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Enterprise resource planning enabling segmental information reporting practices of UK-FTSE 100

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Abstract

The ERP impact on management accounting practices has been widely recognised as having a knowledge gap in relation to how it may facilitate Segmental Information Reporting following the International Financial Reporting Standard No. 8's (IFRS-8) management approach. This study contributes to filling this gap by investigating the joint effect of the ERP and IFRS-8 Post-Implementation Review (PIR) on dimensions: quality, quantity and the reporters' identity of FTSE-100 companies in the period 2013–2017. The study found that ERP is significantly and positively associated with the dimensions of segmental information reporting. The implications of this study extend research and the practices of segmental reporting on the importance of ERP in operationalising segmental reporting and in understanding variations.

Key words: ERP; IFRS-8; Segmental information reporting; FTSE-100; UK

JEL classification: M41, M49

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1. Introduction

The impact of the Enterprise Resource Planning (ERP) system on management accounting information reporting and practices has been widely examined (Rom and Rohde, 2007; Grabski *et al.*, 2011). Interplay between internal and external parties of stakeholders that is documented through various forms of interaction between internal and external reporting, is facilitated by the issuance of International Financial Reporting Standard No. 8 (IFRS-8) "Operating

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Segments" management approach (International Accounting Standards Board (IASB), 2006a; Cohen and Karatzimas, 2013; Nichols *et al*., 2013). Ironically, both ERP and segmental information reporting[1] have been examined independently within the disciplines of information systems (Grabski *et al*., 2011) and financial reporting (Nichols *et al*., 2013), while overlooking interdisciplinary examination. The ERP value creation has been well documented in the context of management accounting (Rom and Rohde, 2007) and/or information systems (Grabski *et al*., 2011), and has focused on the quality of information (Booth *et al*., 2000), strategy (HassabElnaby *et al*., 2012), control (Quattrone and Hopper, 2005), decision-making (Rom and Rohde, 2006), performance (Hunton *et al*., 2003) and reporting (Spathis and Ananiadis, 2005). By the same token, in relation to ERP, changes in segmental information reporting practices that are shaped by the quality dimension (items), quantity (segments) and reporting choice (reporters' identity), either pre- and/or post- a managerial approach that is based on IFRS-8 issuance, have all been given reasonable attention (André *et al*., 2016; Aboud and Roberts, 2018). Understanding the association of the ERP with segmental information reporting has, to date, been given scant attention. This has shaped the main key research objective, which relies on investigation of the value creation of ERP in enabling segmental information reporting practices (quality, quantity and choice dimensions) following IFRS-8's management approach Post-Implementation Review. Specifically, the main research question of this paper sets out to investigate the impact that ERP may have on the dimensions of segmental information reporting (quality, quantity and the reporters' identity). This has been motivated by the three related puzzles that are illustrated in the current section.

First, there is an inconclusive understanding of the impact of the quality dimension of segmental information reporting after the introduction of the management approach-centric IFRS-8 (Nichols *et al*., 2013). This dimension underlines items-based business activity reporting (André *et al*., 2016). Reporting on increases and decreases in the number of reported items of segmental information reporting, following IFRS-8, are two streams that are underlined in the existing literature on segmental information reporting (see Nichols *et al*., 2013). Again, allocation and problems relating to the related inter-transactions, remain a key challenge that undermines the desire to report business performance across segments (Crawford *et al*., 2012) and this is a key driver of ERP adoption (Hyvönen, 2003). Product/ service, customer and geographically–based entity-wide segment information, collection and analysis, are key benefits that are gained by ERP adopters throughout the world (Scapens and Jazayeri, 2003; Spathis and Ananiadis, 2005). To what extent are ERP-embedded best practices that may enable mandatory and voluntary

[1]Segmental information reporting is an accounting practice to report firm's operating segments that considered as accompanying disclosures to the firm's financial statements (IASB, 2006a).

segmental information reporting published by companies listed in the FTSE-100 being neglected?

Second, the management approach-centric IFRS-8 PIR has offered other inconclusive information in relation to the quantity dimension of segmental information reporting. The latter underlines segment-based business activity reporting. In this sense, a set of studies has documented the positive impact that IFRS-8 has had on the reported segments (Nichols *et al*., 2012; Leung and Verriest, 2015), whereas others have shown a more conservative viewpoint (Di Carlo and Lucchese, 2016). Fragmented information systems' problems remain a key challenge that hinders a desire to report segmental performance (Crawford *et al*., 2012), but that was a key driver of ERP adoption (Booth *et al*., 2000). Fully integrated, timely and flexible reporting are the key benefits that are gained from ERP adoptions (Rom and Rohde, 2007; Grabski *et al*., 2011). This causes neglect in accounting for the examining role of ERP-embedded best practices that enable reporting on the business segments that are published by those companies that are listed in the FTSE-100.

Third, management approach-centric segmental information reporting underlines the major change behind introducing IFRS-8, which called for investigation of the interaction between financial and management accounting (Nichols *et al*., 2013). This approach has granted the Chief Operating Decision Maker (CODM) a focal role in deciding what should be reported under the IFRS-8 post-implementation review (PIR) for a particular financial year (Crawford *et al*., 2012). More specifically, André *et al*. (2016) have reported that more managerial preferences can be exercised over the quality than over the quantity dimension. This means that the CODM's identity is key to understanding the variations across segmental information reporting practices. Flexible, friendly and efficient reporting for internal users are, however, the best practices that distinguish the ERP from other means (Booth *et al*., 2000; Spathis, 2006). These competencies therefore probe the role and identity of the CODM, within an ERP environment and that influence the segmental information reporting practices undertaken by the FTSE-100 companies following IFRS-8 PIR.

The above-mentioned puzzles have motivated this research to attempt to uncover the role of ERP in enabling the segmental information reporting that is published by FTSE-100 listed companies. The potential contribution has various implications. First, it contributes to the existing literature, in terms of the research gap outlined in relation to the proprietary cost of segmental information reporting preparation, and contradictory evidence about the variation in the quality and quantity dimensions of segmental information reporting practices. This signals a call for further investigation to explore the interconnection between financial and management accounting by the use of the IFRS-8 management approach through the role of ERP (Nichols *et al*., 2013). Second, it may assist regulators and practitioners in discovering how ERP may contribute to IFRS implementations (Crawford *et al*., 2012). Third,

it updates stakeholders with insights drawn from the FTSE-100 (Lang and Sul, 2014). The premise of this paper is that it will advance our understanding of the ERP's role in enabling segmental information reporting and it will address the above-mentioned contradictions within the existing literature. Practically, this paper contributes to practitioners and society, in a general sense, through uncovering the value creation that may be exploited, and that results from the adoption of ERP in terms of segmental information reporting. Whilst this paper responds to pertinent research calls (Nichols *et al.*, 2013), as well as IFRS-8 PIR, by finding that the implications of the new segmental reporting standard had not been the subject of a great deal of empirical research (IASB, 2013), it extends prior studies through problematizing the impact ERP may have on segmental information reporting practices. It does so by developing well-established statistical models that aim to examine the impact of ERP on: (i) the quality dimension (mandatory and voluntary segmental information reporting); (ii) the quantity dimension (segments); (iii) reporters' identities (CODMs); and (iv) segmental information reporting variations among sectors.

We conclude that the ERP has played a vital role in the operationalisation of IFRS-8, and then in facilitating changes in the segmental information reporting dimensions that are published by the FTSE 100 companies. This was significantly and positively associated with both the quality and quantity dimensions of segmental information reporting; and it is argued that ERP has enabled further disclosures following its adoption. In terms of company characteristics, the company's size and leverage were significantly and positively associated with mandatory segmental information reporting, while, company size, leverage, profitability and sector, were positively and significantly associated with the voluntary segmental information reporting. The rest of this paper is structured as follows: Section 2 is dedicated to the theoretical background and to hypothesis development in relation to ERP and IFRS-8, whereas Section 3 outlines the research design. Section 4 articulates the research findings and discussions, and these are followed by the key conclusions, implications, limitations and the suggestions for future research, which occupy Section 5, whereas the appendices and references are found in Sections (6) and (7), respectively.

