

Enterprise systems, business process management and UK-management accounting practices

Cross-sectional case studies

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Abstract

Purpose – This paper aims to address the extant and arguable role of enterprise systems (ES) in relation to management accounting practices (MAPs) through an inclusion relative neglect account of business process management (BPM). This is also extended to draw out an analytical framework to advance our understanding of how BPM mediate ES-MAPs interplay.

Design/methodology/approach – A cross-sectional case study was adopted as a research strategy with which to collect data about the ES-BPM-MAPs interplay as a unit of analysis. The latter, in the first stage, was examined across (89) mini-case studies operating in the UK context through reports and documentations collected from cases' websites, vendors and consultants of information systems. Drawn insights from cross-sectional analysis and contributions made by prior studies are blended together to inform the second stage that outlines an analytical framework for ES-BPM-MAPs interplay.

Findings – Different ES are mobilised to address different orientations of BPMs and being used for different managerial functions and purposes. Different patterns of ES-BPM-MAPs interplay are identified across (89) UK-case studies and the BPM is a fulcrum understanding. These patterns are centred around three key BPM including customer, logistics and control processes and all oriented by a continuum of an organisation intention focus on control, understanding and strategising. Both processes and orientations explain ES development and MAPs evolution processes. Standardisation, integration and intelligence are key characteristics sought through ES mobilisations. By complementary, information provision, analytics and simulation are three sophisticated ways of using MA information facilitated by ES characteristics.

Research limitations/implications – Dynamic processes of MAPs change over time and are beyond the reach of this study. Such approach requires full access to case studies. BPM is fulcrum understanding of MAPs change and/or stability in relation to ES implementation including other components.

Practical implications – Findings and analytical framework could be used as a base for establishing the best approach in adopting ES to fully exploit the potential of future ES applications as well as to avoid organisations pitfalls of implementations. Organisations are advised to understand their existing business processes, characteristics of MA information would be achieved first upon which decision of ES components selection and implementation could be outlined.

Originality/value – The indirect interplay between ES and MAPs through business processes is rarely examined. By the inclusion of BPM and using cross-sectional case studies, this research contributes to the

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existing shortcomings of ES-MAPs interplay by broadening the picture and proposing an analytical framework. The latter advances our understanding by focusing on attributes of ES-BPM-MAPs upon which informal changes in the use of MAPs are recognised.

Keywords Enterprise systems, Organizational change, ERP, Business process management, Management accounting practices

Paper type Research paper

1. Introduction

The existing literature on enterprise systems (ES)/enterprise resource planning (ERP[1]) systems' impact on management accounting practices (MAPs) have offered inconclusive evidence (see Rom and Rohde, 2007; Granlund, 2011; Grabski *et al.*, 2011; Arnold, 2006). The role of the ERP, whether as the driver (Quattrone and Hopper, 2001) or facilitator of organisational change including MAPs (Scapens and Jazayeri, 2003), enabling sophisticated (Spathis and Constantinides, 2004) or supporting traditional MAPs (Sánchez-Rodríguez and Spraakman, 2012), enabling strategic views (Davenport and Brooks, 2004; Fahy and Lynch, 1999) or sustaining an operational viewpoint (Hunton *et al.*, 2003), is associated (Davenport *et al.*, 2004) or disassociated from the re-engineering of organisational business processes (BPs) (Hyvönen, 2003) has all been vague and still subject to debate. This inconsistency and lack of any theoretical explanation of how ERP-MAPs interplay became the key research questions that have motivated this study.

These inadequate conclusions relating to ERP-MAPs' interplay are revealed by two streams of research recognised within this literature, namely, breadth and depth research. The stream of breadth comes from survey-based research (SBR) and concludes that ERP is a key driver of management accounting change in four areas, namely, characteristics of accounting information, performance management (PM) and control, decision-making process and cost management (Hyvönen, 2003; Sánchez-Rodríguez and Spraakman, 2012; Spathis and Ananiadis, 2005; Spathis and Constantinides, 2003, 2004). The stream of depth is from case-based research (CBR). It is the alternative means for an approach used in the prior literature that considers the role of ERP as a facilitator with moderate impact, if not merely as maintaining the MAPs in-use (Granlund and Malmi, 2002; Scapens and Jazayeri, 2003). Ironically, there is also an unclear understanding of ERP-MAPs' interplay within and across these streams. Furthermore, two literature review studies conducted by Granlund (2011) and Rom and Rohde (2007) also emphasise inconclusive understanding, and they have argued that too much of this research has failed to produce a clear understanding of the ERP-MAPs' relationship; it is thus still at a relatively foundational stage (Arnold, 2006; Sutton, 2006).

This underdeveloped ERP-MAPs' interplay has mobilised several of the motivations for this paper to re-examine it in a different way. *First*, the moderate impact that ERP has had on MAPs was a result of examinations that focused extensively on direct relationship (Granlund and Malmi, 2002). It is argued that the focus during the implementation of the system is not on the technical aspects so much as it is related to organisational and BP issues (Rikhardsson and Kræmmergaard, 2006). Indirect ERP-MAPs interplay through changes in business process management (BPM) is reported in the field of management accounting research (Hyvönen, 2003; Scapens and Jazayeri, 2003) but has been relatively neglected exception of this (Sánchez-Rodríguez and Spraakman, 2012) which showed limitations of its own. Although the role of BPM has resulted in a considerable amount of work in the accounting and information systems' literatures, somewhat surprisingly, comparatively little attention has been given to it in the management accounting research journals (Grabski *et al.*, 2011). By definition, BPM is a way to manage:

[...] a sequential group of events or activities, which performed together in series (or occasionally in parallel), produce an output which contributes to achieving a significant part of the company's mission statement (Gunasekaran *et al.*, 2000, p. 271).

While MAPs existed to underpin these organisational functions and activities of planning, controlling and decision-making through information provision (Drury, 2015), these activities are not isolated from changes in BPM, transforming from the functional to the cross-functional, which are underpinned by ERP (Rikhardsson and Kræmmergaard, 2006). Overlooking the organisational context, including BPM, from which MAPs cannot be disentangled, *underscores* the research findings of ERP's impact on MAPs (Chenhall, 2003; Grabski *et al.*, 2011).

Simplicity of SBR exploration into ERP-BPM-MAPs interplay is the second research motivation (Doran and Walsh, 2004; Spathis and Constantinides, 2004). Departure point of this set draws on ERP as being independent, whereas changes in MAPs are dependent. This has focused on ERP's functionalities and has overlooked the opportunities that may be opened up by ERP and its impacts on the information characteristics that are produced by the same MAPs (Scapens and Jazayeri, 2003). Arguably, this interplay is a nonlinear journey of change and that it is endless (Quattrone and Hopper, 2001; Rikhardsson and Kræmmergaard, 2006). By ascribing this to business environment and organisational context where this interplay operates, one case cannot capture all of interplay aspects. Rather, different outcomes are shaped by different scenarios of implementation (Soh and Sia, 2004). More specifically, ERP-BPM-MAPs interplays are complicated and difficult to separate from each other.

The focus of exploring ERP's impact on formal changes in MAPs post-implementation is the third motivation. This focus includes either traditional or more sophisticated practices of management control systems, e.g. balanced scorecard (BSC) and budgets, and cost accounting systems, i.e. standard costing and activity based costing (ABC). Alternatively, Scapens and Jazayeri (2003) called for an exploration of *informal change* that is facilitated by four characteristics of ERP. They went on adding that these characteristics of ERP have the potentiality to open up opportunities for change in MAPs. While integration, centralisation and routinisation have been given fair attention, opportunities of interplay between standardisation of organisational BPs brought by ERP and MAP in-use are given less attention.

Misalignment between the embedded (preconfigured) practices of ERP and the practices of the implementing organisation is the fourth motivation. The dilemma of misalignment is whether organisational practices should be adapted to preconfigured practices or vice versa (Soh and Sia, 2004). Reconciling these misalignments by maintaining MAPs in standalone (specialised) systems are widely reported within management accounting literature (Granlund and Malmi, 2002; Kholeif *et al.*, 2007; Soh and Sia, 2004) but are rarely examined in comparison to information systems literature. However, ERP is only a generic package that provides a platform for a central database (Davenport, 1998; Grabski *et al.*, 2011) and for understanding why sophisticated MAPs operate in specialised systems, rather than being integrated within ERP, is an area that seems to be *underdeveloped* (Rom and Rohde, 2007). Arguably, different systems' applications are integrated at different stages and are used for different purposes (Cooper and Kaplan, 1998). In this sense, there have been several calls to explore why organisations mobilise and integrate different systems at different stages, and how these systems support different purposes as well as being associated with different MAPs (Grabski *et al.*, 2011; Rom and Rohde, 2007). More specifically, the identification of managerial problems upon which ES, including ERP and specialised systems, are mobilised,

is a relatively underdeveloped area and emphasises the need for research (Rom and Rohde, 2007). ES-BPM-UK-MAPs

These motivations advocate for a need of further research to explore ES-BPM-MAPs in a wider context. Such research has the potential to contribute to both theory and practice. It is intended to add to the prior literature that shows the inconsistencies and shortcomings in its findings that focused, examining only direct interrelations between ERP-MAPs. Alternatively, the premise of this paper takes a more comprehensive approach that aims to address most of the aforementioned shortcomings. What is missing in the literature, and the problem being addressed by this research, is BPM. Instead of replicating, BPM is taken on, in this research, as an additional construct that may expand the existing understanding of the ES-MAPs' interplay (Bromwich and Scapens, 2016). Without giving any prior conditions, this study aims to understand the process of the interplay between ES-BPM-MAPs. The latter is hereafter considered as a unit of analysis and will be examined in a broader sense through the inclusion of an organisational context and a business environment that thus promise a holistic understanding (Scapens, 2006). This research also deals with some of the contradictory evidence through examining this unit of analysis across multiple cases operating in different organisational fields (Grabski *et al.*, 2011; Messner, 2015). Importantly, this paper contributes to society through the intended framework by offering clarifications that advance the understandings of organisations, consultants and accountants about why different systems are implemented and identifying different forms of BPM and MAPs interplay (Grabski *et al.*, 2011; Rom and Rohde, 2007). More specifically, this paper addresses calls by building on and extending prior studies through examining:

- not only ERP but also potential specialised systems/applications that may be mobilised and added at later stages, and this will be denoted as by ES (Grabski *et al.*, 2011; Rom and Rohde, 2007);
- not only the finance process (Sánchez-Rodríguez and Spraakman, 2012) but also three BPM will be examined, namely, the customer (fulfilment) process, the supply chain process and the control process (Grabski *et al.*, 2011; Magal and Word, 2009);
- not only changes in MAPs but also status, how being used, in relation to ES and BPM; and
- insights that are drawn from analysing ES-BPM-MAPs in cross-sectional case studies that inform and shape the second research purpose, an analytical framework that aims to advance our understanding of this interplay.

