyzed BM disclosure in each report to identify which value drivers are disclosed. When there is a specific BM section in the sample company's annual report, that section constitutes the object of analysis. However, when BM information is presented together with other kinds of information, like strategy, we have isolated the sub-section that deals specifically with the BM. If isolation of the BM information is not possible, all the sections have been read in search for BM elements. The sections directly or indirectly linked to the BM section have also been analyzed.

We chose text-units, which are defined as 'each group of words containing a 'single piece of information' that is meaningful in its own right' (Beattie et al., 2004, p. 207), as the unit of analysis (Husin et al., 2012). The use of text-units reduces coding subjectivity and allows coding of different items included in the same sentence in different categories (Beattie & Thomson, 2007). Since the

coding procedure aims to identify a company's value drivers, our analysis was centered on information that focuses on value creation (Amit & Zott, 2001). The description of the BM should illustrate how a company's value drivers contribute as critical success factors to the achievement of competitive advantage. Thus, only text-units that illustrate how an element participates in value creation have been considered. Contrary to this, text-units that refer to BM in general terms, not showing how an element contributes to generating value (e.g., 'We can only succeed if everybody works as a team', Carr's 2014 Annual Report p. 9) and only indicating management intentions and commitment have been excluded. The following excerpts help to clarify how text-units have been coded:

'*Central to our competitive advantage are* ***our proprietary processes for expanding extruded polymers into foam without the use of chemicals*** *(...)'*

(Zotefoams 2014 Annual Report, p. 6)

'*Our global marketing team operates a* ***market research programme which is designed to build deep consumer understanding*** *in the markets and categories we focus on'.*

(Tate & Lyle 2016 Annual Report, p. 12)

The first example shows the role that proprietary processes play for Zotefoams. Proprietary processes are related to the BM QUANT element 'Intellectual properties'. The second example points out that market research programs, which are related to the QUANT element 'Market exploration', are of great importance for Tate & Lyle (2016) to generate value for its customers.

Multiple coders, the calculation of the agreement rate, and the definition of the unit of analysis allow us to enhance coding reliability in the content analysis (Beattie & Thomson, 2007).

A BM disclosure index was constructed by counting how many of the value drivers identified through the BM QUANT system were disclosed. The index takes on this form:

$$\text{BM\_Disc} = \frac{\sum_{i=0}^{n} BM\ value\ driver_i}{n}$$

Where n is the number of value drivers that characterizes the company's BM configuration according to the QUANT system (Taran et al., 2016; Nielsen et al., 2017b).

In using the BM taxonomy (Taran et al., 2016) as a proxy and as our way to measure business model disclosures, we also obtain an idea of what kind of disclosure to expect. Although this proxy presents some degrees of subjective approximation, it can be argued that every type of disclosure list would be subject to a particular level of abstraction and able to capture information only to a relative extent. To compare the results, we have complemented our analysis with an alternative disclosure index built according to conventional practice (more detail is provided in the sensitivity analysis section).

Value relevance measurement approach

Following recent research on the value relevance of NFI, we use a model that relates BM disclosure to companies' market-to-book value (Cormier & Magnan, 2007; Hu et al., 2011; Dal Maso et al., 2017). Our disclosure index is used as the independent variable. We have first run the model without the BM disclosure index to assess the relevance of book value and earnings, as predicted by the literature. Controls for leverage (Morris et al., 2011; Lourenco et al., 2014; Baboukardos & Rimmel, 2016), profitability (Dal Maso et al., 2017), risk (Hu et al., 2011), loss-making firms (Joos & Plesko, 2005; Baboukardos & Rimmel, 2014, 2016), industry fixed effects and year fixed effects are added. Leverage is measured as the ratio between total debt and total capital. Return on assets (ROA) is used to control for profitability (Dal Maso et al., 2017), while Beta captures risk (Hu et al., 2011). We winsorize data at the 1st and 99th percentile. We estimate the following model:

$$MTB_{it} = \alpha + \beta_1 \, 1/BV_{it} + \beta_2 \, Inc_{it}/BV_{it} + controls + \varepsilon \quad (1)$$