2. Theoretical background and hypothesis development

This paper contributes to bridging an outlined research gap by examining the impact of ERP on segmental information reporting that is published by the FTSE-100. It does so through mobilising three interrelated concepts, namely, IFRS-8, proprietary cost theory and integrated information systems, into a framework that can advance our understanding of the outlined research gap. This informs the selection and review process of prior studies in developing a research hypothesis about the potential interrelations between the ERP and segmental information reporting that are demonstrated in the consequent sections.

2.1. Theoretical background

The introduction of this subsection provides an overview about the history of segmental information reporting standards and highlights the key differences that exist between them. Table 1 illustrates a summary of segmental information reporting standards in a chronological order[2].

The FASB issued a segmental information reporting standard with a new approach in 1997, and it was entitled "Disclosure about Segments of an Enterprise and Related Information". It was called FAS-131, which suspended FAS-14. The main and dramatic change between the two standards that FAS-131 adopted was an internal approach in order to provide segmental information reporting. Specifically, it requires an entity to define its segments, based on a management approach. In other words, this standard requires an entity to disclose its segmental information reporting in accordance with the management organisation of the entity when making operating decisions, assessing performance as well as being consistent with the way that the entity is organised internally (FASB, 1997). Internationally, the IASB issued its Exposure Draft-8 2006. The objective of this Exposure Draft is to replace IAS 14R. In this Exposure Draft, the IASB (i) considered the academic research findings that are relative to the FAS-131 management approach; (ii) it also received comment letters from shareholders; (iii) and met a number of key shareholders (i.e., investors and analysts) who support the disclosure of the segmental information that is based on the management approach of FAS-131 (IASB, 2006a). Accordingly, the IASB decided to adopt the management approach of FAS-131 around the globe through IFRS-8, which was issued in 2006. Due to this, the segmental information is already available to management for the internal decision-making process. Tthe IASB believed that one of the benefits of the IFRS-8 management approach is that it reduces the costs of disclosing disaggregated segmental information reporting (IASB, 2006b). In this sense, it is argued that the "greater disaggregation leads to more, finer, information being available to investors. More detailed disclosure reduces information asymmetry, and, arguably, increases the precision of the information in the financial statements" (Chen *et al*., 2015, p.1018). This argument is aligned with the IASB perceptions of the IFRS-8 management approach, in that an entity provides a higher level of quality, quantity and disaggregated segmental information to the public through the eyes of the management. In sum, IFRS-8 was focused on a purely management approach. This brought the alignment between segmental information reporting and organisational

[2]Aforementioned key abbreviations are used as follows: ASC refers to Accounting Standard Committee; ED refers to Exposure Draft; FAS refers to Financial Accounting Standard; FASB refers to the Financial Accounting Standards Board; IAS refers to the International Accounting Standard; IASC refers to the International Accounting Standards Committee; and SSAP refers to Statement of Standard Accounting Practice.

Table 1
Segmental reporting standards

Year issued	Standard abbreviation/ "Title"	Issuing body/ Application	Key objective(s)/ Key difference(s)
1976	FAS-14/ "Financial Reporting for Segments of a Business Enterprise"	FASB/ USA	Requires identifying segments as "components of an enterprise engaged in providing a product or service or a group of related (similar) products or services to customers for a company profit" (FASB, 1976, para 10)
1981	IAS-14/ "Reporting Financial Information by Segment"	IASC/ International	Its requirements were similar to FAS-14 and SSAP-25
1990	SSAP-25/ "Segmental Reporting"	ASC/ UK	Its main objective is to enhance the understandability of the users of financial statements about the entity's performance and to assist them in their decision-making process through the Segmental Information Reporting (ASC, 1990)
1997	FAS-131/ "Disclosure about Segments of an Enterprise and Related Information"	FASB/ USA	This standard requires an entity to disclose its Segmental Information Reporting in accordance with the management organization of the entity when making operating decisions, assessing performance as well as being consistent with how the entity is organized internally (FASB, 1997)
1997	IAS-14R/ "Segment Reporting"	IASC/ International	Requires an entity to disclose its primary and secondary segments, based on its assessment of the dominant sources of risk and returns (IASC, 1997). In this sense, prior studies have identified this approach as being a two-tier approach to identifying segments (Mardini et al., 2012; Nichols *et al.*, 2013)
2006	ED-8/ "Operating Segments"	IASB/ International	The objective of this ED is to replace IAS 14R
2006	IFRS-8/ "Operating Segments"	IASB/ International	As a result of ED-8, the IASB decided to adopt the management approach of FAS-131 to the whole globe through the IFRS-8

(continued)

Table 1 (continued)

Year issued	Standard abbreviation/ "Title"	Issuing body/ Application	Key objective(s)/ Key difference(s)
2012	IFRS-8-PIR/ "Operating Segments"	IASB/ International	The IASB adopt, for the first time, a review of its standards after the effective date (IASB, 2013). The aim of this review is to define the extent of IFRS 8 functionality as intended (IASB, 2013)

structure into one pool, and thus it places no restrictions on segment format, as long as the operating segments are based on the company's organisational structure (Nichols *et al*., 2013).

IFRS-8 requires managers to report the internal structure and the measures that they use internally to evaluate performance and to allocate resources, and outcomes that should provide users with segmental information through the eyes of the management and be informed by the ways in which the company is organised and functions. Users report information on two aspects of segmental activities, namely, segments, and the number of items per segment. The reported segments reflect the quantity of segmental information reporting and define the components of an organisation that: (i) engages in business activities (products and services, geographical area), thus earning revenue and incurring expenses; (ii) are regularly reviewed by management, which is represented by the firm's CODM, and (iii) where discrete financial information is available. By aligning segmental information reporting with the internal organisation, the management approach gives managers (CODMs) the leeway and freedom to report segment information (Crawford *et al*., 2012). These managers' choices of segmental information reporting are influenced by proprietary costs (Bens *et al*., 2018). This rationalises proprietary cost theory as the theoretical choice through which to understand a phenomenon that relates to why companies report, or do not report, segmental information to the market (Verrecchia, 1990). As a theoretical lens, it is adopted to senstise quality (the number of items), quantity (the number of segments) and managers' choices, in reporting segmental information in the sense of ERP, as will subsequently be discussed.

The proprietary cost theory is widely recognised in the advancing of an understanding of segmental information reporting (Aboud and Roberts, 2018; Katselas and Rosov, 2018; Leung and Verriest, 2019). Competition and preparation costs are the two cornerstones that shape the behaviour of segmental information reporting. The competition, first, concerns adverse and harmful actions that may be taken by competitors, and upon which companies may limit their segmental information reporting when proprietary costs arise from competitors. Prior studies found support for proprietary cost to be

important determinants of managers' decisions to disclose customer information (Ellis *et al.*, 2012) and voluntary segmental information reporting (Prencipe, 2004). In complement to this, mandatory segmental information reporting is suggested as a strategy through which to overcome these limitations, in order to fulfil the demands of users and analysts through the exercise of the power that may be imposed over quality rather than quantity, through the managerial choices that are granted by IFRS-8 (André *et al.*, 2016). Furthermore, Lang and Sul (2014) added a further dimension to proprietary cost theory that is concerned with the notion that sector concentration and the intensity of the sector competition have an impact on the level of segmental information reporting, concluding that high competition in a sector may not assure a low level of segmental information reporting, as the sector concentration and intensity also play important roles. Although the segmental information reporting preparation cost is the second dimension of proprietary cost theory (Verrecchia, 1990), it has been underdeveloped. This cost was an obstacle to the slow pace of IFRS, in general (Burnett *et al.*, 2010), and to segmental information reporting, in particular, due to technical issues relating to preparation and auditing (Prencipe, 2004). Examining such determinants concerns ERP, as an advanced technology and to the extent to which it influences the proprietary costs of preparing segmental information reporting, has overlooked in prior studies.