The remainder of this paper is organised as follows: the next section reviews the contribution of the existing literature on ERP's impact on changes in MAPs, followed by the research design, which occupies Section 3. Section 4 presents findings and discussions in a logical way to facilitate drawing out a framework to understand ES-BPM-MAPs. Section 5 advances our understanding of ES-BPM-MAPs' interplay. The final, sixth, section draws out the key conclusions of this paper.

2. Literature review

The potential impact of ERPs on MAPs has become interesting as a research topic since 2000. This interest explored ERP's impact on MAPs' changes in terms of functions, practices and/or information characteristics. The findings of relevant studies are vague and inconsistent. Prior studies of ERP's impact on changes in MAPs are critically discussed and logically organised into three subsections outline research gap upon which research motivations are mobilised.

2.1 Management accounting practices

The hypothetical role of ERP in introducing changes to MAPs has been extensively reviewed shown inconclusive findings (Granlund, 2011; Rom and Rohde, 2007). Rom and Rohde (2007), in particular, reviewed the existing literature on ERPs and MAPs and revealed two contradictory conclusions in terms of ERP's role as being either a driver or a stabiliser of MAPs' change. This section explores exiting research evidence about the role and impact of ERP on the status of MAPs revealed by research approaches that have been previously utilised in examining this interplay, namely, survey (breadth)-based research and case (depth)-based research.

The first set of the prior literature explored the association between ERP and changes in management accounting techniques using questionnaire survey. This stream of research highlighted that ERP tends to increase the use of traditional techniques, such as budgeting, forecasting, performance measurement and basic costing techniques (Doran and Walsh, 2004; Jackling and Spraakman, 2006; Spathis and Constantinides, 2004). They also found an association between ERP and adoption of more sophisticated techniques that support strategic views, i.e. ABC, target costing and capital budgets. However, these techniques are integrated into ERPs. Nevertheless, these studies showed consistency in the role of ERPs as driver of change, in both traditional and sophisticated management accounting techniques in the Irish, Greek and Australian contexts. They are, however, inconsistent with others' observations that were drawn from the Finnish (Hyvönen, 2003), Danish (Rom and Rohde, 2006) and the Australian contexts (Booth *et al.*, 2000), although using the same approach. Further, the findings of ERP as a driver of change are not free from the need for caution, due to the difficulty in identifying a clear-cut between the adopters and non-adopters of sophisticated techniques, especially those of ABC, by using a questionnaire (Al-Omiri and Drury, 2007; Hyvönen, 2003). Further, it depicts ERP-MAPs' interplay as a linear relationship. Therefore, there is an unclear understanding of this pattern of literature.

A less radical view of ERP's impact on MAPs' change is revealed by case (depth)-based research. The studies of Scapens and Jazayeri (2003) and Granlund and Malmi (2002) provide a key foundation that ERP is considered as a facilitator rather than a driver of MAPs' change (Rikhardsson and Kræmmergaard, 2006). Generally, both studies found that ERP has had moderate impact on MAPs. This is attributed to institutional factors and organisational context. For instance, one of the interviewee plant managers says that "we wanted what we had before" (Scapens and Jazayeri, 2003, p. 216). This however provides contradiction to observations of Sánchez-Rodríguez and Spraakman (2012). On observing 13 Canadian case studies, they found that management accounting techniques became more efficient and effective than ever upon by which information analysis, and decision-making became easier. This change in-use was attributed to changes in the charts of accounts that are facilitated by transactional processing.

This contradictory evidence also applies to costing practices, PM and control, but not to forecasting. In terms of costing practices, Granlund and Malmi (2002) found that existing cost accounting techniques were transferred as they stood into ERPs, but why this happened seemed to be beyond the scope of their cases-based interview survey. This is inconsistent with Sánchez-Rodríguez and Spraakman's (2012) conclusion, which underlines significant change in-use, rather than in practices, of the costing system, which became broadly available and was easily reported. However, only relatively small changes are found in the management control and procedures that are led by ERP implementation (Granlund and Malmi, 2002). Sánchez-Rodríguez and Spraakmans' (2012) conclusions also support changes in performance and management control. They found that performance measures became more extensive and detailed. This change was enabled by a chart of accounts that, in turn,

contributed to engine finance process's (transactional processing) standardisation. In addition, the automation of transactions led to more timely information. For forecasting, there is conclusive evidence about changes in use following ERP's implementation. Scapens and Jazayeri (2003) found changes in-use of management accounting information, rather than in its techniques, following ERP's implementation, particularly with forecasts offering a forward-looking emphasis.

Overall, the prior studies reviewed above have revealed contradictory findings. Ironically, these contradictions are found not only across research approaches but also within approaches that have been used in exploring ERP-MAPs interplay. Furthermore, prior research focused more on formal changes in MAPs, and such focus may dismiss opportunities to explore changes in-use of information (Scapens, 2006). More specifically, some studies draw attention to two issues by which ERP-MAPs interplay is influenced, namely, ERP characteristics and organisational intention. *First*, Scapens and Jazayeri (2003) called for further research to indirectly explore the ERP-MAPs interplay through examining the opportunities that are opened-up by ERP's characteristics. It is argued that there are four characteristics that distinguish ERPs from other systems and have potential to open up opportunities for changes in MAPs: integration, routinisation, centralisation and standardisation (Scapens and Jazayeri, 2003). While integration, routinisation and centralisation have been examined in previous literature, standardisation is underdeveloped. *Second*, organisational intention could be an alternative explanation for the stability of management accounting with the practices that are preconfigured within ERPs (Rom and Rohde, 2006). Both standardisation and management intention are discussed in the subsequent section.

2.2 Business process management

BPM, business process re-engineering (BPR), BP change and process in the ways of working all are terms used in an interchangeable way across the literature on information technology (Grabski *et al.*, 2011), organisational studies (Light, 1999) and management accounting (Burns and Baldvinsdottir, 2005). Generally, BP underlines a set of logically related tasks or activities that are performed to achieve a defined business outcome (Davenport and Short, 1990). Fulfilment/customer process, the procurement process, production process, finance process and control/ performance process are examples of organisational BPs (Davenport *et al.*, 2004; Magal and Word, 2009). The BPM term however will be used throughout this paper because it is more general, and it extends to include stability and levels of change as discussed below.

ERP is structured and designed around the aforementioned organisational BPs (Davenport, 1998). The implications of ERP's requirements in restructuring an organisation's departments/ functions have been suggested as a topic for further research (Granlund and Mouritsen, 2003; Scapens and Jazayeri, 2003). Scapens and Jazayeri (2003), in particular, have called for an examination of the impact of standardisation (one of ERP's characteristics, as mentioned in a previous section) on highly function-structured organisations. Imposing such imperatives for moving from one form of BPM to another underlines change in BPM, and this may result in a misalignment. The latter emphasises the differences between the best practices that are offered by ERP packages and the actual processes and practices that are in use in the implementing organisation (Soh and Sia, 2004). It is the role of ERP standardisation that aims to achieve best practice-based processes that may involve changing the basic assumptions of the predominant language, values and BP logic (Granlund and Mouritsen, 2003). This also extends to the restructuring of the organisational rules and practices around BPs, rather than the functions.

BPR/change is an organisational initiative. It aims to overcome misalignments (Kholeif *et al.*, 2007). The BPR is underlined as the [...] fundamental rethinking and radical redesign of BPs to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed (Hammer, 1990). Undertaking BPR means that existing BPs are insufficient (Poston and Grabski, 2001). Aligning existing organisational BPs with the ERP imperatives may vary from one organisation to another and may take the form of revolutionary evolutionary change and/or stability (Burns and Scapens, 2000).

Nevertheless, the previous ERP literature frequently underlines the association between ERP and BPR. However, undertaking BPR is not straightforward (Davenport *et al.*, 2004). As Rom and Rohde (2006) have argued, change is not an option for ERP. Rather, it is an organisational choice that decides why, when and how an organisation's BPs and practices, including MAPs, need to be developed or replaced. The authors went on suggesting that the sophistication of management is another factor that is likely to affect the extent of MAPs change in relation to ERPs' implementations. This factor concerns the extent to which management focuses on, and adopts, the appropriate management (accounting) techniques. For instance, variations across surveyed UK organisations in terms of costing systems and profitability analyses were found and advanced to a matter of personal preference, organisational and/or sector custom (Drury and Tayles, 2006).

In the context of MA literature, the standardising/re-engineering of organisational BP have been reported and are relatively neglected. BPR is found in a context where ERP was introduced, but it is argued that there is no association between ERP and BPR (Hyvönen, 2003; Scapens and Jazayeri, 2003). Rather, BPR was already taking place prior to ERP's implementation. On the other hand, implementing an ERP system has its own methodology for implementing BPR (Granlund and Malmi, 2002). In this sense, it is argued that while some organisations implement BPR prior to ERP implementation, others often perform BPR alongside the ERP's implementation, and the latter is used as a vehicle, although this can cause massive upheaval in an organisation (Arnold, 2006). This means that MAPs' change in these contexts was not attributed to ERP, rather than to BPR. Ironically, it is often reported, in the information systems discipline, that ERPs have had, either directly or indirectly through BPR, an impact on decision-making and then on organisational performance (Poston and Grabski, 2001). To sum up, organisational BPR (standardisation) was not given fair attention when the ERP-MAPs' interplay was examined by comparing it in the information systems discipline.

The prior literature on management accounting tends to jump from BPM that is generally triggered by either ERP and/or changes in the business environment. Within this literature, both SBR and CBR, with the exception of Sánchez-Rodríguez and Spraakmans (2012), neglect the role of BPM in influencing ERP-MAPs' interplay. By drawing on Magal and Word's (2009) argument, Sánchez-Rodríguez and Spraakman (2012) examined only the interrelations between ERP, finance (transactional) process and four MAPs through which change took place. These changes are attributed to the chart of accounts that, in turn, was an outcome of standardising finance process that benefitted from advantages of transactional processing. By contrast, the interplay between ERP's standardisation and other organisational processes, mentioned above, and their interactions with MAPs, are unexplored. There are no adequate explanations of how changes in the forms of organisational BPM may interact with MAPs in-use.

2.3 Enterprise resource planning versus specialised systems

ES, integrated information systems, ERP and SAP are other terms used interchangeably in the prior studies of information system (Grabski *et al.*, 2011) and management accounting (Rom and Rohde, 2007). ES is, however, more general term, and it extends to include systems that are built on generic systems or platforms and ERP as instance (Rom and Rohde, 2006).