We then add BM disclosure to test for Hp 1:

$$MTB_{it} = \alpha + \beta_1 \, 1/BV_{it} + \beta_2 \, Inc_{it}/BV_{it} + \beta_3 \, BM\_Disc_{it} + controls + \varepsilon \quad (2)$$

As accounting research has shown that earnings of loss-making firms are valued differently than profit-making firms (Venter et al., 2014), a part of value relevance studies uses a variable to control for this factor. These studies use a dummy variable that takes value of 1 when income is negative and 0 otherwise and create an interaction term between this variable and earnings in order to control for valuation of earnings in loss-making firms (Xu et al., 2007; Coulmont & Berthelot, 2015; Baboukardos & Rimmel, 2016; Baboukardos, 2018). In line with those studies, we run an additional analysis where we add a dummy variable 'Loss' that takes the value of 1 when a company's earnings are negative and 0 otherwise. We let this variable interact with earnings.

$$MTB_{it} = \alpha + \beta_1 \, 1/BV_{it} + \beta_2 \, Inc_{it}/BV_{it} + \beta_3 \, BM\_Disc_{it} + \beta_4 \, Loss + \beta_5 \, Loss * Inc_{it}/BV_{it} + controls + \varepsilon \quad (3)$$

Assessment of business model disclosure association with earnings persistence

In line with previous studies (e.g. Li, 2008; Coulton et al., 2014), we assess the relationship between BM disclosure and earnings persistence by regressing future earnings on current earnings and BM disclosure and adding an interaction term between BM disclosure and current earnings (equation (4)). Each coefficient related to a specific independent variable measures its effects on the dependent

variable of interest, holding all the other variables equal. In the case of an interaction term between continuous variables, the coefficient indicates the slope of the dependent variable on the first variable given one-unit change in the other (Jaccard et al., 1990). In our case, the coefficient of the interaction term indicates the change of the slope of Earnings at time t+1 on Earnings at time t given a one-unit change in BM_Disc.

We then assess whether companies with more extensive BM disclosure have more persistent earnings. We use the following model:

$$Earnings_{it+1} = \alpha + \beta_1 Earnings_{it} + \beta_2 BM_{it} + \beta_3 BM*Earnings_{it} + Controls + \varepsilon \qquad (4)$$

Following previous studies (Li, 2008; Skinner, 2011; Coulton et al., 2014), we control for the effects of dividends by adding a dummy variable (DIV), which equals 1 if a company has distributed dividends in the period and 0 otherwise and letting it interact with earnings, as empirical research has documented a significant association of dividends with earnings persistence (Skinner, 2011). We then control for loss-making firms by adding a dummy variable (Loss), which takes the value of 1 for loss-making firms. We let this variable interact with Earnings. Finally, we control for firm size, measured as the natural logarithm of total assets.

In line with previous studies (e.g. Tang and Firth, 2012; Mahjoub and Khamoussi, 2013), Earnings is measured as net income for the period, scaled by common shares outstanding at the end of the year. We have also used earnings before interests and taxes (EBIT), scaled by common shares outstanding. Untabulated results show results that are consistent with the analysis based on net income.

RESULTS

Descriptive statistics show that on average, companies disclose only a few of the value drivers identified through the BM QUANT classification (Table 2). The index may vary from 0 (no value

drivers disclosed) to 1 (all the value drivers that characterize the BM configuration are disclosed). The average value for this variable is .185, indicating that less than 20% of the value drivers which our taxonomy specification predicts are disclosed on average. The median value (.180) is close to the mean value.