In terms of the ERP[3], this is an information system that consists of different components from advanced applications that underpin best practices and that are designed around structured cross-organisational functions (Davenport, 1998). This architecture underlines four key characteristics of ERP, namely, (Scapens and Jazayeri, 2003, p.225): (i) integration - interconnecting organisational functions into a central database, (ii) standardisation - best practice-based organisational rules, (iii) centralisation of real-time access, and (iv) routinisation - the computerisation of daily accounting routines. In Scapens and Jazayeri, (2003, p.201), *it is argued that the characteristics of [ERP] (specifically, its integration, standardization, routinization and centralization) opened up certain opportunities and facilitated changes which were already taking place within the company*. Nevertheless, ERP has been reported to be a powerful tool in supporting the key functions of (management) accounting (Rom and Rohde, 2007). The ERP's role in bringing alignment between internal and external reporting is unexplored. It is thus concluded that the extent to which ERP facilitates the managerial choices of segmental information reporting is under-researched, and the discussion of the potential

[3]This is a "commercial software package[s] that promises the seamless integration of all the information flowing through a company - financial and accounting information, human resource information, supply chain information, customer information" (Davenport, 1998, p. 121). These modules offer different applications that support various organisational tasks.

implications that ERP may have for the proprietary costs of preparing segmental information reporting should be promoted. The development of this argument is illustrated in the subsequent section.

2.2. Hypothesis development

The preceding theoretical background to segmental information reporting and ERP draws our attention to reviewing the contribution of prior studies on the hypothetical relationship between both constructs. Generally, ERP enhances the interaction throughout an organization, but its benefits are difficult to quantify (Ugrin, 2009). The significant and positive impact of ERP on the quality of management accounting information has been widely recognised in prior studies that have been conducted in different contexts. This is exemplified by the improvements in the integration, accuracy and timely reporting (Rom and Rohde, 2007; Grabski *et al*., 2011) that are facilitated by powerful information processing (Rikhardsson and Kræmmergaard, 2006). Integrated information delivered by ERP was reported not only across business segments in the contexts of Australia (Booth *et al*., 2000), Denmark (Dechow and Mouritsen, 2005) and Greece (Spathis and Ananiadis, 2005), but also in relation to the integration between financial and non-financial information (Scapens and Jazayeri, 2003). Information accuracy and timely (i.e., reducing the time lag) reporting is another implication that is facilitated by ERP adoption and that is reported in the contexts of the USA (Brazel and Dang, 2008), Canada (Sánchez-Rodríguez & Spraakman 2012), Greece (Spathis, 2006) and Iran (Abbasi *et al*., 2014). Arguably, these information qualities that are associated with ERP adoptions have had an impact on financial statements (Booth *et al*., 2000) and will be further discussed.

2.2.1. ERP-the quality dimension of the segmental information reporting relationship

The ERP characteristics turn our attention to the potential implication for mandatory segmental information reporting in terms of solving technical problems that are encountered by the implementers of IFRS-8 (Nichols *et al*., 2013; Di Carlo and Lucchese, 2016). Information integration that is achieved through ERP adoption has resulted in having timely and consolidated/integrated financial reports across organisations, and across segments, in different contexts (Dechow and Mouritsen, 2005). This quality may enrich mandatory segmental information reporting in the provision of assets, liabilities, expenses, revenues, and then the profit for each segment, as well as the profit from associates and joint ventures. For instance, allocating overhead costs and administrative expenses to business centres was one of the major problems in reporting segmental performance that have been overcome through ERP adoption (Hyvönen, 2003). Whilst these conclusions endorse

the positive implication that ERP has had on information quality, neither have they specified items of financial information, in general, nor segmental items, in particular, that were impacted upon by ERPs adoption.

The status quo of information systems at a company may limit managerial capabilities to report mandatory segmental information reporting. For instance, examining segmental information reporting quality following IFRS-8 showed an inconclusive understanding that ranges from being significant to having no impact (Nichols *et al*., 2013). One set of the published research found that the amount of information reported for each segment has declined (Nichols *et al*., 2012; Franzen and Weißenberger, 2015). Similarly, Di Carlo and Lucchese (2016) found no significant changes that related to reporting under IAS-14R or IFRS-8 in the Italian context. By contrast, an increase in the extent of the reported items of segmental information reporting was notable (Kang and Gray, 2013; Aboud and Roberts, 2018). These variations may be influenced by companies' capabilities in relation to segmental information reporting preparation, which are due to costly and disruptive changes in information systems (Burnett *et al*., 2010). Considering this inconclusive evidence leads us to hypothesise upon the potential impact that ERP may have on the mandatory segmental information reporting (quality dimension), as follows:

> H1a: ERP has a positive and significant impact on the number of reported mandatory items, quality dimension (Model 1)

ERP standardisation was a notable characteristic that offered best practices in information processing, analysis and reporting. For budgetary reporting, ERP shows a positive impact for the capital budget process, in terms of flexibility, preparation, time and accuracy, in the context of Australia (Jackling and Spraakman, 2006), Greece (Spathis and Constantinides, 2004), and Iran (Abbasi *et al*., 2014). Being advanced by ERP, companies will be able to report voluntary segmental information relating to capital expenditure on planning and equipment. Best practice based ERP has improved in different contexts, for instance, in forecasting (Spathis and Ananiadis, 2005) and performance measurements (Sánchez-Rodríguez & Spraakman 2012). Such a quality may not only lend support to analysis, but also to reporting investment activities and employees per segment as part of the voluntary segmental information reporting items (Jackling and Spraakman, 2006). In other words, ERP's qualities may enable companies to overcome voluntary segmental information reporting problems that have limited managerial capabilities to implement IFRS-8 (Burnett *et al*., 2010; Di Carlo and Lucchese, 2016). For instance, Wagner *et al*. (2011) argue that ERP allows modifications that meet particular entanglements of users and technology. Whilst these conclusions uncover the potential of ERP for solving the problematics that relate to the implementation of IFRS-8, the impact of ERP on voluntary segmental information reporting has been given no attention, leading us to hypothesise that:

H1b: ERP has a positive and significant impact on the number of reported voluntary items, quality dimension (Model 2)

2.2.2. The ERP-quantity dimension of the segmental information reporting relationship

Both integration and standardisation are key characteristics of ERPs that have driven companies' capabilities for information systems that relate to analysis and reporting (Rom and Rohde, 2007; Grabski *et al.*, 2011). Whilst integration connects business segments, such as functions, departments, subsidiaries and/or regions, into a central database (Booth *et al.*, 2000; Dechow and Mouritsen, 2005), standardisations offers an array of the best practices that are embedded in ERP (Scapens and Jazayeri, 2003). These characteristics, among others, motivate managers to adopt ERP in order to perform a profitability analysis at the segment/ product level in the contexts of Greece (Spathis and Constantinides, 2004), Finland (Hyvönen, 2003), and Australia (Booth *et al.*, 2000). With standardisation, ERP introduces different sets of best practices for the allocation of overhead costs and administrative expenses to a business as cost centres (Hyvönen, 2003), and this may overcome one of the obstacles to reporting segmental performance. This was recently endorsed by the conclusion that the extent of managerial information system use influences the costing system, leading to improvements that affect customer satisfaction and company profitability (Maiga *et al.*, 2013), and all of them interact in order to have a positive impact on financial performance in the US context (Maiga *et al.*, 2014). As a complement to this, integration has demonstrated the positive impact that ERP has had on managerial changes, including reporting on new segments, the integration of functions among departments, offering effective monitoring and the exploitation of segments' assets and revenue-expenditure flow in different contexts (Spathis and Ananiadis, 2005; Spathis, 2006; Abbasi *et al.*, 2014). Whilst this enables ERP adopters to exercise control at both the general (entity-wide), and individual (account-level) levels (Morris, 2011), such capabilities are attributed to charts of accounts that have increased both information availability and consistency, thus empowering performance measures across units and products (Sánchez-Rodríguez & Spraakman 2012).