Operating either traditional or sophisticated MAPs independently, rather than being integrated within ERPs, is widely reported in the ERP-MAPs' literature (Grabski *et al.*, 2009; Granlund and Malmi, 2002). Instead of ERP, specialised/standalone systems are found to be superior in terms of supporting strategic MAPs especially ABC (Hyvönen *et al.*, 2006) and BSC (Malmi, 2001). In their observations, which are drawn from ten case studies, Granlund and Malmi (2002, p. 312) concluded that:

One of the main results of this study has been the fact that so far ERPs, contrary to many expectations, seem to have had little impact on both the management accounting methods and managerial controls used. In most of the cases studied [sophisticated] management accounting techniques - and many of the [traditional] ones, too (e.g. annual budgeting) - are operated in separate systems.

Similarly, Hyvönen (2003) has argued that standalone systems surpass ERPs in terms of solving management accounting problems that are related to budgeting, cost control and flexibility; and to the accuracy and reliability of the reporting activities. This challenges the finding that ERP adopters' performance is better than non-adopters (Hunton *et al.*, 2003). Using questionnaires, Hunton *et al.* (2003) also found that financial departments tended to adopt standalone systems, whereas production departments still generally preferred ERPs (Booth *et al.*, 2000; Fahy and Lynch, 1999). Grabski *et al.* (2009) also reinforce this claim through a conclusion drawn on observations of seven case studies in the UK context and they stated that:

[M]anagement accountants using traditional software (such as spreadsheets) for budgeting, ABC, balanced scorecards and other performance management techniques independent of, rather than integrated with, ERP systems (p. 7).

Operating MAPs in standalone, instead of in an ERP system, has not been given fair attention. Rather, prior studies often criticises the complexity and incapacity of ERP in not offering such user-friendly methods as the most sophisticated accounting software (Granlund and Malmi, 2002; Sangster *et al.*, 2009). These limitations made accountants reluctant to adopt ERPs (Sangster *et al.*, 2009). Rom and Rohde (2006) add that ERP is better in supporting data collection and processing at breadth management level, whereas specialised packages, such as strategic ES, seem to be better in supporting the higher levels of management in conducting analysis. They continue by arguing that when exploring the relationship between ES and management accounting, it is important to identify the nature of tasks to which the ES is applied, and how they impact on MAPs in-use. Instead of pursuing formal changes in MAPs, explaining why, and for which purposes, these systems are adopted seems to be an underdeveloped area.

In this vein, Rom and Rohde (2007) proposed a theoretical framework that conceptualises ES-MAPs. The framework was an outcome of an extensive literature review and argues that there is a bidirectional relationship between ES and MAPs. This relation is mediated/moderated by power and politics, as well as by context variables. Rom and Rohde's (2007) framework suggests components and characteristics as attributes through which to measure ES, whereas MAPs are classified into tasks, techniques and the roles of accountants. Although the framework has its strengths and advances our understanding of ES-MAPs, it has several limitations. First, it is a rather abstract framework and is unsupported by empirical study that outlines how ES-MAPs interplay. Second, it does not provide an account to explain how contextual factors influence this interplay. Third, it also dismisses the role of BPM in explaining ES-MAPs' interplay. Fourth, it does not explain what sort of ES components or characteristics impact/trigger MAPs' change.

This research deals with some of the contradictories of prior studies reviewed above. It does so by expanding the organisational parameters of the examination of the ES-MAPs interplay and the inclusion of BPM, first, as an additional construct (Booth *et al.*, 2000; Rikhardsson and Kræmmergaard, 2006). Second, the ES-BPM-MAPs interplay is explored within and across organisational fields (Messner, 2015). Third, ES is examined not only in terms of ERP but also extends to potential systems/applications that are adopted to perform specific tasks (Grabski *et al.*, 2011; Rom and Rohde, 2007). Building on Sánchez-Rodríguez and Spraakman (2012), fourth, BPs are expanded and will be examined in terms of the customer process, supply chain process and control processes (Davenport and Brooks, 2004; Magal and Word, 2009). Instead of focusing on formal change, fifth, MAPs are examined in terms of information characteristics and how these are being used in the context of customer and product/services analysis, forecasting, PM and supply chain management (SCM) (Scapens, 2006).

3. Research design

This paper aims to examine the ES-BPM-MAPs interplay and then to draw out a framework that advances our understanding and makes sense of this interplay in a broader context. It re-examines the ES-MAPs' interplay more explicitly, by building on, and extending, prior studies through the inclusion of BPM. The study focuses on BPM as the *fulcrum* of an understanding of ES-MAPs' interplay, rather than tracing changes in MAPs' post-ERP introduction (Caglio, 2003). In so doing, this paper addresses calls, builds on and extends prior studies by examining:

- the opportunities that might be opened up by ES that extends to include not only ERP but also systems/applications that, *ad hoc*, perform specific tasks (Cooper and Kaplan, 1998; Scapens and Jazayeri, 2003);
- the changes and roles of BPM in ES-MAPs' interplay (Granlund, 2011; Rom and Rohde, 2007);
- changes in-use of management accounting information; and
- refining the extant theory of ES-BPM-MAPs' interplay by building on existing literature and expanding further Rom and Rohde's (2007) theoretical framework about ES-MAPs.

These characteristics have shaped research design process including research methodology, data collection and analysis process; they are all articulated in the subsequent sections.

3.1 Research methodology

The case study choice is adopted as a research strategy. This aims to make sense of the interconnection between management and ES interplay, on one hand, and the context in which this interplay operates, on the other (Scapens, 2004). Earlier, Scapens (1990, p. 264) argued that case studies offer us the possibility to understand the nature of management accounting in practice, both in terms of the techniques, procedures, systems, etc., which are used, and the ways in which they are used. Ironically, each case study that implemented ES has a unique story of organisational practices. This uniqueness is a reflection of organisational context including its history and the business environment in which this interaction is operating (Soh and Sia, 2004). In this sense, Arnold (2006, p. 13) argued that:

In the management accounting research domain, both the case study and survey methods have been used extensively, but the validity issues associated with each have long been recognised.

Exploring ES-BPM-MAPs, as an instance in different types of industries, is suggested to “offer better explanations for why accounting is practised in the way that it is” (Messner 2015, p. 5). This paper draws on a specifically cross-sectional case study as a research strategy through which to address the research purposes that have been set out. Such a strategy has been used in prior studies of management accounting in general (Lillis and Mundy, 2005), and of ERP-MAPs, in particular (Granolund and Malmi, 2002; Sánchez-Rodríguez and Spraakman, 2012). The use of this strategy is suggested so as to bridge the contradictory findings that are revealed by the different approaches used in exploring ERP-MAP interplay (Arnold, 2006; Lillis and Mundy, 2005). As outlined in the Section 2, both breadth (survey-based) and in-depth (case-based) research on ERP’s impact on MAPs have underlined this inconclusive evidence.

The use of cross-sectional data is a sort of systemic research approach aims to minimise research biasness, contribute to the theory and enhance findings’ generalisability (Arnold, 2006; Lillis and Mundy, 2005). It differs from those common approaches that have been used by pertained prior studies. These have included broad ERP-MAPs studies using surveys because this offers more structured and less intensive data collection (Hyvönen, 2003; Rom and Rohde, 2006); and an in-depth ERP-MAPs case study that involves unstructured, longer and more intensive data collection on site (Quattrone and Hopper, 2001; Scapens and Jazayeri, 2003). By drawing on Lillis and Mundy’s (2005) argument for using cross-sectional case studies, this paper aims, *first*, to resolve some of the outstanding contradictions in the existing literature relating to ERP’s effects on MAPs; change, and, *second*, to clarify the role of BPM as a dimension upon which there is contradictory or inconclusive knowledge; and *third*, to identify organisational fields among which these dimensions differ.

A qualitative approach is a common research methodology that is used in the management accounting field for various reasons (Parker, 2012). *First*, it provides penetration and unpacking from the inside of BPM and the ES-MAPs interface with such processes (Ahrens *et al.*, 2008). *Second*, consistency with the research’s purpose so as to understand how ES-MAPs interplay in different organisational settings (Parker, 2012), and consistency across sectional case studies that are more or less a result of the in-depth and broad interplay process across ES-BPM-MAPs, as will be discussed in the subsequent section (Lillis and Mundy, 2005). However, this approach is not free of criticisms of *biasness*, and it is hard to eliminate this as a researcher is part of research process (Parker, 2012; Scapens, 2004). Instead of biasness elimination, Golden-Biddle and Locke (1993) proposed three criteria provide convincing texts of qualitative research approach, namely, plausibility, authenticity and criticality/transferability (Baxter and Chua, 2008). These criteria are addressed in Sections 3.2, 3.3 and 5, respectively.

3.2 Data collection

Data collection strategy corresponds to research call for using multiple and cross-sectional case studies aiming to overcome limitations of breadth (survey) research and subjectivity (*biasness*) of depth research (Arnold, 2006; Lillis and Mundy, 2005). *Authenticity* is key criterion of qualitative case study strategy concerns the relationship between a researcher and undertaken fieldwork. Outcomes of this process resulted in selecting (89) case studies drawn from different sectors of the UK and have implemented different components of ES. In pursuing data and sources triangulation, organisations’ and consultants’ reports, documentations, videos and other information are key data (Lukka and Modell, 2010). These data collected from different sources including case studies’ websites; vendors or suppliers including SAP, Oracle and others; and consultant including Capgemini, Deloitte, LogicaCMG

and others (Appendix 1). In other words, biasness of qualitative research approach is minimised by performing following steps to maintain authenticity:

3.2.1 Sources integrity and triangulation was ensured through the following steps.

- Selection process ensured that each selected case has one consultant and one vendor. It is common practice across organisations that role of vendor is to deliver and implement ES, whereas consultation pre-implementation and monitoring implementation process is a role assigned to consultants due to limited knowledge in IT.
- Different reports (of consultants and vendors) about the same case study are checked to verify existence of claim. In so doing, additional information and reports were also collected from websites of selected cases.
- These selected reports capture semi-structured interviews, comments and additional information that shed light on why, how and for what purposes ES components are mobilised in (89) case studies from the UK.

3.2.2 Data integrity and intensiveness were focused on three sets that reflect both character and quality of data collection.

- (1) The case study's profile, as stated by interviewees, include managerial problems to understand reason of adoption and purpose of use upon which ES component is disclosed and adopted.
- (2) Regarding interviewees, only two sets of data were considered, namely, interviewees' direct quotations as stated in the selected reports and interviewees' profile in terms of name and position. Both direct quotations and interviewees' positions have been disclosed in the Section 4 to support research evidence.
- (3) More importantly, these direct quotations provided references to the case's general information, key changes in the business environment, the managerial problems being encountered, the targeted information characteristics, the component(s) of adopted ES, BPM subject to the implementation process and management (accounting) practices and information characteristics (Appendix 2).