< INSERT TABLE 2 HERE >

A qualitative analysis of value drivers shows that the most disclosed value drivers are related to expertise (with a frequency of 82 total occurrences), human resources and research and development (66 descriptions each), production and talented human resources (61), and reliable services and products (60). These are closely followed by disclosures about production processes, reliable services and products and understanding of customer preferences. The least disclosed value drivers refer to an aggressive sales force, an annuity from add-on product or service, an annuity from upgrades, customer base, focus on follow-up products and services, and high-performance R&D (one description each over the three years).

The correlation matrixes in Table 3 show that there are no collinearity issues among independent variables.

< INSERT TABLE 3 HERE >

Value relevance analysis results

Table 4 illustrates the results of the model that has been used to assess the value relevance of the BM disclosure index. First, we have estimated the model without BM disclosure (equation (1)). Book value and earnings are both positively and significantly related to market-to-book value as expected. We then added the variable related to BM disclosure (equation (2)) to test Hp 1. Results show a non-

significant association between BM disclosure and market values. Thus, the quantified BM disclosure seems not to be value relevant. The coefficients of book value and earnings remain significant.

< INSERT TABLE 4 HERE >

Earnings persistence analysis results

Results of the model used to assess the association between BM disclosure and earnings persistence (Table 5) show that BM disclosure significantly interacts with earnings in all the models tested. This means that a change in BM disclosure quality is positively associated with the relationship between earnings at time t and earnings at time t+1, hence supporting Hp 2. Overall, these findings provide evidence of the capability of BM disclosure to provide useful information about how earnings are generated.

<INSERT TABLE 5 HERE >

ADDITIONAL ANALYSES

Alternative disclosure index

We have performed sensitivity analyses using an alternative measure for BM disclosure. Besides the outlined advantages of our methodology based on the BM QUANT taxonomy, as mentioned earlier, this approach also introduces some challenges. Thus, to improve the validity of the BM QUANT taxonomy instrument, we complement the above VD-based content analyses with an additional analysis based on the number of disclosed building blocks according to the well-known Business Model Canvas (BMC) (Osterwalder & Pigneur, 2010). The BMC has been widely adopted by managers and professionals and therefore represents a suitable frame of reference to function as an index for complementary analysis.

In contrast with the index used in the main study, this index does not consider the specific BM configurations of each company but applies the BMC framework (Osterwalder & Pigneur, 2010) to all the companies.

Osterwalder & Pigneur's (2010) framework represents the most comprehensive BM ontology. The purpose of an ontology is to define what the main components of a concept are and how the relationships among those elements are structured (Morecroft, 1994; Ushold and King, 1995). Hence, a BM ontology purports to define its components and the interrelations among those elements. Moreover, a BM ontology could help managers share their vision and understand the logic of value creation of a company with stakeholders.

The ontology developed by Osterwalder & Pigneur (2010) has been built on the basis of previous definitions of BM created by scholars in the field. Starting from the elements identified as BM components by the different authors, Osterwalder & Pigneur (2010) have selected all the items that are cited in at least two different contributions. The results of this review are nine domains that have been recurrently discussed by scholars: value proposition, target customers, customer relationship, distribution channels, key resources, key activities, partnerships, revenue model and cost structure. Each building block defines how a company addresses various aspects of the value-creation process.

The index based on the BM canvas is calculated as follows:

$$\text{BMC\_Index} = \frac{\sum_{i=0}^{n} BM\ canvas\ pillar_{it}}{9}$$

where BMC pillar $_{it}$ refers to the number of BMC elements covered by BMD for company i at time t and 9 is the number of building blocks that characterize the BM canvas framework (Osterwalder & Pigneur, 2010).

Although this analysis mainly serves a control purpose, in conjunction the two measures provide an accessible overview of the extent of disclosure versus the theorized disclosure expectations. Using

the BMC building blocks as content categories was also a means of enhancing the inter-rater reliability during the content analysis process, as suggested by Milne and Adler (1999) in reference to Krippendorff (2004).