The ERP's implications are that its capabilities may overcome the limitations in reporting on the Quantity Dimension of segmental information reporting, too. This was previously exemplified by a positive association between information system use and internal and external corporate reporting (Xiao *et al.*, 1997), and also, more recently (Abrokwah *et al.*, 2015). However, the quantity dimension of segmental information reporting should not be isolated from the technical issues of the quality dimension (mandatory and voluntary segmental information reporting) (André *et al.*, 2016), in which information

systems may play a role (Burnett *et al*., 2010). The aforementioned advantages of ERP standardisation and integration may explain changes in the reported segments post IFRS-8's implementation after 2009 (Nichols *et al*., 2012). An increase in the number of reportable segments has been widely documented, thus enabling comparability and enhanced insight-analysis in the context of Europe, in general (Leung and Verriest, 2015), the UK (Aleksanyan and Danbolt, 2015), Germany (Franzen and Weißenberger, 2015), and Australia (Kang and Gray, 2013). In sum, this broadness was demonstrated in terms of the number of business segments and customers' locations-based geographical information (Crawford *et al*., 2012), and this may be facilitated by ERP adoption. It is argued that the predictive accuracy of IFRS-8 entity-wide geographic sales significantly outperforms consolidated sales in forecasting consolidated sales 1 year forward (Cereola *et al*., 2018). Consequently, based on the above facts, the relationship between ERP and the quantity dimension of segmental information reporting has not been empirically examined, leading us to hypothesise that:

H2: ERP has a positive and significant impact on the number of segments reported in relation to the segmental information reporting, quantity dimension (Model 3)

2.2.3. ERP-reporters' identity relationship

Through centralisation, ERP has introduced an array of benefits to users, including decision-makers, in terms of friendly-reporting (Booth *et al*., 2000) and information control (Quattrone and Hopper, 2005). These implications were ranked firstly, for the managerial level; secondly, for the operational level; and, thirdly for the IT infrastructure level (Spathis and Ananiadis, 2005). Improving timely access, decision-making processes and maintaining competition showed a positive association with ERP adoption, offering better support for planning and decision-making, higher quality reporting, and organisational flexibility and efficiency in different contexts (Booth *et al*., 2000; Spathis, 2006; Abbasi *et al*., 2014). More specifically, ERP enables strategic decisions (Rom and Rohde, 2006), and this offers a competitive advantage over non-ERP adopters (Hunton *et al*., 2003; Spathis and Ananiadis, 2005). This was furthered by the notably positive impact that ERP has on making more spaces for strategic reporting (Malinić and Todorović, 2012), and it has a positive impact when companies employ a prospecting business strategy (HassabElnaby *et al*., 2012).

This may explain the variations across quantity that have been attributed to managerial choice, by means of which managers solve proprietary costs by decreasing the quantity or quality of information (André *et al*., 2016). For instance, Dorantes *et al*. (2013, p.1428) found a positive association between ERP and forecasting properties, concluding that ERP has *the potential for [ERP] to allow managers to manipulate accounting data more easily in order to*

meet reported forecasts. Such authorities have been exploited by the CODM, since recent evidence indicates that more power may be exercised over quality than over quantity (André *et al*., 2016). More specifically, the CODM provides a lower level of segmental information reporting for material that is adverse to competition (André *et al*., 2016; Aboud and Roberts, 2018). Whilst prior studies criticise IFRS 8's failure to force companies with higher proprietary costs to increase segmental information reporting in relation to either quality and/or quantity (Aboud and Roberts, 2018), examining companies' capabilities for information systems in shaping CODM choices has been overlooked, and this leads us to hypothesise that:

H3: The level of segmental reporting differs depending upon the identity of the CODM

2.2.4. ERP-segmental information reporting across sectors' relationships

Understanding the hypothetical relationship between ERPs adopters' rate and segmental information reporting practices' (quality and quantity) variations across sectors, is discussed. The potential impact of the context (sector) on practice variations has repeatedly been put forward as an area that needs research, and it is argued that giving considerations to industry specifics may offer a better understanding of accounting variations (Messner, 2015). For instance, ERP adoptions by Greek companies were driven by their needs in an increasingly competitive environment in order that they could survive and/or succeed (Spathis and Constantinides, 2004). In the UK context, Ammar (2017), it was noticed that variations in management accounting practices that are due to ERP mobilisation have been used to address different managerial functions, including planning and decision-making, across multiple cases operating in the UK context. Similarly, Goumas *et al*. (2018) reported that ERP demonstrated various implications, both within and across different manufacturing categories, both for reducing uncertainty and for improving operations and managerial decision-making.

Changes to segmental information reporting following IFRS 8 implementation varies between one sector and another (Crawford *et al*., 2012). Variations have been reported across different contexts, and it is still unknown whether this variation is a matter of competition and/or preparation costs (Nichols *et al*., 2013; Lang and Sul, 2014). This variation still exists, according to a recent study which found that the amount of reported segmental information (e.g., the number of segments and items) differs across sectors (Mardini *et al*., 2018). These variations have brought consistency and comparability, through the use of IFRS-8, into question (Nichols *et al*., 2013), and Leung and Verriest (2015) add that segment disaggregation results in greater cross-sectional divergence in geographical segment reporting. Variations were further endorsed by the conclusion that the concentration and intensity of the sector competition

have an impact on the level of disclosure, and the sector concentration is affected by many factors, such as innovation, market growth, risks and sector alliances (Lang and Sul, 2014). Although competitive cost, as a determinant of segmental information reporting, has been given fair attention (Prencipe, 2004), the effect of ERP (preparation costs) in addressing IFRS-8's requirements is under-researched, leading us to hypothesise that:

H4a: ERP has a positive and significant impact on the quality dimension of segmental information reporting (mandatory items) variations across sectors

H4b: ERP has a positive and significant impact on the quality dimension of segmental information reporting (voluntary items) variations across sectors

By contrast, Kajüter and Nienhaus (2017) have reported the superior value relevance of segmental information reporting, according to IFRS-8, if compared to IAS 14, and this leads to the suggestion that the adoption of IFRS-8 has also reduced information asymmetry across the German listed companies they found. Along this line, Cereola *et al.* (2018) attributed improvements in the predictive accuracy of geographical sales to high and moderate enforcement, (see also Katselas and Rosov, 2018). Another interpretation is that the conversion complexity of IFRS requires far-reaching changes in companies' information systems, and such change may be costly and disruptive (Burnett *et al.*, 2010). This interpretation is aligned with earlier evidence that found that information systems use increased information asymmetry (Xiao *et al.*, 1997). Considering this inconclusiveness, this gap leads us to hypothesise on the potential impact that ERP may have on the quantity dimension of segmental information reporting across sectors, as follows:

H4c: ERP has a positive and significant impact on the quantity dimension of segmental information reporting (segments) variations across sectors

3. 3. Research design

Understanding the ERP-segmental information reporting relationship is this research's purpose, and this shapes the characteristics of the paper's research design. It underlines the research approach, sampling, data collection and analysis, in order to investigate the joint implications that ERP and IFRS-8 PIR may have on segmental information reporting practices undertaken within the FTSE-100 context.

3.1. Research approach, sampling and data collection

Market based research choice is adopted as a research strategy through which to understand the quality and quantity levels and the reporters' identities following ERP, IFRS-8 PIR and segmental information reporting. The latter is

investigated in the context of the FTSE-100 for three reasons. First, although the FTSE-100 is one of the most efficient, active, and largest of the world's capital markets, exploring the impact of ERP-IFRS 8 PIR interplay upon it has not been given attention, if compared to the US, German, Australian and Italian markets (Nichols *et al.*, 2013). Second, although the impact of IFRS-8 PIR on segmental information reporting that has been undertaken in relation to the FTSE-100 has been given attention, and the role of the ERP may affect the moderation of this impact, and this has generally remained both underdeveloped and unexplored (Nichols *et al.*, 2013). Third, examining large companies that are listed on the FTSE-100 offers a great opportunity, since these companies operate along a variety of business lines, and offer a variety of products or services. All these motivations draw our attention to utilising the FTSE-100 as a market-based research choice.