3.3 Analysis process

The notion of plausibility is about how field research is made sensible and believable (Baxter and Chua, 2008). It is addressed by several different elements. *First*, this paper mobilised NVivo software version 11 to perform data interrogation and conduct rigours analysis. All actions are recorded and maintained in the NVivo project that can be retrieved by independent a researcher to ensure subjectivity/biasness. Furthermore, this also address concerns over qualitative research in terms of lack of analysis protocols and reference to common structures and language (Marginson, 2004). In other words, using NVivo 11 aims to ensure that the internal intellectual processes of ES-BPM-MAPs are formally held, no conclusion is missed, the whole field is explored, conjectures are held to be contingent and all are subject to rigorous cross-checking (Berry and Otley, 2004).

Second, having set up the project, the data analysis process was *driven* by the research question that explores interplay of ES-BPM-MAPs. Case study research however does not follow a simple and a linear process, and it is quite often much more "messy" (Scapens, 2004). Rigorous and systematic analysis was performed in terms of classifying, coding and reviewing (Hutchison *et al.*, 2010). The story of ES-BPM-MAPs' interplay was developed by *four* stages:

- (1) The first stage was *Coding*. This began with browsing, reading and then coding a reference that pertained to the unit of analysis (ES-BPM-MAPs). Coding references means that the researcher select and then assign the relevant data, i.e. sentences or paragraphs into a particular theme called a *Node*. The key nodes were entitled ES, BPM and MAPs. This process enables the segmenting of blocks of data, driven by a unit of analysis, into different nodes/themes. The same process is performed in the rest of the cases through browsing, reading and coding relevant references into themes (parent nodes, such as MAPs) and sub-themes (child nodes, such as cost management, forecasting, management control), and all are linked into hierarchical patterns called trees. The latter consists of a number of references that came from different cases ([Appendix 3](#)).
- (2) The attributes and codes identified above fuel stage two of the analysis process as well development of a classification sheet within NVivo 11. Such function allows to pull out and classify the attributes of ES-BPM-MAPs' interplay. In so doing, each case was classified in terms of general information; ES including drivers, characteristics and adopted components; BPM including drivers of the business change, types of BPM rearrangements and types of BPs; and MAPs including practices that are subject to change and/or that reinforce information characteristics and the purposes of use. It is the key advantage of a cross-sectional case studies that different cases emphasise different scenarios for the implementation, the mobilisation of different components of ES and the targeting of different area of BPM and MAPs ([Lillis and Mundy, 2005](#); [Soh and Sia, 2004](#)). However, this classification sheet was then exported to an Excel sheet, by use of which the observed cases are patterned showing similar issues/changes in terms of ES-BPM-MAPs' interplay (refer to [Appendix 4](#)).
- (3) Stage 3 of data analysis is *reviewing*. As mentioned, analysing qualitative data by using NVivo 11 allows the researcher(s) to retrieve the outcomes of the analysis process. Two types of reviews were performed, in trees of nodes and the content of nodes. While the reviewing of a tree of nodes (themes) is about re-grouping the content of the nodes, the review aims to re-check the relevance of the assigned references, and this may result in *Uncoding from This Node*. In other words, using NVivo helped the researcher to control the messiness of qualitative research and allowed to go through all of the coded data repeatedly and iteratively (forwards and backwards) to identify themes and patterns. All the themes that emerged (nodes) and the sub-themes (nodes), together shape the detailed story of the ES-BPM-MAPs' interplay ([Hutchison et al., 2010](#)).
- (4) The patterns of ES-BPM-MAPs' interplay are visualised that are featured in the fourth stage of the data analysis and the development of plausibility ([Baxter and Chua, 2008](#); [Scapens, 2004](#)). Using both the Excel sheet and diagrams advanced the understanding of, and the outline framework of the ES-BPM-MAPs' interplay. Overall, the data analysis for this project was a process that emerged, but there was rigorous and systematic analysis. An emerging process allowed issues to be undiscovered, rather than predetermined. As will be seen in Section 4, this includes the patterns of interplay, the components and characteristics of ES, and the levels and means of BPM rearrangements, MAPs and the characteristics to be identified.

The outcomes of the above processes and stages of analysis are driven by the research question that is set out in this study. These outcomes featured the patterns of ES-BPM-MAPs' interplay that is centred around, and shaped by, three focal BPs as follows:

Figure 1 shows the spectrum of the patterns of the ES-BPM-MAPs' interplay. Different components and characteristics of ES are mobilised to support different types, orientations and arrangements of BPM within which MAPs are not isolated (Cooper and Kaplan, 1998; Grabski *et al.*, 2011; Rom and Rohde, 2007). While these findings are articulated in more details, the subsequent section, the insights and implications of these findings in advancing our understanding of ES-BPM-MAPs' interplay are developed further.

4. Findings and discussions

The outcomes of how ES-BPM-MAPs interplay functions, across this (89) mini-case study operating in the UK, are articulated and discussed here. Arrays of interplay patterns are found and summarised in the Figure 2. These patterns are fuelled by different organisational BPs that seek the different characteristics of ES mobilised at various stages and are being used for different purposes of MAPs (Kaplan, 1990; Rom and Rohde, 2007).

Overall, three key patterns of interplay are recognised that centre around key organisational BPs, namely; customer process, logistics process and control process (Magal and Word, 2009). However, these patterns are complex and are not operating in a vacuum. Rather, each key interplay shapes/is shaped by three dimensions, namely, contextual changes (Spathis and Constantinides, 2004), an organisation's intention (Rom and Rohde, 2006) and the attributes of ES-BPM-MAPs. The subsequent three sections discuss these (sub-) patterns of interplay among the attributes, contextual changes and organisation intention.

4.1 Customer process patterns

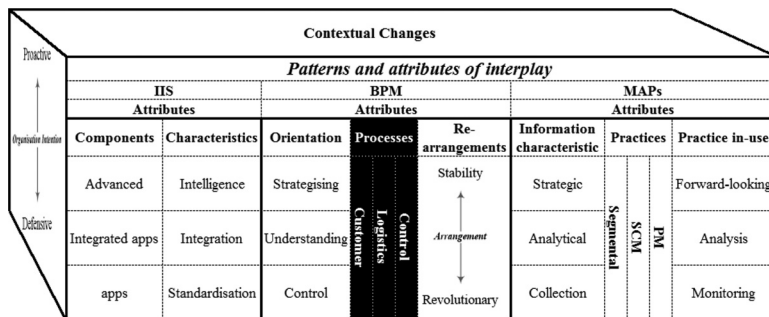
The customer process is path-dependent and provides a *fulcrum* for understanding how ES and segmental practice interplay. The Figure 3 shows that this interplay is a complex box that shapes/is shaped by three dimensions, namely, contextual changes, organisation intention and the attributes of ES-customer process-segmental practice interplay.

More specifically, customer process orientations are the focal point of understanding sub-interplays *centred* around customer culture creation, understanding customers'

Figure 1.
Key findings of interplay patterns of ES-BPM-MAPs

IIS		BPM			MAPs		
Attributes	Key characteristics	Key processes	Intelligence	Customer	Key practices	Segmental analysis	
			Integration	Logistics		Supply chain management	
			Standardisation	Control		Performance management	
Attributes	Key components	Key orientations	Advanced	Strategising	Key purposes	Strategising	
			Integrated Apps	Understanding		Analytics	
			Apps	Standardisation		Provision	
Attributes	Key arrangements	Key arrangements	Configuration	Streamline	Key characteristics	Strategic	
			Streamline	Reengineering		Analytics	
			Reengineering			Integration	

Figure 2.
Attributes of ES-BPM-MAPs



behaviour and maintaining customer sustainability as summarized in Figure 3; all are ES-BPM-UK-MAPs discussed in the following subsections.

4.1.1 Customer culture. It is a modest level of sub-interplay of customer process focuses on creating customer awareness and fulfilling requirements as an organisational culture (Figure 3). A set of cases shapes this stream of interplay providing insights into how ES is mobilised to enable organisational change. The latter is a respond to competition or governmental pressure for awareness to create customer services as a new organisational value. Both Staffordshire County Council (SCC) and Glasgow City Council (GCC) have faced imposition from the government to adopt *Modernising the Government Project*. In the case of GCC, the ways in which the new customer process, including its orientation and arrangements, should be implemented to comply with *Modernising the Government Project* were vague. As argued, ES-ERP, including CRM, in particular, was mobilised to facilitate organisational change towards creating a customer culture (Rikhardsson and Kræmmmergaard, 2006). Tully pointed out:

[...] the Glasgow model – bringing an ERP system into the Authority, driving process improvement, reorienting the organisation to a customer-service culture, delivering customer services through a shared service facility – that is the agenda we are undertaking here. (Tully, 2006; Deputy Director of Financial Services, Glasgow City Council).

Standardising the customer process is the key characteristic of CRM (Grabski et al., 2011). The aim is to have new *rules* and *procedures* about how customer service activities should be performed (Scapens and Jazayeri, 2003). This contrasts with the case of the SCC, although it attempts to operationalise the same governmental pressure. As the Council is aware of its citizens’ (customers) needs, customer service, as an organisational value, has already taken place, but how the pertinent activities should be carried out in a more professional way was in question. Seeking standardisation, SCC shares with GCC in having new best practices in modernising and streamlining their back-office operation. This, in turn, shaped the decision to adopt the ES-BS in Staffordshire, as Thomas has stated:

We have to put the business focus first and the technology second, building it round what the customer needs. Using SAP-BS’s world-leading solutions as the enabler, we want to make Staffordshire a centre of excellence and proactively support our strategic vision to put the Customer First (Thomas, 2006; Corporate Applications Manager, Staffordshire).

ES-ERP and CRM are therefore mobilised to operationalise governmental demands that are set out in *Modernising the Government Project*. The standardisation of such components enables organisational change towards new ways of performing the customer process, which is centred on customer services. While both councils share some similarities in mobilising ES, there are small differences in the path-patterns of interplay. The SCC has mobilised ES-BS and built it around the prevailing values of customer service, accompanied with

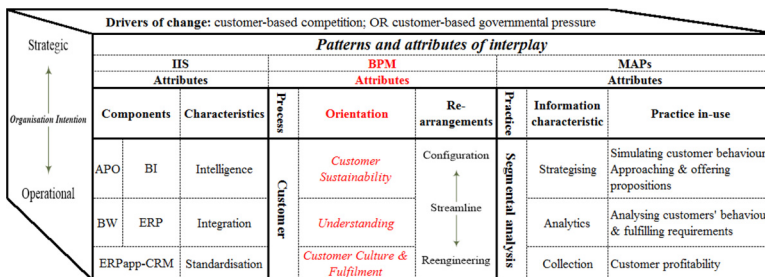


Figure 3. Customer process pattern

changes in the customer process arrangements (Scapens and Jazayeri, 2003). In contrast, GCC exploited CRM, in particular, both as a driver of organisational change in creating a customer culture and in outlining the arrangements for the customer process (Spathis and Constantinides, 2004).