Equations (2) and (3) have been re-estimated replacing BM_Disc, which is based on QUANT value drivers, with an index based on Osterwalder and Pigneur's BM Canvas elements, namely the BMCIndex. The following equations are tested:

$$MTB_{it} = \alpha + \beta_1\, 1/BV_{it} + \beta_2\, Inc_{it}/BV_{it} + \beta_3\, BMC\_Index_{it} + controls + \varepsilon \quad (5)$$

$$MTB_{it} = \alpha + \beta_1\, 1/BV_{it} + \beta_2\, Inc_{it}/BV_{it} + \beta_3\, BMC\_Index_{it} + \beta_4\, Loss + \beta_5\, Loss_{it} * Inc_{it}/BV_{it} + controls + \varepsilon \quad (6)$$

Results (Table 6) confirm that the coefficient related to BM disclosure is not significant. Like in the main analysis, book value and earnings are significantly associated with market values in all specifications.

We have also used this index to assess the relationship between BM disclosure and earnings persistence. Hence, we re-specify equation (4) as follows:

$$Earnings_{it+1} = \alpha + \beta_1\, Earnings_{it} + \beta_2\, BMC\_Index_{it} + \beta_3\, BMC\_Index*Earnings_{it} + \beta_4\, DIV_{it} + \beta_5\, DIV_{it} * Earnings_{it} + \beta_6\, Loss_{it} + \beta_7\, Loss_{it} * Earnings_{it} + year\ and\ industry\ fixed\ effects + \varepsilon \quad (7)$$

<INSERT TABLE 6 HERE >

Results (Table 7) show that BM disclosure is positively related with earnings persistence. Hence, these findings strengthen the evidence of a positive association between BM and earnings quality found in the main analysis, supporting the relationship predicted by Hp 2).

<INSERT TABLE 7 HERE >

Alternative models

We have conducted an analysis based on a number of alternative models which have historically been used in the accounting literature to assess the value relevance of information. First, we use a linear price-level model. This kind of model is commonly used and is based on Ohlson's (1995) valuation model. Following this approach, we express the value of a stock (P) as a linear function of the book value per share (BVPS), earnings per share (Earnings), and other information.

We test both our main BM disclosure index (BM_Disc) and the index based on BM Canvas (BMC_Index). The equation is the following:

$$P_{it} = \alpha + \beta_1 BVPS_{it} + \beta_2 Earnings_{it} + \beta_3 BM_{it} + controls + \varepsilon \quad (8)$$

where BM represents BM_Disc in the first model specification and BMC_Index in the second model specification.

We then employ a return model (Easton, 1999). In line with the literature, return is calculated as the difference between price at time t and price at time t-1 plus dividends in year t, scaled by price at time t-1 (Cazavan-Jeny and Jeanjean, 2006; Filip and Raffournier, 2010). Following previous studies, we estimate the following model:

$$Ret_{it} = \alpha + \beta_1 Earnings_{it}/P_{it-1} + \beta_2 \Delta Earnings_{it}/P_{it-1} + \beta_3 BM_{it} + controls + \varepsilon \quad (9)$$

Where:

$Ret_{it} = (P_{it} + Div_{it} - P_{it-1})/P_{it-1}$

$Earnings_{it}$ = earnings per share for company i at time t

BM represents BM_Disc in the first model specification and BMC_Index in the second model specification. Results of the tests (Table 8) confirm that BM disclosure is not value relevant,

<INSERT TABLE 8 HERE >

Use of market values at different time lags

Coherently with previous studies, we consider the impact of disclosure on market values at 3 months (Tsoligkas and Tsalavoutas, 2011; Carnevale and Mazzucca, 2014; Verbeteen et al., 2016) and 6 months (Lang et al., 2003; Nikolaos and Dimosthenis, 2009; Dimitopoulos et al., 2013; Baboukardos and Rimmel, 2016; Reverte, 2016) from the end of the fiscal year in order to consider time-lag effect between disclosure and use of the information by investors.

Hence, we have run the same analysis as in the main model with market-to-book value at 3 months and at 6 months from FY end. Untabulated results[1] confirm the insignificant relationship between BM disclosure and market values.