The FTSE-100 is the basis of the research sample, and the data collection processes aim to examine the impact of ERP on segmental information reporting practices following IFRS-8 PIR. The segmental information reporting practices extend to include the levels of the quality and quantity dimensions, as well as the reporters' identities, over a 5-year period (2013–2017) for FTSE-100 UK listed companies. To address the questions being dealt with in this paper, the sample process was initiated with all of the listed companies of the FTSE-100. However, since segmental information reporting is a dependent variable, the initial selection was subjected to two further filtration processes. The first process concerns the reporters of IFRS-8 PIR within the FTSE-100 over a 5-year period (2013–2017). It takes into consideration only those companies reporting segmental information in their annual reports. For instance, the FTSE-100 companies that sell/produce only one product, or that provide one service and operate locally, may not report any segmental information in their annual reports. These companies are considered to be 'non-reporters', as they do not provide segmental information across the sample period, and thus a score of zero has been assigned. Such companies have been excluded, because they do not fulfil the needs of the research inquiry. Another elimination includes companies that have data missing across the sample period. Panel A of Table 2 summarises the sampling process in relation to the IFRS-8 PIR reporters, thus arriving at the final sample of 85; a total of 425 company-year observations was used. Panel B of Table 2 illustrates the spread of companies across the different sectors (Financial Services, Manufacturing and Mining Resources and Services)[4] that

[4]The FTSE-100 includes 8 sectors (Oil and Gas, Financials, Consumer Goods, Basic Materials, Consumer Services, Health Care, Industrials, Telecommunications, Utilities and Technology). Some of these sectors include only a few listed companies. For the purposes of the current study, the companies that have thus been included come from three major sectors; namely, Financial Services, Manufacturing and Mining Resources, and Services.

Table 2
Sampling (FTSE-100)

Panel A: Sampling process employed	
Population	100
Less:	
Single segment companies	7
Missing data across the target period	8
Final Sample	85
No. of Observations (5 years)	425
Panel B: Final Sample per Sector	
Company Sector	
Financial Services	15
Manufacturing and Mining Resources	34
Services	36
Final Sample	85
No. of Observations (5 years)	425

were utilised in the final sample, and which provide the ground from which to collect data about ERP adopters.

The second process concerns ERP adoption by the final sample from the FTSE-100 companies over a 5-year period (2013–2017). ERP adopters were collected from different sources, including: (i) companies' websites; (ii) vendors or suppliers, including SAP, Oracle and others; (iii) consultants, including Capgemini, Deloitte, LogicaCMG, and (iv) blog announcements and interviews, including Bloomberg, ComputerWeekly.com and Gartner (Brazel and Dang, 2008; Morris, 2011). In pursuing data and sources' triangulation, companies and consultants' reports, documentation, videos and other information were key sources of ERP data (Lukka and Modell, 2010). This resulted in a sample of companies, which were drawn from different sectors of the UK-FTSE-100, and which have adopted ERP and implemented the Finance module, at least sufficiently to achieve information integration (Granlund and Malmi, 2002). However, the sample of ERP adopters and companies listed on the FTSE-100 has been subjected to further filtration processes. The first criterion for elimination has forced out companies that have not shown any evidence of segmental information reporting. The second criterion for exclusion has removed reporters who adopted and/or implemented an ERP after 2013, and the latter was considered a reference point for IFRS-8 PIR. The scoring process in relation to the ERP adopters and non-adopters is discussed in the following section.

3.2. Disclosure index approach

In order to measure the extent of segmental information reporting (SIR) items, the current study prepared a disclosure index checklist. The checklist is

based on the requirements of the IFRS-8 (18 items). Moreover, the disclosure index captures any SIR items that were disclosed by FTSE-100 companies on a voluntary basis; five items were supplied. The checklist thus included 23 items. This study used an un-weighted disclosure index approach that scores 1 if the item were disclosed in the annual report, and 0 otherwise (Cooke and Wallace, 1989). Companies were not penalized for failing to disclose some items, such as the inter-segmental sales, based on inter-segmental sales and the profit of joint ventures. Due to this, these items did not apply to the operations of a specific firm. In such a case, these items were classified as 'not-applicable' -- without a value --rather than 'not-disclosed', with a value of 0. For companies that had 'not-applicable' segmental items, the total number of mandatory segmental information reporting (m) items was thus adjusted downwards. This approach has been employed by the pillars of disclosure index studies (Cooke and Wallace, 1989; Owusu-Ansah, 1998) as it leads to a more accurate measurement, since all of the companies are not identical in terms of their operations. The company-specific total was thus used to calculate a company-specific disclosure score. Accordingly, two disclosure indices were developed, which are (i) mandatory segmental information reporting (M-SIR), and (ii) voluntary segmental information reporting (V-SIR).

$$\mathrm{M-SIR} = \sum_{i=1}^{\mathrm{m}} msdi/\mathrm{m} \tag{1}$$

$$\mathrm{V-SIR} = \sum_{i=1}^{\mathrm{v}} vsdi/\mathrm{v} \tag{2}$$

where $msdi$ and $vsdi = 1$, if a segmental information item is provided, and 0 otherwise, for segmental information that was provided in the sample period (5 years). Moreover, the disclosure index also captures the number of segments reported, and the CODM's identity. Specifically, the number of segments reported and the identity of the CODM, were counted from the annual reports.

3.3. Regression models

Prior studies of the regression models have measured many different variables when determining company characteristics. For instance, Darus et al. (2012) and Lopes and Rodrigues (2008) determine the *company size* as market capitalization, total assets or total sales. This study uses the total assets' measure as a proxy for the company's size, in order to allow the data that is normally distributed as the company size to be transferred to log outputs. The ratio of total debt to common equity represents the *Leverage* (Al-Shammari *et al*., 2008). The current ratio demonstrates the *liquidity* (Talha *et al*., 2008;

Enqvist *et al*., 2014). The return on equity represents the *Profitability* (Ağca and Önder, 2007; Hossain, 2007; Samaha *et al*., 2012). The current study employed three dummy variables: (i) the status of the company's *ERP adoption*, (ii) *industry membership (SEC* hereafter*),* and (iii) *cross listing (CRL* hereafter*)*. Specifically, if the company used ERP they were given 1, and 0 otherwise (Hunton *et al*., 2003), while the SEC was given 1 if the company were a financial company, a value of 2 if the company were in manufacturing and mining, and a value of 3 if the company were in the service sector. For the CRL, if the company is listed on the FTSE only, it was given 0, and 1 in a case where it is listed on the FTSE and, additionally, on the international stock markets (i.e., New York Stock Exchange, Johannesburg Stock Exchange, Hong Kong Stock Exchange). To the best of the researchers' knowledge, the third dummy variable's impact (relation) on SIR quality and quantity have not been investigated in prior studies. The investigation of the CRL status of the firm, and its impact on the level of SIR quality and quantity, thus adds value to the knowledge in the literature on SIR, in general. The results' section provides some descriptive statistics about the variables that are included in the current study.