Moving from production to customer orientation was also a challenge that was created by competition across cases of manufacturing sector. ES-ERP and CRM were in particular the key component that was mobilised to support vision of change at Rolls-Royce. The latter is becoming focused on customer orientation, rather than production, as has been pointed out by Shepherd:

[...] it was having to move from the old historical way of working with customers, which was very product focused, to being much more focused on the customer to be a lot more service oriented (Shepherd, 2002; Director, Market Support, Rolls-Royce PLC).

Such change reinforces the existing understanding of using ES technology, which is driven by competition and the organisation's intention not only to survive but also to remain as a competitor (Spathis and Constantinides, 2004). It also contributes to this literature by adding that standardisation was sought through CRM, upon which new best practices of customer process were adopted and introduced. Overall, the interplay process of ES-segmental practice in fabricating a customer culture is summarised in the following Figure 4.

Figure 4 shows that this set of cases are undergoing organisational change that is moving into customer culture creation (Rikhardsson and Kræmmergaard, 2006). This new organisational value is triggered either by competition or by governmental pressure for change (Spathis and Constantinides, 2004). However, the way in which customer culture should be operationalised is through organisational challenge. Alternatively, ES-CRM is mobilised to provide a platform for the customer process through the standardisation that involves so-called best practices (Magal and Word, 2009). As argued, this standardisation provides opportunities to re-arrange the customer process through introducing new rules and procedures with which to manage pertinent activities (Scapens and Jazayeri, 2003). Contrary to Hyvönen (2003), ES is a driver of organisational change when the new vision is unclear about how to operationalise it (Spathis and Ananiadis, 2005). Further, this confirms that ES is only a facilitator that is built around customer culture, as a prevailing organisational value (Scapens and Jazayeri, 2003). Segmental practice, as an instantiation of customer culture creation, focuses on sense-making of pertinent activities (Burns and Scapens, 2000). Such a role supports the prior literature that found ES role has not transcended information provision with extra attention to a segmental information (Booth *et al.*, 2000; Rom and Rohde, 2006). However, more advanced roles for segmental practice in

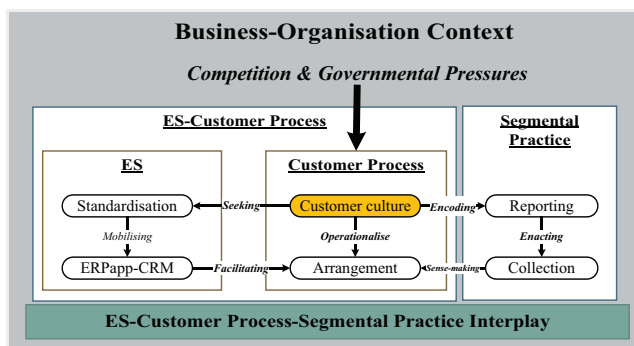


Figure 4.
Customer culture
orientation interplay

supporting a greater level of organisational orientation in the customer process are found and discussed in the subsequent section.

4.1.2 Understanding customers' behaviour. It is the second stream of the customer process interplay that is centred on understanding customers' behaviour (Figure 3). The latter is shaped by a cluster of cases drawn from different sectors. The University of Newcastle Upon-Tyne is a particularly insightful case that explains why and how ES is mobilised to streamline the customer (student recruitment) process and to *understand* declining trend in recruitment (Spathis and Ananiadis, 2005). The university faced intense global competition for international postgraduate students. However, the key challenge emphasises a gap between actual performance and strategic plan for the University's market share. The legitimacy of the existing student recruitment process came into question, as Hopkins pointed out:

[...]if we wanted to double our postgraduate and international students within five years, we had to put in the necessary systems and re-engineer our BPs to achieve that gain (Hopkins, 2006; Chief Information Officer, University of Newcastle Upon-Tyne).

The orientation of this customer (student recruitment) process becomes focused on understanding customers' (students) behaviour. More specifically, identifying a bottleneck and dropping points from students' applications is a critical issue in keeping the university competitive in the education field, as stated by Hopkins: "our focus was to try and find ways to improve the conversion rate of inquiries to applications, applications to acceptances, and acceptances to students". Targeting integration, recruitment standardisation and online communication are key characteristics. The latter were sought, respectively, through mobilising CRM and EP alongside the existing ES components. While CRM aims to standardise and streamline the students' recruitment process, the Enterprise Portal (EP) offers the advantage of online application. However, segmental practice was not isolated from these changes. Complementarily, analytical information becomes a vital source, as it aims to identify the drive factors that are associated with the student recruitment process.

A similar combination of ES-CRM and ES-BW is mobilised by the London Borough of Southwark to target standardisation and integration, respectively. This empowers the authority to enhance their understanding of operations at all levels, as has been pointed out by Murphy:

[...] the quality of data we are getting is just fantastic in terms of understanding the volume data about what customers want from us. We have never had the data collated in one place before. In terms of planning for the future, we are now much better able to target our resources at the volume of services required than we ever were before (Murphy, 2004; Assistant Chief Executive, London Borough of Southwark).

The focus of the authority was on understanding customers' needs. Thus, customer analysis was inevitable. However, the key purpose of such practice is transcended information provision. Rather, it is being focused on understanding customers' behaviour, and this was also the case in the service provider field. Linklater's case experienced market competition, in which understanding customers' needs have become critical. In this sense, the case of Kingspan adds more details about why segmental practice was encoded and enacted by this orientation and by providing particular characteristics of information. Due to information system failure, in terms of the capacity for growth and suitability, Kingspan called ERP and other ES components, such as Sales Distribution Reporting, to address:

[...] the main objective of the company [...] was to provide a multi-site environment where senior management could easily see information on profitability by product, by country or by plant, and therefore monitor how the company was performing (Keeling, 2005; Divisional Finance Director, Kingspan Panels).

This change in expanding information provision to include financial and non-financial information is aligned with prior studies (Scapens and Jazayeri, 2003; Spathis and Constantinides, 2004). Importantly, this information is not generated in a segmental way to sensitise the decision-making process, but mainly to focus on profitability. Similarly, Ryanair established an outstanding route profitability system that would allow the monitoring of costs and profits. The major target for Ryanair was therefore to have information readily available about all of the costs in detail, as Cassidy has pointed out:

We knew that to achieve such detailed reporting, we needed a fully integrated solution that has wide area network capability and the capability of interfacing with our other operational systems (Cassidy, 2006; Financial Accountant, Ryanair).

Using an ERP system in monitoring cost structure and analyse profitability supports prior studies that shows the moderate impact that ERPs have on MAPs (Granolund and Malmi, 2002; Spathis, 2006). This impact on change includes financial and non-financial information provision from which the segmental practice is evolved. ES and segmental practice are fabricated around understanding customers' behaviour, and it is summarised in the following Figure 5.

Figure 5 shows that this set of cases concerns understanding of customers' behaviour. It is moderate organisational change towards a customer process orientation. While this focus is triggered by competition pressure (Spathis and Constantinides, 2004), it has two implications. First, it shapes the organisational motivation to mobilise a set of ES components such as ERP and BW, seeking integration by building on existing components, such as a CRM module. This reinforces the view of a middle level of the hardware integration process (Booth *et al.*, 2000; Kaplan, 1990). Second, the analytics are the key purpose for using the segmental practice that represents a change in use. The practice is the local instantiation for understanding the customers' behaviour (Burns and Scapens, 2000). It focuses on analysing and generating financial and non-financial KPIs. While such a finding is consistent with the existing literature (Sánchez-Rodríguez and Spraakman, 2012; Spathis and Constantinides, 2004), this change in-use of segmental practice could be ascribed to a change in the customer focus that become more concentrated on the understanding and analysing of customers' behaviour. As argued, this is facilitated by integration among existing ES components, including BW and ERP (Scapens and Jazayeri, 2003). More advanced roles in using segmental practice to support strategy and decision-making are discussed in the subsequent section.

4.1.3 *Customer sustainability.* This stream of customer process interplay is centred on maintaining customer sustainability (Figure 3). It is shaped by a set of cases operating across

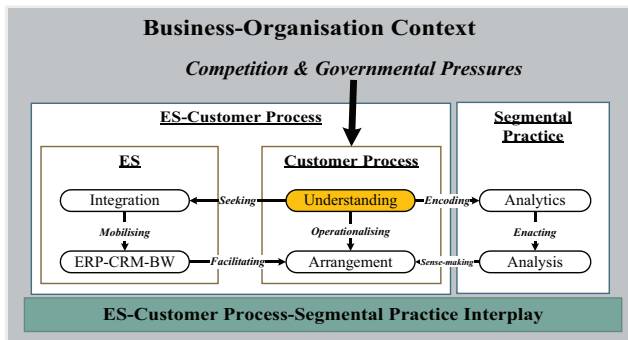


Figure 5. Understanding behaviour orientation interplay

organisational fields in which Glanbia and Boots are considered to be extreme cases. They provide insights into how the customer sustainability orientation is mobilised and advanced, and the intelligent components of ES through which segmental practice was strategised. The case of Glanbia showed a noticeable change in customer orientation, focusing on customer sustainability. The latter denotes how customers' loyalty is maintained and upon this new business perspective are adopted to simulate customers' needs. According to Glanbia, the key change behind this is that "if our customers are winning, we are winning. That is the philosophy behind it" (Minogue, 2006; General Manager of Business Services, Glanbia). Being strategic, this shapes the characteristics of ES that need to underpin customer sustainability. ES-CRM was mobilised to support the proactive role that focus not only to understand customers' behaviour but also to simulate and offer propositions, as Floyd states, believing that:

ES-CRM gave us a very comprehensive view of our customers' behaviour, their demands, and enabled us to segment our markets much better. From there we can offer service propositions to each section of our customer base. (Floyd, 2006; Customer Services, Consumer Foods Division, Glanbia).