Discussion of sensitivity analyses

We have performed a battery of different analyses to investigate the value relevance of BM disclosure and its relationship with the earnings persistence. All the tests conducted reject Hp 1, which predicts that BM offers investors valuable information to assess a company. Results show that the interaction term between BM disclosure and earnings is always positive and significant. Thus, we have found evidence of a significant association between BM disclosure and the persistence of earnings as predicted by Hp 2.

[1] Results are available upon request.

DISCUSSION

Our findings show low levels of BM disclosure in the annual report despite the mandatory requirements. The low quantity and quality of BM disclosure recall previous studies that investigate mandatory non-financial disclosure in contexts where companies have high freedom of choice about what to communicate and how (Elzahar et al., 2015), making it mandatory disclosure in principle, but voluntary in nature. These results spur further reflections on the current state of BM reporting regulations and their purpose. In its current form, the UK regulation and EU directive do not indicate any specific structure or minimum content requirements regarding the mandatory BM sections. It is not even required to use the actual word 'business model' and despite the regulation, some companies still do not have a dedicated BM section in their annual reports. The fuzziness of requirements and lack of clear definitions may in due course leave the concept as a fad, much like, e.g., the case of Intellectual Capital Statements which suffered precisely this fate due to weak regulation (Nielsen et al., 2017a).

Moreover, many different definitions of what a BM is can be found in the literature (Massa et al., 2017), which may create misalignments between companies and investors related to varying conceptions of the BM and its core elements (see also DaSilva and Trkman, 2014). In light of this, we argue that standard-setters should be interested in developing more detailed guidelines which address BM reporting issues, i.e., provide a definition, a disclosure framework and guidelines regarding 'how to make it' and 'how to use it' for both preparers and users.

When observing the consequences of BM disclosure, significant results are found. While our results show that BM disclosure does not directly influence market values, we find BM is positively associated with earnings quality. The significant coefficient related to the interaction between BM disclosure and earnings indicates that a one-unit change in BM disclosure is positively related to the slope of future earnings on current earnings. Hence, the more extensive BM disclosure, the higher

the magnitude of the positive relationship between current and future earnings. Two considerations emerge from these results.

First, this result is in line with previous studies that find non-financial disclosures to enhance the value relevance of earnings by providing investors with supplementary information about how value is generated (Baboukardos & Rimmel, 2016; Reverte, 2016; Mechelli et al., 2017; Chou and Chang, 2020). In particular, our findings demonstrate that more extensive BM disclosure is associated with higher earnings persistence. These findings support the emphasis that both academics and regulators place on the BM as context-provider for all the other pieces of information disclosed in the annual report (Holland, 2004; FRC, 2014; Nielsen & Roslender, 2015; EC, 2017). In particular, the BM is seen as the 'link' between different inputs and the capability of a company to create profits (IIRC, 2013). In this regard, Stewart and Zhao (2000, p. 290) claim that the BM is 'a statement of how a firm will make money and sustain its profit stream over time'.

As such, the BM offers the context that allows investors to better understand where financial values come from, as it sheds light on the way different value drivers are combined to achieve and sustain a competitive advantage. This competitive advantage is the ultimate source of earnings, as it turns into financial outcomes (Zott & Amit, 2008; Leisenring et al., 2012; Van Ewjik & Arnold, 2014). Our results also support the strand of research that points out the strict link between BM and revenue models, identifying the latter as a key component of the former (see Linder & Cantrell, 2001; Petrovic et al., 2001; Osterwalder & Pigneur, 2010).

Second, our results suggest that investors do not value BM disclosure itself, but they use this information vehicle through the BM to assess financial numbers. Thus, information about the BM is not relevant when considered in isolation, but it needs to be integrated with financial outcomes, it has the capability to offer information that helps investors evaluate future earnings. This supports the view that information offered in 'isolated silos' is not useful for investors (Holland, 2004), who

benefit from the joint use of forward-looking information about business function and traditional financial measures, with the former kind of information acting as a leading indicator for future financial performance (Davern et al., 2019).