In order to attain the current study's objectives and its hypotheses, the researchers have developed three multiple regression models. Model 1 investigates the relationship between M-SIR and ERP, and the company's characteristics, while Model 2 examines the association between V-SIR, ERP and the same independent variables. Finally, Model 3 observes the association between the number of segments (quantity) (NoS) and ERP and the company's characteristics.

$$M - SIR = a + B1ERP + B2Size + B3LEV + B4LIQ + B5PRO + B6SEC + B7CRL + eit \quad (3)$$

$$V - SIR = a + B1ERP + B2Size + B3LEV + B4LIQ + B5PRO + B6SEC + B7CRL + eit \quad (4)$$

$$NoS = a + B1ERP + B2Size + B3LEV + B4LIQ + B5PRO + B6SEC + B7CRL + eit \quad (5)$$

where: M – SIR: Mandatory Segmental Information Reporting (disclosure index items); V – SIR: Voluntary Segmental Information Reporting (disclosure index items); NoS: Number of Segments (reported in the annual reports); ERP: Status of the firm's Enterprise Resource Planning adoption (dummy variable); SIZE: Company Size (Total Assets); LEV: Leverage (Total Debt to Common Equity Ratio); LIQ: Liquidity (Current Ratio); PRO: Profitability (Return on

Table 3
Study variables' descriptive statistics (N = 425)

Var.	Min.	Max.	Mean	SD
M-SIR	0.00	0.94	0.66	0.16
V-SIR	0.00	0.80	0.25	0.22
NoS	0	11	4.44	1.90
LOGSize	2.68	6.43	4.12	0.79
LEV	1.71	409.19	49.43	37.54
LIQ	0.14	12.31	1.47	1.23
PRO	−216.54	264.23	16.75	33.15
Dummy Var.				
N = 85	ERP 32		No ERP 52	
	Financial 15		M&M 34	Services 36
	Cross listed 38		Not Cross listed 47	

This table illustrates the descriptive statistics of the variables included in the study. M-SIR refers to Mandatory Segmental Information Reporting; V-SIR refers to Voluntary Segmental information Reporting; NoS refer to Number of Segments reported; LOGSize refer to log transformation of Size; LEV refers to Leverage; LIQ refers to Liquidity; and PRO refers to Profitability. M&M refers to Manufacturing and Mining.

Equity Ratio); SEC: Firm's Industry Membership (dummy variable); CRL: Status of the firm's cross listing (dummy variable).

This study employs further analysis to enhance the findings and their interpretations. Specifically, the current study employs correlation analysis, Chi-Square tests, One-way ANOVA tests, cross-tabulations, and compares the means of M-SIR to the identity of the CODM.

4. Results and Discussion

The outcomes of the investigation of the joint impact of ERP and IFRS-8 PIR implementation on the SIR dimensions of: (i) quality, (ii) quantity, and (iii) reporter's identity (CODM), that are published by FTSE-100 companies are all articulated here. This commences with descriptive results that are followed by results obtained from the theoretically informed models, and there is discussion in the subsequent sections.

4.1. Descriptive and correlation results

First, the descriptive results of minimum, maximum, mean and S.D for both independent and dependent variables are presented in Table 3.

This Table shows the variables in relation to the per-year-sample of 85 FTSE-100 firms, 32 sampled companies are ERP adopters, whereas 52 companies are not ERP adopters. In addition, the Table shows the industry membership of

the sample from the FTSE-100, 15 financial, 34 manufacturing and mining, and 36 from the services sector. 38 companies are listed on more than 1 stock exchange, and 47 companies are listed on the FTSE only. An analysis of Table 3 indicates that the FTSE-100 companies, on average, disclosed 0.66 of the M-SIR that is included in the disclosure index. The Table also reveals that the FTSE-100 firms had a debt to common equity ratio of 49.43 percent, on average. On the other hand, the liquidity was an average of the current ratio of 1.47, which is high. Interrelations across these variables are further explored through the use of a correlation analysis that is reported in Table 4.

Second, Table 4 provides the results of the Spearman Correlation Test between the variables that are investigated in the present research. An analysis of this Table reveals that the majority of the correlation coefficients were small; and, although a few sizeable values were uncovered, most were under 0.351. An inspection of some significant correlations reveals that the M-SIR measure was positively and significantly associated with NoS, ERP and CRL. On the other hand, it was negatively associated with the LEV, LIQ, PRO and SEC, but this was not significant. Moreover, the V-SIR measure was positively and significantly associated with ERP, LOGSize, LEV, PRO, SEC and CRL, while it was negatively associated with the LIQ. In terms of the quantity of the SIR (NoS), its measure was positively and significantly associated with ERP and CRL, whereas it is not significant in regard to LOGSize, LEV and LIQ. The remaining significant correlations among the independent variables suggest that the presence of multi-collinearity will need to be investigated in the regression analysis[5]. In testing the proposed hypotheses, more advanced analysis has been applied, using multiple regression analysis, as articulated in the subsequent section.

4.2. Modelling analysis

This more advanced analysis examines associations between the adoption of ERP and SIR following IFRS-8 PIR. This was performed through the three regression models that are mentioned above, and the findings of these models are reported and discussed below:

4.2.1. ERP and SIR-quality dimension

The impact of ERP on the quality dimension of the SIR that has been practiced by the FTSE-100 firms since IFRS-8 PIR, is examined through Models (1) and (2). This dimension focuses on mandatory and voluntary segmental information reporting practices, and the results of this investigation

[5]A multi-collinearity diagnostic test was performed in order to avoid any statistical errors, the test documented that multi-collinearity was not present in the current study. Specifically, the Variance Inflation Factor (VIF) values were less than 2; the details of VIF are presented in Tables 5 and 6.

Table 4
Correlations analysis

Var.	M-SIR	V-SIR	NoS	ERP	LOGSize	LEV	LIQ	PRO	SEC	CRL
M-SIR	1.0	0.054	0.110**	0.194***	0.066	−0.015	−0.019	−0.037	−0.018	0.033***
V-SIR		1.0	0.029	0.163***	0.166***	0.072*	−0.024	−0.128**	0.131***	0.056*
NoS			1.0	0.170***	0.066	0.078	0.094	−0.099	−0.120	0.113***
ERP				1.0	0.111**	0.012	−0.029	−0.083*	−0.216***	0.158***
LOGSize					1.0	0.211***	0.122**	0.209***	0.330***	0.379***
LEV						1.0	−0.138**	0.056	−0.045	0.351***
LIQ							1.0	−0.118**	−0.250***	−0.063
PRO								1.0	0.110**	0.117
SEC									1.0	0.183***
CRL										1.0

This table represents the correlation test (Spearman) between dependent and independent variables. *Refers to 10 percent significance level; **Refers to 5 percent significance level; ***Refers to 1 percent significance level. SEC refers to Sector and CRL refers to Cross Listing.

Table 5
Regression analysis and segmental items disclosed (quality dimension)

Regression analysis model 1 and 2 (M-SIR and V-SIR)					
Var.	Model 1 (M-SIR)	*p*-Value	Model 2 (V-SIR)	*p*-Value	VIF
Intercept	8.458 (8.521)	0.001***	5.453 (3.255)	0.003***	–
ERP	3.114 (1.684)	0.039**	3.707 (2.881)	0.000***	1.08
LOGSize	2.756 (0.420)	0.061*	3.457 (2.620)	0.002***	1.98
LEV	−1.351 (−1.321)	0.000***	−2.258 (−3.120)	0.000***	1.13
LIQ	−0.011 (−1.498)	0.271	0.014 (0.467)	0.254	1.09
PRO	−0.002 (−0.849)	0.294	0.007 (2.756)	0.000***	1.04
SEC	−0.009 (−0.499)	0.114	0.035 (1.756)	0.084*	1.38
CRL	0.004 (0.290)	0.025**	0.074 (0.259)	0.062*	1.57
Adjusted R^2	0.633	–	0.678	–	–
F-Statistics	3.567	0.072*	9.357	0.000***	–
Hypothesis Status	H1a (Accepted)		H1b (Accepted)		–

This table represent the regression analysis of the association among the three models. *Refers to 10 percent significance level; **Refers to 5 percent significance level; ***Refers to 1 percent significance level.

are presented in Table 5. This Table is followed by a discussion of the implications of these results in relation to prior studies.