This quotation emphasises not only the strategic role of segmental practice but also how such practice becomes strategising. Maintaining and developing loyalty through approaching customers, simulating their needs and then offering propositions is obviously a proactive role. This conclusion is also endorsed by a case in the retail sector, Boots. In the Boots, it is believed that selling products is not the only target value. Rather, understanding, analysing customers' needs and identifying ways to respond, including offering propositions, together constitute key organisational values, as Dearnley has said:

I think there is a lot more we will do beyond just selling products. We will be able to get to people, meet people's needs more, which again comes back to understanding your customers, understanding what they need (Dearnley, 2002; Chief Operating Officer of Digital, Boots Wellbeing).

This shaped ES characteristics and components that Boots has mobilised. Intelligence is a characteristic of the most advanced ES components that are underpinned by CRM and BI[2], and which have been implemented in Boots. This combination of superior tools is being used to analyse and simulate the customers' preferences, which are informed by their purchase history. Having all of the (financial and non-financial) data in one place, the intelligent components of ES have allowed Boots to run data-based queries and to segment customers' responsiveness against their values and needs, which are expressed in financial and non-financial-KPIs. It is reported that once the customers' orders are fulfilled, BW and BI enable not only the analysis of customers' and products' profitability but also forecasting and simulating customers' needs in the future.

In the same vein, the case of The Body Shop endorses customer sustainability and the strategising of segmental practice in the retail field. It is reported that the major area questioned and a need to change were The Body Shop's orientation, which "should be able to react quickly in the way of fashion-oriented business" (Darragh, 2006; IT Manager, The Body Shop). In so doing, The Body Shop have streamlined the customer process to enable customer intelligence, as Darragh stated:

[...] yet we are a fairly complex organisation in terms of logistics, which means we need a software product that provides visibility through all our BPs and ultimately provides good business intelligence to make decisions based on what is really happening (Darragh, 2006; IT Manager, The Body Shop).

The initiative for a fashion-oriented business has been translated into a new vision for business strategy that was eventually supported by ES-ERP implementation, as pointed out

by Birchenough that '[ES-ERP] has given [...] an understanding of where we can go and how we can grow as a company,' (Ron Birchenough, Finance Manager and Company Secretary, The Body Shop). Improving productivity, reacting to customer responsiveness and the market with new products, are all activities related to the customer process that were questioned, re-arranged and facilitated by ERP. The latter enabled the users to analyse consumers' behaviour quickly and efficiently by monitoring product sales, as Granville stated:

[...] the first implementation was [ES]Data Management, which feeds information from all of the stores around the world, such as sales, stocks, events and promotions, prices and margins, and analytical reason codes for returns to a central system. This enables users to analyse consumer behaviour quickly and efficiently – monitoring product sales (Granville, 2006; Global Head of IT, The Body Shop).

ES-segmental practice centred on customer sustainability as a core of the customer process, and it is summarised in the following Figure 6.

Figure 6 shows that ways to maintain customer sustainability are the most advanced level of the customer process orientation. It is a way of creating competition pressure at the extra-organisational level which was made by these proactive organisations. This, in turn, has two types of implications at the intra-organisational level. First, it shapes organisational motivation by mobilising the most superior set of ES components, especially BI. This level has transcended integration and targets intelligence as an advanced characteristic. As speculate, intelligence has changed organisational logic by not only being a customer process but also being part of the logistics, planning and control, as will be discussed later (Granlund and Malmi, 2002). By strategising and maintaining customer loyalty, it is the key purpose of segmental practice enable proactive organisations to focus on customer sustainability through simulating customers' behaviour and offering propositions. In expanding the prior studies, there is a change in the way of using financial and non-financial information (Rom and Rohde, 2006). While profitability analysis is backward-looking (Spathis and Constantinides, 2004), the simulation of customers' behaviour and offering matched preferences is a forward-looking logic (Scapens and Jazayeri, 2003). While prior studies limits the scope of this practice to profitability analysis (Rom and Rohde, 2006; Spathis and Ananiadis, 2005), this study articulates the ways in which such practice was revolutionised and was being used for advanced purposes.

Overall, different patterns of customer process orientations shape/are shaped by the extra- and intra-organisational contexts. Externally, competition and governmental pressure are caused by proactive organisations that focus on customer sustainability, which is infused

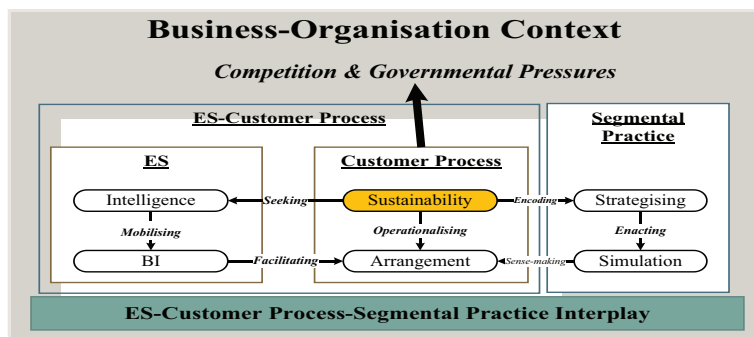


Figure 6.
Customer sustainability orientation interplay

by intelligence, whereas the late adopters among organisations only respond to contextual changes by reshaping customer orientation that focuses on either customer culture creation or behavioural understanding (Dillard *et al.*, 2004; Spathis and Ananiadis, 2005). Internally, different attributes of ES and segmental practice are mobilised and shaped by three path-dependents of the customer process orientations. The latter, in turn, shapes three ways of using segmental practice. They include collecting financial and non-financial information, understanding and simulating customers' behaviour. These three purposes for using segmental practice are, respectively, facilitated by transactional processing, integration and intelligence (Scapens and Jazayeri, 2003). On one hand, this study supports the prior studies' findings in relation to ERP as a powerful tool for data collection and information provision to understand the customers' behaviour (Booth *et al.*, 2000; Rom and Rohde, 2006; Sánchez-Rodríguez and Spraakman, 2012). On the other hand, the study contributes to existing literature that shows that intelligent ES, such as BI and BW, are superior in providing strategic support (Fahy, 2001; Rom and Rohde, 2006). Such purpose involves customers' loyalty being maintained by approaching, rather than being approached by, customers. They do so by simulating customers' behaviour and offering matched preferences. It is noteworthy that simulation is a strategic practice that was evolutionary changing facilitated by the data warehouse, accuracy, real-time access and integration (Doran and Walsh, 2004). In other words, ERP and intelligent systems are complementary systems in which the former is a platform of data management, whereas the latter is a technological aid for decision-making to enable data mining for strategic purposes (Rom and Rohde, 2006). These findings also reinforce the argument posed earlier regarding the role of BPM in shaping different patterns of interplay. Changes that pertain to customers also have implications for planning, the SCM and PM, as discussed in subsequent sections.

4.2 Pattern of logistics process

The logistics process is a fulcrum of ES and of SCM practices' interplay (Davenport and Brooks, 2004; Grabski *et al.*, 2011). The following Figure 7 shows that this interplay is also a complex box that is made up of three dimensions, namely, contextual changes, organisational intention and the attributes of the ES-logistics process-SCM interplay. However, logistics' process orientations are also the focal point of understandings that include efficiency, new business models and strategising. These spots on the continuum of the logistics process orientations mobilise different attributes of ES (components and characteristics) upon which the different characteristics of supply and inventory

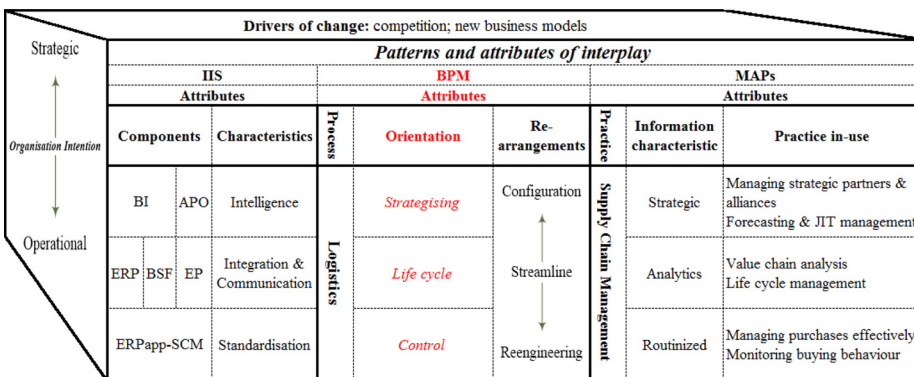


Figure 7. Logistics process interplay

management information are sought to support different purposes of using SCM. The subsequent sections articulate and discuss further how the aforementioned levels of orientations mediate on the interaction between extra- and intra-organisational levels that shape/are shaped by the interplay between the attributes of ES and SCM.

4.2.1 Control and efficiency. It is the modest level of the sub-interplay of customer process that is centred on pursuing efficiency and control, as organisational focus is shaped by a set of cases (Figure 7). Banking sector cases, in particular, provide insights into how ES is mobilised to respond to competition and to support the modest level of the logistics process's orientation that focuses on procurement and cost control.

Transparent transactions and efficiency are a key organisational orientation of both the Bank of Ireland and Lloyds-TSB. In the Bank of Ireland case, both procurement processes and pertinent control practices were key concerns. The latter gives the lack of a central database and standardised practices in managing the procurement processes, as Long states: "we did not have visibility of costs, standard best-practice procurement procedures, and uniform purchase orders" (Long, 2008; Programme Director, Bank of Ireland). These managerial concerns mobilised the Bank of Ireland to implement their first specialised system focusing only on SCM. Later, the bank upgraded ES to include ERP and Business Suit Family (BSF), and both have streamlined the procurement process, as stated by Flinn:

Given the focus on cost control in financial services these days [...] we see ERP and other components of ES for Banking as the key enabler of improved cost-effectiveness going forward," and he continued "we [...] see benefits from process efficiency and visibility which have enabled management to challenge costs on a transaction-by-transaction basis." (Flinn, 2008; General Manager, Finance and Business Services, Bank of Ireland).

The implication of this procurement process standardisation enables the Bank to control and monitor buying behaviour. Further, procurement visibility and standardisation across bank units empowered the Bank to understand cost drivers. Procurement processes and cost control are also part of Lloyds-TSB's focus. The latter added ES-SCM to its existing appFI system so as to introduce standardisation into their procurement process and to manage costs in a more effective way, as Swyny highlighted:

The solution [ES-SCM] is a key part of the Lloyds TSB Group's major Procurement Transformation Program and [...] allows [us] to optimise control of the spend and to reduce costs in the bank's procurement to pay for processes using an electronic, fully integrated, closed loop solution with our existing [ES] Financial and Reporting solutions (Swyny, 2007; Service and Systems Director, Group Procurement at Lloyds-TSB).