CONCLUSIONS

This study can be of interest for many stakeholders of corporate communication, ranging from academic scholars interested in the measurement of non-financial disclosure and BM disclosure to practitioners and standard-setters, who are involved in the ongoing non-financial disclosure regulation process and involved in producing non-financial information-sets.

The concept of the BM has gained a primary role in financial reporting developments in recent years. BM disclosure is the object of an ongoing regulation process which has introduced the requirement for companies to communicate their BM in the UK and also in the other countries of the European Union. The popularity of the BM concept is related to its capability to offer a simplified representation of the value creation process (Nielsen, 2010). Thus, the knowledge of a company's BM is supposed to provide users with a picture of how the different elements that contribute to creating value are connected. As such, the BM is able to offer a context for other types of information disclosed by a company, connecting the different parts of the annual report (Bukh, 2003; IIRC, 2013; FRC, 2014; EU, 2017).

The first contribution of this research is the application of a novel method to assess BM disclosure. Unlike previous studies on BM disclosure (e.g., Bini et al., 2016; Mechelli et al., 2017; Bini et al., 2019), the method used here is not based on a standardized list of items, but considers the particular BM configuration of the company being analyzed. Thanks to this method, it is possible to verify if companies disclose information about the value drivers that are predicted as the most relevant for each specific configuration (Nielsen et al., 2017b). Hence, the outcomes of this study provide useful

insights on the opportunity to use the approach based on the taxonomy developed by Taran et al. (2016) and Nielsen et al. (2017b) to measure BM disclosure. This analysis is complemented with an additional, more traditional analysis categorizing a firm's disclosure based on the nine building blocks of a BM canvas.

Second, the value relevance and the earnings persistence tests of BM disclosures contribute to understanding the effect that the inclusion of BM descriptions in the annual report has on decision-makers in financial markets. The analysis is also useful to assess whether such disclosures have an incremental value for investors. Our findings show that while capital markets do not (yet) directly value BM disclosure, it can, in its current form, offer useful information to assess the quality of earnings.

Read together, our results show that BM disclosure alone is not perceived as relevant by capital markets, but investors use it to assess financial performance, understand the quality of accruals and to predict future income streams. This recalls the aforementioned 'linkage principle' (FRC, 2014) and shows that non-financial information can be useful to investors to the extent to which it has the capability to complement financial information and provide context to accounting measures (Clarkson et al., 2004; Cormier and Magnan, 2007; Hussainey and Salama, 2010; Coram et al., 2011). In other words, financial and non-financial items are two halves of the same coin. The role of the BM can be considered parallel to the role of the knowledge narrative in the Intellectual Capital Statement (Mouritsen et al., 2003) that explains how knowledge resources are mobilized in interaction with one another to create "use value". In much the same manner, the BM, explained in a narrative fashion, provides the context for understanding how value is created and captured (Lund & Nielsen, 2014). This view also calls for the development of integrated forms of reporting, as advocated by the IIRC (2013).

This study only investigates companies based in the UK. This choice is related to the fact that UK was the first country to regulate BM disclosure. As mandatory requirements to communicate the BM have been introduced in every European country from 2018, future studies may focus on different countries. Cross-country comparisons can provide useful insights on the influence that cultural factors have on BM disclosure practices.

Future studies may also investigate how preparers and users of financial statements conceive the BM concept, the purpose associated to it and the opportunities and costs associated with its disclosure. To this aim, surveys and interviews with preparers and users of financial and non-financial statements could be conducted.