First, in reference to Table 5, Model 1 investigated the association between ERP and M-SIR, as well as company characteristics. The results of the examination using this model conclude that M-SIR is significantly and positively associated with ERP, LOGSize (coefficients of 3.114, 2.756 respectively), while there is a significant (at 1 percent), but negative, association with LEV (coefficient −1.351). While the CRL shows a significant (at 5 percent) positive association with M-SIR, this means that the CRL companies from the FTSE-100 are more likely to publish further M-SIR, if compared to their counterparts in non-CRL companies. The remaining characteristics (LIQ, PRO and SEC) showed no significant relationship with the M-SIR variable. More specifically, the model interprets 0.633 of M-SIR. This supports H1a, and we conclude that the mandated segmental information (the quantity dimension) of SIR was facilitated by ERP adoption. Second, Table 5 outlines the results that arise from testing Model (2), which observes the association between V-SIR, ERP and company attributes. The results of Model (2) are slightly different to those reported in Model 1; specifically, the V-SIR is positively and significantly associated with ERP (and this supports H1b), LOGSize, (surpassingly) LEV, PRO (although the coefficients showed a negative sign), SEC and CRL, which all had p-values of less than 0.01, except SEC and CRL, at 10 percent. Model 2 demonstrates a slightly higher proportion of disclosure than Model 1; specifically, it has an adjusted *R*2 of 0.678. This supports H1b, and we conclude that the V-SIR was facilitated by ERP adoption.

Table 6
Regression analysis and reported operating segments (quantity dimension)

Regression analysis model 3 (NoS)			
Var.	Model 3 (NoS)	*p*-Value	VIF
Intercept	5.956 (3.151)	0.000***	-
ERP	3.723 (3.312)	0.000***	1.08
LOGSize	2.189 (1.075)	0.063*	1.98
LEV	1.651 (1.429)	0.095*	1.13
LIQ	0.214 (2.674)	0.004***	1.09
PRO	0.004 (0.810)	0.281	1.04
SEC	−0.014 (−.078)	0.124	1.38
CRL	0.155 (0.228)	0.001***	1.57
Adjusted R^2	0.556	–	–
F-Statistics	4.957	0.001***	–
Hypothesis Status	H2 (Accepted)		–

This table represent the regression analysis of the association among the three models. *Refers to 10 percent significance level; **Refers to 5 percent significance level; ***Refers to 1 percent significance level.

The overall insight achieved through the use of Models (1) and (2) advances our understanding about how ERP enables the quality (M-V) dimension of SIR. This supports earlier research, which reported an increasing trend in relation to both M-SIR and V-SIR in FTSE-100 companies (Mardini and Ammar, 2019). This may be due to the best practices of cost allocation (Hyvönen, 2003) and budgeting (Jackling and Spraakman, 2006) that are offered by ERP. The findings of this study extend prior research, as outlined in Section (2), value creation and implications of ERP for the proprietary costs of preparing SIR. More specifically, notable changes in both M-SIR and V-SIR reinforce the conclusions that reported ERP to be a facilitator of reporting quality (Hyvönen, 2003) and explains the business motivations of the FTSE-100 companies in pursuing ERP to overcome budgetary obstacles (Jackling and Spraakman, 2006). In sum, this study advances our understanding through exposing ERP's value creation, specifically, in relation to the quality dimension of SIR.

4.2.2. ERP and SIR-quantity dimension

The impact of ERP on the quantity dimension of segmental information that is practiced by the FTSE-100 companies following IFRS-8 PIR, is examined through Model (3). This dimension focuses on the reported segments, and the results of this investigation are presented in Table 6, which is followed by a discussion of the implications that are raised as a result of prior studies.

Table 6 shows the results achieved through examining the associations between ERP, NoS (reported segments) and company characteristics. The

analysis shows that NoS had a positive significant relationship with ERP, LOG size, LEV, LIQ and CLR: coefficients were 3.723, 2.189, 0.214, 1.651 and 0.155, respectively, with significant p-values that varied among these variables. Interestingly, NoS is significantly and positively associated with CLR, at a 1 percent significance level, and this leads us to conclude that the CRL companies of the FTSE-100 are willing to publish NoS, if compared to their counterparts in non-CRL companies. In terms of ERP, H2 is supported, concluding that the quantity dimension of SIR (reported segments) was facilitated by ERP adoption. However, the analysis found that the PRO and SEC have no significant relationship to NoS. In general, this model seems to be a good fit, since it explains a significant proportion of NoS, with an adjusted $R2$ of 0.556.

The major insights achieved with this model advance our understanding of ERPs' role in terms of financial reporting. This insight explains the link between internal (management accounting) and external (financial accounting) parties through SIR's quantity dimensions (Cohen and Karatzimas, 2013). Specifically, it explains why the trend in relation to reported segments published by FTSE-100 companies has generally increased in NoS (Mardini and Ammar, 2019). This may be ascribed to the value creation achieved through ERP's characteristics, and this may explain: (i) the motivations of FTSE-100 companies in pursuing ERP (Ugrin, 2009), and (ii) an increasing trend in the number of reported segments globally (Kang and Gray, 2013; Aleksanyan and Danbolt, 2015). This study advances our understanding through exposing the value creation of ERP, specifically in relation to the quantitative dimension of SIR that is represented by the number of segments reported in FTSE-100 companies' annual reports.

4.2.3. SIR reporters' identities

The role of ERP in enabling SIR reporters' identities for segmental information by the FTSE-100, following IFRS-8 PIR, is discussed here. The results of this investigation are presented in Table 7.

From this Table, we conclude that the identity of the CODM affects the level of segmental disclosures. Specifically, firms that identify their CODM as being the EC provide the highest level of SIR (73 percent), followed by BoD & CEO (71.3 percent), and BoD (66.5 percent). H3 is thus accepted, in that the level of SIR differs according to the identity of the CODM. Beyond these figures, the ERP adopters (a total of 32 per year) mainly identify their CODM to be the EC, BoD and CEO (15, 8 and 7 from 32, respectively), while some ERP adopters (2 of 32) did not identify their CODM. Indeed, some firms changed their identity from year-to-year, but the majority of the ERP adopters identify the same CODM over the 5-year period, with minor variations. Specifically, one of the two NP firms identified their CODM for the first time as the CEO in

Table 7
CODM identity and level of segmental information reporting (N = 425)

CODM identity	No. of observations	Mean level of SIR (%)	Rank (by Mean)	SD
NP	36	41.2	7	0.171
MGT	55	56.3	6	0.121
CEO	70	60.0	5	0.183
OC	10	62.5	4	0.064
EC	108	73.0	1	0.171
BoD	130	67.5	3	0.132
BoD & CEO	16	71.3	2	0.091
Hypothesis Status	H3 (Accepted)			

This table illustrates the CODM identity of FTSE-100. NP refers to Not Provided; MGT refers to Management; CEO refers to Chief Executive Officer; OC refers to Operating Committee; EC refers to Executive Committee; BoD refers to Board of Directors.

2014, while two firms changed their CODM's identity to the BoD, from the CEO, in 2016. On the other hand, no changes were made to the CODM's identity in 2017.

Enabling CODM to report segmental information may be attributed to the value creation that is offered through ERP's characteristics (Scapens and Jazayeri, 2003). In other words, this value creation may explain: (i) the motivations of FTSE-100 companies for pursuing ERP, especially in relation to integration (Booth *et al.*, 2000); (ii) forecasting properties (Dorantes *et al.*, 2013), and (iii) power and flexibility, since the CODM is being offered a solution to proprietary costs through the manipulation of the SIR dimensions (André *et al.*, 2016). This conclusion not only reinforces prior studies that reported ERP to be a competitive tool (HassabElnaby *et al.*, 2012), but also elaborates on this understanding through exposing the value creation of ERP for the CODM of FTSE-100 UK firms.

4.2.4. Variations across sectors

The joint impact of ERP and IFRS-8 PIR on the quality and quantity dimensions of SIR across the FTSE-100 sectors, is discussed here. The results of this investigation are presented in Table 8, and this is followed by a discussion on the implications for the results of prior studies, as well as for the theoretical framework that has been outlined.

To test H4a, H4b and H4c, and to discover whether SIR differs statistically across industry types when using the three models, a one-way analysis of variance (ANOVA) and a chi-square test were employed. Results supported H4b and H4c, but rejected H4a, concluding that the reported segments and V-SIR vary across sectors, while M-SIR did not vary. This means that the level of M-SIR is unaffected by the sector and its context. This is an expected result,

Table 8
One-way ANOVA and chi-square tests

Model	*F*-Value	χ^2	Hypothesis status
M-SIR	1.562	3.662	H4a (Rejected)
V-SIR	6.334***	7.214***	H4b (Accepted)
NoS	3.850***	5.271***	H4c (Accepted)

***Refers to significant level at 1 percent.

since the M-SIR required by IFRS-8 does not discriminate amongst the sectors. Table 8 indicates that the level of NoS and V-SIR were statistically different among sectors (at 1 percent). The majority of the differences related to the financial services sector, in which NoS and V-SIR were frequently reported. On the other hand, differences between the services and manufacturing sectors were insignificant.