Sub-pattern interplay between ES-SCM practices is centred around control, as the core of the logistics process, which is summarised in the following Figure 8.

Figure 8 shows that this set of cases are concerned with procurement efficiency and control. This conservative vision is triggered by either competition or banking regulation. However, the way in which the procurement process should be controlled, and so become more efficient, seems to be a challenge. Hence, SCM is mobilised to introduce standardisation into the existing procurement process and aims to implement best practices, including rules and routines, for the means to re-arrange and then manage procurement related activities (Magal and Word, 2009; Scapens and Jazayeri, 2003). This reinforces the view that the SCM module is adopted either to drive or re-arrange the procurement process (Davenport and Brooks, 2004; Spathis and Ananiadis, 2005). Similarly, efficiency and the control of the procurement process, as an organisational orientation, has brought SCM practices into question. Reporting, profit centres/accountability and the self-management budget are found as key changes in SCM practices (Spathis and Ananiadis, 2005). In other words, the focus of

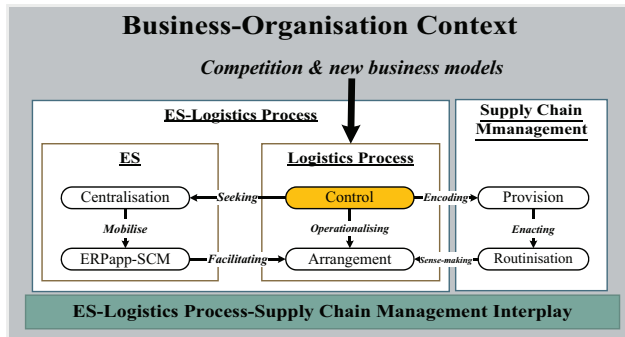


Figure 8.
Logistics control orientation interplay

this stream is given to international communication and coordination across departments (Spathis and Constantinides, 2004). The role of SCM is, however, concerned only with information collection and provision for the purpose of monitoring the purchasing activity (Booth *et al.*, 2000; Rom and Rohde, 2006). More advanced roles in using SCM practices to support a greater level of logistics process orientation are also to be found and discussed in the subsequent section.

4.2.2 Life cycle management. This is the second stream of logistics process interplay, which is centralised around life cycle management that is clustered on a set of cases drawn from different sectors (Figure 7). Both Rexam and the University of Newcastle Upon-Tyne are relevant insightful cases. These cases elaborate on the interplay between the organisational focus on product/service life-cycle management, procurement process streamlining and ES components. Competition for international students and a decline in the market share are two of the key reasons that have drawn the attention of the University of Newcastle Upon-Tyne to the life cycle of the student recruitment process. Information and software integration, as well as communication, are key characteristics of ES that are sought, and upon which the combination of ERP, including CRM and SCM, and EP, were mobilised to manage and shorten the life cycle of student applications, and Hopkins said (2006):

While applications are down 10 per cent from last year, we are more than 25 per cent ahead in firm acceptances. It used to take between 40 and 50 days to make a decision on a postgraduate student's application – we have that down to less than 7 days, on average. And there are instances where we will make a decision within four hours of receiving the student's application.

Rexam shares similarities with Newcastle Upon-Tyne University's concern over service life cycle management. However, the case of Rexam underlines the interrelations between the inventory life cycle and the procurement process. Rexam upgraded the existing ES and implemented technology functions similarly to EP, which are called the NetWeaver Platform. This aims to target integration across business units, as well as managing suppliers' relations. ES-EP provides, in particular, the basis for a communication tool, not only across the inter-organisation level but also across the intra-organisational one. The implication of this interplay indirectly affects the inventory life cycle over time. It is reported that inventory levels became close to Just-In-Time (JIT) in the case of Rexam, as stated:

[it] was to give each supplier a customised portal that they could use to improve their internal efficiencies, and [...] use to support [Rexam's] vendor-managed inventory program. Hence, because of [Rexam's] supplier portal.

Martin said “we reduced the daily inventory of aluminium coils on our factory floor by 25 per cent” (Martin, 2006; Director of Group Information Management, Rexam).

In the same context, martin stated that:

[...] the daily aluminium inventory will be down to 50 per cent of its previous levels by the end of 2004 and that Rexam will eventually get to the point of just-in-time delivery of coils.

Becoming close to JIT is attributed to an e-procurement process that is facilitated by ES-EP. The latter provides a means for Web-based collaboration, and such a characteristic provides a bridge between the suppliers-customers as well as between planners-executives, by which the need for inventory holding and control is eliminated over time. Other MAPs are, however, not isolated from these changes in inventory management and control, as will be discussed in Section 4.3. The sub-pattern interplay between ES-SCM practices that centred around the focus of the logistics process on life cycle management is summarised in the following Figure 9.

Figure 9 shows that this set of cases concerns the life cycle of the procurement and inventory processes. While competition pressure and new models of business trigger this orientation in organisations’ the life cycle, this has implications in two ways. First, it shapes the organisational motivation to mobilise a set of ES components, seeking both integration through ERP across existing information systems and communication and coordination through EP, not only across departments but also suppliers. This finding supports the prior studies from information systems (Davenport and Brooks, 2004). The authors found that using an SCM module facilitates the squeezing out of delays from suppliers and deliveries to customers, and, correspondingly, there is a reduction in inventory levels of 50 per cent. Such characteristics contribute to reproducing SCM practice. Second, SCM practices become more focused on analysing intra-organisational value chain information to shorten the life cycle of procurement, services and inventory processes (Spathis and Ananiadis, 2005). More advanced roles for SCM practices in supporting the most advanced level of the organisational orientation of the logistics process are discussed in the subsequent section.

4.2.3 *Strategising supply chain management.* The set of cases across organisational fields streams a logistics process interplay that is centred around proactive and strategic orientation (Figure 7). Microsoft and Hewlett-Packard (HP) are particularly extreme cases that provide insights into how intelligence was sought and upon which market competition was created. Intelligence ES was mobilised to support the most advanced level of the logistics process’s orientation and was the purpose of using SCM practices.

In Microsoft’s case, planning and accuracy were particularly questioned. The objective was “to deliver a forecasting and planning system infrastructure that supports BPs and

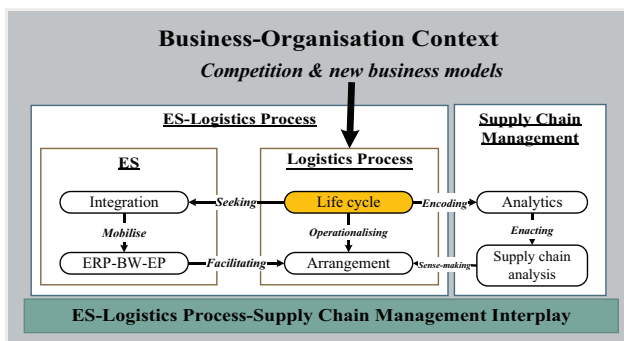


Figure 9.
Logistics life cycle
orientation interplay

enable Microsoft to achieve a competitive advantage in costs and responsiveness” (Microsoft Report, 2001). Microsoft adopted ES-SCM and Advanced Planning and Optimisation (ES-APO) to support the strategic initiatives of Microsoft across their global business operations. Seeking accurate forecasts to remain competitive in the market was the key characteristic that was driven by ES-APO adoption. Both components facilitate a real-time analysis and understanding of value chain metrics across Microsoft. Further, they enable the company to plan, commit, produce and fulfil them with an increased degree of certainty.

Managing demands and inventory management are other managerial issues that shape the interplay between the logistics process and SCM. HP shares with Microsoft in adopting the same systems to overcome a different managerial issue. In HP, it is believed that accuracy is the focal point of change to the traditional inventory management. The accuracy was the key facilitator of the pertinent forecasting information that moves a company to come close to JIT, as outlined in the Hewlett-Packard (2002) Report:

ES-SCM has recorded increases of up to 5 per cent in its forecasting accuracy. Measured against the company’s colossal sales volumes, increases in forecasting the accuracy of just a few percentage points already translate into significant cost-savings through reduced stock levels.

Furthermore, the vision express case stressed another role for ES: supporting inventory management:

Service Parts Planning for Logistics Service Providers [one of ES” components] allow us to forecast demand and manage inventory more dynamically, which will bring further inventory savings and productivity gains, lower shipment and distribution costs, and improve parts availability. (Hart, 2002; IT Manager, Vision Express).

These quotations show that JIT was not the organisations’ intention for implementation. Rather, it was an outcome of evolutionary changes that arose over time in the forecasting and accuracy that finally arrived at the JIT philosophy. In this context, the case of Kimberly-Clark endorses the interrelations between forecasting and fulfilling customer needs, on one hand, and inventory management, on the other, which were facilitated by ES-APO, as stated by Powell:

[APO] is used for a number of things, such as demand planning which is related to forecasting from the businesses for what their requirements will be for the finished product. It is also used for what we call central inventory deployment, which is working out where stock should be located to be the most efficient and cost effective way of actually meeting a customer’s needs (Powell, 2005; Director of Management Information Systems, Kimberly-Clark Europe).

Balancing the fulfilment of customers’ needs and maintaining inventory costs are also dilemmas encountered in higher education organisations, especially Oxford University Press (OUP). Sherry brought to notice the interaction between three factors:

The more accurate view of the quantities would result in improved customer service which, in turn, reduces operating costs and leverages sales performance (Sherry, 2005; Commercial Director, OUP Education and Children’s Division).

Having a long process, Sherry believes that both accuracy and intelligence are respectively key characteristics that are offered by APO and BI. While accuracy facilitated significant changes in forecasting, the intelligence of BI enabled OUP to simulate and plan for customers’ needs, as Sherry stated (2005):

APO gives [...] a single, consistent set of advanced optimisation techniques that help [to] maximise sales, improve customer service and reduce costs.

She continued:

[BI] allows us to track the widely varying demand patterns for the range of books we sell and to give each publication its best forecast profile. It combines human and market intelligence with accurate, near real-time information to help us make better planning decisions faster.

The sub-pattern interplay of ES-SCM practices is centred on strategising as the core of the logistics process, and it is summarised in the following **Figure 10**.

Figure 10 shows that this set of the cases' logistics process orientation is at the most advanced level, as it is concerned with strategising SCM. In extending the prior literature, such organisational vision creates competition pressure at the extra-organisational level, including the invention of new business models (Rom and Rohde, 2006; Spathis and Constantinides, 2004). The same applies also at the intra-organisational level in two ways. First, BI and APO are mobilised and are built on existing ES, i.e. ERP and EP, seeking intelligence, while implementing EP allows the seamless integration of the implementing organisation with others, such as suppliers, customers and outsources, as well as identifying alliance partners (Davenport and Brooks, 2004). As Granlund and Malmi (2002) have speculated, benefiting the BI and APO of the data warehouse and organisational inter-relations seems to be a changed logic in the logistics process that empowers a proactive role (Rom and Rohde, 2006; Willis *et al.*, 2002). Strategising, rather than having a strategy, is, second, the key concern of SCM practices. The latter is being used to identify and manage strategic suppliers and alliance partners. This supports the conclusion that strategic ES are superior tools that are mobilised to support strategic management accounting, including decision-making (Fahy, 2001; Rom and Rohde, 2007).