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Table 1. *Breakdown of analyzed companies by industry*

Industry	**No. of companies**
Chemicals and Pharmaceuticals	19
Food and Beverage	15
Software	14
Industrial Machinery	16
Electronics	11
Total	**75**

Table 2. *Descriptive statistics*

	Mean	Median	Percentile 25	Percentile 75	St. Dev.
MTB	3.577	2.856	1.926	4.702	3.289
1/BV	.027	.005	.002	.013	.099
Inc/BV	.125	.122	.049	.218	.327
Earnings (unscaled)	209,524.7	19,247	3,841.5	77,652	812,747.6
BM_Disc	.185	.180	.070	.280	.136
Leverage	.264	.217	.016	.408	.292
Profitability	.085	.089	.041	.131	.110
Beta	.725	.670	.46	1.03	.421
Loss	.124	0	0	0	.331
Div	.823	1	1	1	.383

Table 3. *Correlation matrixes*

a) Value relevance analysis

	MTBV	1/BV	Inc/BV	BM_Disc	Leverage	Profitability
1/BV	.026					
	(.700)					
Inc/BV	.532***	.033				
	(.000)	*(.625)*				
BM_Disc	.121*	-.140**	-.013			
	(.070)	*(.037)*	*(.850)*			
Leverage	.009	-.095	-.187***	.130*		
	(.899)	*(.161)*	*(.005)*	*(.054)*		
Profitability	.105	-.182***	.399***	.028	.086	
	(.120)	*(.006)*	*(.000)*	*(.683)*	*(.205)*	
Beta	.073	-.340***	.092	.067	.061	.127
	(.279)	*(.000)*	*(.172)*	*(.318)*	*(.368)*	*(.063)*

b) Earnings persistence analysis

	Earnings (t+1)	Earnings (t)	BM_Disc	DIV	Loss
Eearnings	.728***				
	(.000)				
BM_Disc	.231***	.190***			
	(.001)	*(.004)*			
DIV	.318***	.340***	.041		
	(.000)	*(.000)*	*(.545)*		

Loss	-.299***	-.425***	-.078	-.493***	
	(.000)	*(.000)*	*(.246)*	*(.000)*	
Size	.401***	.421***	.335***	.404***	-.175***
	(.000)	*(.000)*	*(.000)*	*(.000)*	*(.009)*

****; **; * denote significance at the .01, .05; .10 respectively*

Table 4. *Regression results for BM_Disc*

Dependent variable: MTB	(1)	(2)	(3)
Const	2.444***	2.556***	2.848***
	(0.633)	*(0.678)*	*(0.646)*
1/BV	14.813***	14.646***	8.245*
	(4.526)	*(4.553)*	*(4.328)*
Inc/BV	2.535***	2.546***	4.469***
	(0.546)	*(0.549)*	*(0.612)*
BM_Disc		-.683	-.154
		(1.461)	*(1.326)*
Leverage	5.159***	5.125***	2.953**
	(1.506)	*(1.512)*	*(1.426)*
ROA	-2.431	-2.448	-2.130
	(1.813)	*(1.818)*	*(1.840)*
Beta	-.690	-.671	-.842
	(0.585)	*(0.589)*	*(0.534)*
Loss			-.453
			(0.497)
Loss * Inc/BV			-7.485***
			(1.362)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Observations	216	216	216
F-value	5.85***	5.12***	8.14***
R-squared within	0.23	0.24	0.38
Mean VIF	1.20	1.18	1.51

****; ** denote significance at the .01, and .05 respectively*

Table 5. *Association between BM on earnings persistence*

Dependent variable: Eearnings(t+1)		(4)	
Const	.372**	.289*	2.693**
	(0.147)	*(0.159)*	*(1.410)*
Earnings(t)	.104	.712	.606
	(0.495)	*(0.602)*	*(0.601)*
BM_Disc	-.320	-.309	-.328
	(0.351)	*(0.348)*	*(0.346)*
BM_Disc*Earnings(t)	1.111**	1.078**	1.065**
	(0.433)	*(0.431)*	*(0.428)*
Div	.123	.174	.166
	(0.163)	*(0.171)*	*(0.169)*
Div*Earnings(t)	-.512	-1.047*	-.942
	(0.494)	*(0.584)*	*(0.583)*
Loss		.049	.057
		(0.116)	*(0.116)*