The overall insight gained from this test advances our understanding beyond the variations in SIR. This endorses an earlier research review that concluded that V-SIR and the number of segments vary from one context to another (Nichols *et al*., 2013). This study adds a valuable insight: that this variation may be advanced to ERP adoption. Specifically, this finding reinforces prior studies' conclusions that the different components of ERP are utilised to address different managerial functions and purposes across cases relating to companies operating in the UK context (Ammar, 2017). Furthermore, this responds to calls to give attention to examining the different kinds of industry specifics and their effects on accounting (Messner, 2015). The implications of ERP may explain the variations in the SIR(quality and quantity) dimensions across sectors (Leung and Verriest, 2015), thus lending support to Lang and Sul (2014), by assuring that there is a medium to high level of disclosure, since the sector concentration and intensity play an important role in relation to the level of SIR, even though FTSE-100 companies have a high level of sector competition.

5. Conclusions, limitations and future research

The key insights drawn from the ERP-Segmental Information Reporting interplay, as a unit of analysis, are articulated in this section. The implications of such findings are also further developed in the sense of the existing literature, both in relation to practitioners and IFRS setters. Generally, this study concludes that changes in the segmental information reporting practices of the FTSE-100 are the outcomes of IFRS-8 PIR, facilitated by ERP adoption in the following dimensions:

First, the quality dimension of segmental information reporting has also been influenced, following IFRS-8 PIR's operationalisation and ERP's

implementation. The mandatory segmental information reporting of the FTSE-100, following IFRS-8 PIR, was positively and significantly influenced by ERP's adoption. These notable changes, especially in regard to the Entity-Wide-Disclosures that are required by IFRS-8, can be attributed to the standardisation that offers best practices in costing, performance measures and flexible reporting. These key qualities may overcome obstacles in reporting on segmental items. As a complement to this, ERP has delivered a similar contribution, marking a significant and positive impact on voluntary segmental information reporting. These notable changes are found in capital expenditure, non-current assets and investment activities, and they showed a sizeable improvement following IFRS-8 PIR, which may be assisted by the preconfigured best practices in ERP. The voluntary segmental information reporting, which varies across the sectors of the FTSE-100 companies, gives rise to the (non-)existence of ERP and the way it is used to encourage such variations. More specifically, differences were significant between the financial sector, on the one hand, and both the manufacturing and mining and services sectors, on the other. This extends prior studies by exposing the value creation of ERP, and it sensitises the inconclusive understanding of the quality dimension of segmental information reporting.

Second, the quantity dimension of segmental information reporting has been changed following IFRS-8 PIR's operationalisation and ERP's adoption. On one hand, we conclude that ERP has facilitated the operationalisation process of IFRS-8 PIR, thus taking the number of segments reported by the FTSE-100 to higher levels (Spathis, 2006). More specifically, ERP has had a positive and significant impact on the reported segments over the 5-year period (2013–2017) following IFRS-8 PIR (Bugeja *et al*., 2015). This may be ascribed to ERP's best practice in relation to flexible reporting, which is a key quality in overcoming the obstacles to segmental information reporting across segments. This value creation may explain both the motivations of these FTSE-100 companies in pursuing ERP, and an increasing trend in the reported segments that are found in different contexts. This extends the findings of prior studies by uncovering the value creation of ERP and developing a sensitised understanding of the quantity dimension of the segmental information reporting that varies from one sector to another, thus shedding light on industry specifications (Kajüter and Nienhaus, 2017).

Third, there were notable changes in the CODM's identity, and this is the person(s) who is (are) involved in segmental information reporting. Introducing IFRS-8 PIR minimises the CODM's confusion about what needs to be reported, both internally and externally. Following ERP's adoption, the CODM's role was clearly delegated from a higher level, e.g., an Executive Committee and/or a BoD, to lower management levels, such as the CEO and/or management in general. In this sense, ERP is widely recognised to be a friendly reporting system allowing users (i.e., the CODM) to customise information reporting in a way that meets the outlines of the higher

management levels. Specifically, having timely access to a single central database (integration), and benefitting from standardisation that offers the best practices that are embedded, has relaxed the identity of the CODM. This delegation within ERP is not without restrictions. Rather, hierarchical levels of controls are another feature of ERP through which segmental information sensitivity and the adverse action of competitors may be controlled. The influence of the CODM, through ERP, on segmental information reporting practices, may explain both the power exercised (André *et al.*, 2016) and the manipulation of reporting (Dorantes *et al.*, 2013).

Finally, the tests in relation to the segmental information reporting differences across sectors show that the level of mandatory segmental information reporting is unaffected by the sector and its context; the majority of the differences are related to the financial services sector, in which NoS and voluntary segmental information reporting were frequently reported. This important finding suggests that the sector concentration and intensity play important roles on the level of segmental information reporting disclosure in FTSE-100 firms (Lang and Sul, 2014).

The importance of the above-mentioned conclusions is built on three fundamentals that address the theoretical and practical implications for the existing literature, for practitioners and for IFRS setters. *First*, it was drawn from an efficient market (the FTSE-100) that consists of companies that play a significant role across business environments worldwide. *Second*, it drew the attention of non-ERP adopters to thinking about, and evaluating, the implications of ERP, not only in facilitating segmental information reporting, but also in controlling information sensitivity and the adverse action of competitors. More specifically, the key insight for the CODMs of the FTSE-100 companies, those who make decisions on the content of segmental information reporting, is that they should glean valuable insights into how segment-related investors perceive the information which their companies publish, and which is then capitalised into the company's performance and value. *Third*, this study may draw the attention of IFRS setters to thinking about the implications of integrated information systems in restructuring mandatory segmental information reporting and voluntary segmental information reporting. More specifically, the IASB may need to explore how the ERP perceives the information that is provided under a new accounting standard, such as IFRS-8. *Finally*, this study's findings respond to research calls, specifically to variations in segmental information reporting, referring such matters not only to the operational context, but also bringing the role of ERP to light (Nichols *et al.*, 2013). It contributes to the existing literature on segmental information reporting by providing evidence of ERP's impact on segmental information reporting and its dimensions.

Some limitations were seen in relation to this research. For instance, the disclosure index method used involved some elements of subjectivity in relation to the items that were mandated by IFRS-8 on segmental information

reporting, although the paper adopted reliability and validity tests to reduce this element as much as possible. Moreover, other factors, that are beyond IFRS-8 PIR, may have influenced changes in segmental disclosure practices, but these are not considered here. This therefore motivates calls for further research to be carried out to explore the impact of ERP on segmental information reporting following IFRS-8 PIR. Such a report should include not only different contexts, but also an exploration of how the CODM assesses the adverse action of competitors before publishing segmental information reporting. This extends to exploring the influence of the CODM's personnel characteristics on segmental information reporting through utilising different research approaches, such as qualitative methods, including the use of case studies that are supported by interviews.

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Appendix

Disclosure index checklist

IFRS 8 Mandatory Disclosures for Operating Segments (if reviewed by the CODM)
Profit
Assets
Liabilities
Revenue (external)
Depreciation & amortization
Other non-cash expenses
Reconciliation to consolidated accounts
Revenue (internal)
Basis of inter-segment pricing
Profit from associates and joint ventures
Basis of measurement
Interest revenue
Interest expense
Income tax expense
Factors used to identify the entity's segments
Entity-Wide (major customers)
Entity-Wide (products and services)
Entity-Wide (geographic information)
Voluntary Disclosures
Number of Employees by Segment
Capital Expenditure on plant and equipment
Intangible Assets by Segment
Non-Current Assets
Investment Activities