Loss*Earnings(t)		-.657	-.508
		(0.498)	*(0.504)*
Size			-.188*
			(0.110)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Observations	222	222	222
F-value	2.26**	2.21**	2.31**
R-squared (within)	0.10	0.13	0.14

***; * denote significance at the .05, and .10 levels respectively*

Table 6. *Value relevance analysis with BMC_Index*

Dependent variable: MTB	(5)	(6)
Const	2.671***	2.943***
	(0.678)	*(0.649)*
1/BV	14.672***	8.245*
	(4.531)	*(4.318)*
Inc/BV	2.567***	4.469***
	(0.548)	*(0.611)*
BMC_Index	-.899	-.478
	(0.960)	*(0.873)*
Leverage	5.121***	2.955**
	(1.507)	*(1.424)*
ROA	-2.513	-2.182
	(1.816)	*(1.841)*
Beta	-.665	-.832
	(0.586)	*(0.533)*
Loss		-.456
		(0.496)
Loss*Inc/BV		-7.436***
		(1.361)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	216	216
F-value	5.23***	8.18***
R-squared	0.24	0.38
Mean VIF	1.18	1.53

****; **; * denote significance at the .01; .05, and .10 levels respectively*

Table 7. *Earnings persistence analysis with BMC_Index*

Dependent variable: Earnings(t+1)		(7)	
Const	.426***	.363**	3.050**
	(0.146)	*(0.163)*	*(1.370)*
Earnings(t)	.155	.466	.331
	(0.466)	*(0.590)*	*(0.588)*
BMC_Index	-.343	-.294	-.332
	(0.225)	*(0.231)*	*(0.229)*
BMC_Index*Earnings(t)	1.189***	1.104***	1.133***
	(0.280)	*(0.293)*	*(0.290)*

Div	.116	.148	.138
	(0.156)	*(0.164)*	*(0.163)*
Div*Earnings(t)	-.757*	-1.003*	-.882
	(0.476)	*(0.567)*	*(0.564)*
Loss		.042	.050
		(0.113)	*(0.112)*
Loss*Earnings(t)		-.296	-.120
		(0.494)	*(0.497)*
Size			-.210**
			(0.106)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Observations	222	222	222
F-value	4.14***	3.32***	3.45***
R-squared (within)	0.17	0.18	0.20

****; **; * denote significance at the .01; .05, and .10 levels respectively*

Table 8. *Alternative models*

Dependent variable	*P*		*Ret*	
Const	4.713***	4.480***	.170***	.155**
	(1.670)	*(1.650)*	*(0.062)*	*(0.064)*
BVPS	1.257***	1.231***		
	(.385)	*(.382)*		
Earnings	2.685***	2.705***		
	(0.870)	*(0.864)*		
Earnings/P_{t-1}			.100	.141
			(.455)	*(.454)*
ΔEarnings/P_{t-1}			1.160***	1.156***
			(.245)	*(.246)*
BM_Disc	2.097		-.156	
	(2.330)		*(0.159)*	
BMC_Index		2.457		-.026
		(1.537)		*(0.118)*
Leverage	.430	.354	.063	.055
	(2.531)	*(2.508)*	*(0.079)*	*(0.079)*
ROA	1.028	1.284	.295	.271
	(3.380)	*(3.360)*	*(0.268)*	*(0.268)*
Beta	-.877	-.868	-.096*	.097*
	(0.941)	*(0.934)*	*(0.052)*	*(0.052)*
Loss	.425	.486		
	(0.804)	*(0.800)*		
Loss*Earnings	-1.253	-1.415		
	(1.125)	*(1.124)*		
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	216	216	216	216
F-value	3.34***	3.56***	37.05***	35.98***
R-squared (within)	0.20	0.22	0.09	0.08
Mean VIF	1.80	1.83	1.31	1.30

****; **; * denote significance at the .01; .05, and .10 levels respectively*