Overall, different patterns in the logistics processes' orientations shape/are shaped by the extra and intra-organisational context. Externally, competition and developing new business models are caused by a proactive organisation that focuses on a planning and strategising logistics process. In contrast, late organisation adopters respond to this pressure by reshaping the logistics process's orientation, becoming more focused on the control and/or life cycle. Internally, different attributes of ES and SCM practices are mobilised to support these paths of logistics' orientations, whether control, life cycle and/or strategising. While the SCM module, the ERP package and EP support, respectively, standardisation, integration and the coordination of the logistics process, both within an organisation and across the inter-organisational fields, including the suppliers, customers and other business partners (Davenport and Brooks, 2004). Using BI and APO to seek intelligence is an extension of the existing ES that is motivated by, and aids, the strategic purposes (Hyvönen *et al.*, 2006; Rom and Rohde, 2006). Rom and Rohde (2006), in particular, have made it clear that ERP performs better in supporting breadth management relating to data collection, whereas strategic or intelligence systems perform better in supporting the top management level of

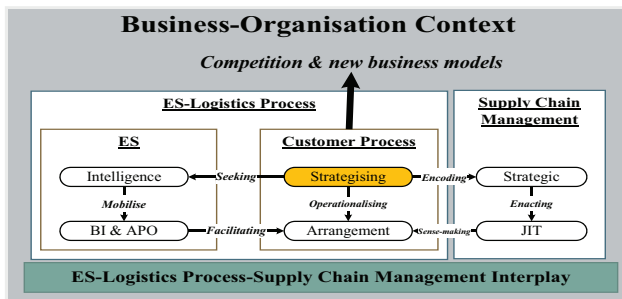


Figure 10.
Logistics strategic
orientation interplay

strategic planning and decision-making (Fahy, 2000; Booth *et al.*, 2000). Such a combination benefits the data warehouse provided by ERP/BW in running data mining and internet-based EP between customers and suppliers facilitates changes in SCM practices in relation to planning and decision-making. This indicates that different management accounting tasks are supported by different parts of the ES.

In extending the prior literature of MA, there is a fundamental change in the ways (logic) of using SCM practices (Granlund and Malmi, 2002; Willis *et al.*, 2002). From an inter-organisational perspective, supply–customer interrelations became highly iterative processes involving a shortened life cycle, and they bring supply costs into scrutiny. In addition, SCM practices are being used not only in monitoring and shortening the life cycle but are also being strategised to manage strategic suppliers, partners and alliances (Davenport and Brooks, 2004). These include sophisticated practices, such as ABC and BSC (Spathis and Constantinides, 2004). The former is being used to understand the cost drivers and costs that are incurred, relative to the value added by specific supply chain activities. Dashboards are represented in BSC and are being used to give suppliers, purchasing managers, plant managers and customers the access to supply chain information within and across the implementing organisation. It is noteworthy that strategising/sophisticating SCM practices did not emerge as a revolutionary process. Rather, it is an evolutionary change that is facilitated by communications and intelligence (Doran and Walsh, 2004; Scapens and Jazayeri, 2003). These changes have, in turn, implications for the management control process and PM, and they will be discussed in a subsequent section.

4.3 Control process patterns

The control process is another fulcrum for an understanding of ES and PM interplay. Figure 11 shows that this interplay is a complex box made up of three dimensions, namely, contextual changes, organisational intent and the attributes of the control process interplay.

However, the logic of the control process is the focal point of such understandings, which include accountability and reporting; evaluation and analysis; and strategising organisational performance. The rest of this sub-section discusses the interplay between ES (components and characteristics) and PM (information characteristics and purposes) that are mediated by the logic/orientation of the control process.

4.3.1 Accountability and reporting. There is a modest level of sub-interplay of the control process fabricating managerial concerns over financial and managerial accountability and reporting (Figure 11). The set of cases shape this stream of interplay that provides key insights into how ES components are mobilised to address contextual demands. Financial

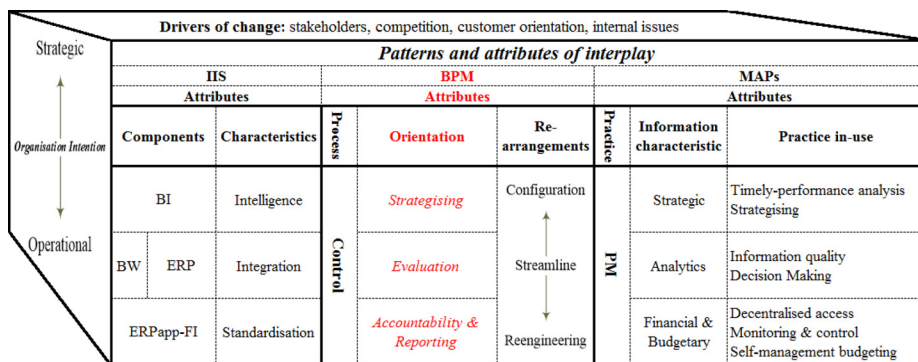


Figure 11. Control process interplay

accountability and reporting to stakeholders are the overriding issues in this stream. BW is mobilised as an extension to the existing ES in the case of Waltham Forest Borough Council, upon which the transactional process of data has been brought into standardisation. The latter involves new ways of data processing by which information is easily accessible, as Badrinath has underlined:

End-of-month reports, which previously took three days and required 24 boxes of paper, can now be produced electronically in five minutes, freeing staff for other activities and cutting costs. Elected Councillors now have accurate and up to date information on the Authority's performance on which to base their decisions about service delivery (Badrinath, 2006; Executive Director of Corporate Services, Waltham Forest Borough Council).

The centralisation of ES components facilitates data processing upon which reporting to the stakeholders is simplified. The same applies to managerial accountability. Pursuing an integrated view and the comprehensive monitoring of organisational performance are the key orientations of Homebase's control process. This case mobilised ES-BW, as Hopper has cited:

I think one of the crucial things about ES-BW is that we are working from a comprehensive and uniform data source and everyone is working with the same information for their decisions. The trading team [for instance] tend to use it for all the product management, all the product details, cost maintenance [...] and so on, and the merchandising team use it for all their purchase order management and for extracting data from the BW system to support their activities (Hopper, 2005; Merchandising Manager, Homebase).

This sheds more lights on the role of ES-BW in decentralising management accounting information. In the banking field, transparency, streamlined accountability and the decision-making process are key issues that have shaped this interplay. The case of the Bank of Ireland is concerned with obtaining an integrated view of information across all business units, as Lattimore states:

[Bank of Ireland] needed to centralise all information related to operations and give our management a 360-degree view across our distributed business units. Selecting the business intelligence [...] has the functionality to support both our current and future information needs – and empowers our executives with the information they need to improve day-to-day decision making (Lattimore, 2008; Manager of IT Procurement Services, Bank of Ireland).

The Bank of Ireland wanted to ensure a holistic view to monitor operational and financial performance on a daily basis. In so doing, BO, alongside BI, was adopted to provide quicker, decentralised access to information from across the Bank. Accountants became able to distribute the performance reports to managers in branches and trading desks on a daily or weekly basis, automatically.

The field of public organisations is not isolated from the changes mentioned above. The London Borough of Southwark implemented a combination of BW and CRM. While the BW was used by them to produce information and to improve reporting capabilities, the CRM gives a sense that they understand what their customers need. Murphy stated:

We have never had the data collated in one place before. In terms of planning for the future, we are now much better able to target our resources at the volume of services required than we ever were before (Murphy, 2004; Assistant Chief Executive, London Borough of Southwark).

Collecting information and monitoring organisational performance on a daily basis is the key change in the use of PM. Such change in-use extends the previous literature (Sánchez-Rodríguez and Spraakman, 2012; Scapens and Jazayeri, 2003). ES-PM centred on accountability, as the core of the control process is summarised in the following Figure 12.

Figure 12 shows that this set of cases concern financial and managerial accountability. Stakeholders and managerial demands are the key drivers that shape the logic of this control process's orientation. Both transactional processing standardisation and decentralised information access are sought through Financial (FI) module. This standardisation aims to implement best practices, including rules and routines, in relation to computerising the daily accounting routine (Scapens and Jazayeri, 2003). This reinforces the existing conclusions that ERP and FI have an explicit impact, not only on improving the quality of the information but also in reducing the time needed to prepare reports of accounts periodically (Booth *et al.*, 2000; Rom and Rohde, 2006; Sánchez-Rodríguez and Spraakman, 2012; Spathis and Constantinides, 2004). As the accountability control process's focus, this set of cases is still focusing on information provision and monitoring employees' behaviour. In contrast, more advanced roles for PM practices, in supporting a greater level of organisational orientation of the control process, are also found and discussed in the subsequent section.

4.3.2 Evaluations. It is the second stream of control process interplay, which is centred on performance evaluations that are shaped by a set of cases (Figure 11). Seeking integration through mobilising a set of ES components and monitoring organisational performance on a daily basis are the key concerns of this stream. Rexam is an insightful case which had no previously centralised reporting capabilities. Rather, internal reporting had always involved manual production, which was based on Microsoft Excel and shared through e-mail. It seems to be a key concern of Rexam to have a consistent view of organisational performance upon which the interrelationship between ES-BI adoption and PM changes was mediated. This was a big step forward for Rexam and its implication, as Martin explains, was that:

[...] they log in, and they can easily access the transactions they need right there. The CEO [...] can look at his portal dashboard and see just where we stand relative to the 10 key performance indicators (Martin, 2006; Group Information Management Director, Rexam).

Moving from monitoring to analysing organisational performance is another focus of performance evaluation. Both British-American Tobacco and Royal & SunAlliance share similarities in seeking to go beyond data availability, reliability and consistency. Rather, integration is sought by mobilising the analytical components of ES to dedicate more time to analysis. In the British-American Tobacco case, it reported that *less time is spent compiling data and more time analysing it – allowing the markets to focus on selling and managing BAT's reputation*'. The same applies to the case of Royal & SunAlliance, as Fendall stated:

BW has enabled staff at Royal & SunAlliance to concentrate more on the analysis of the data, rather than its production, which makes greater use of the team's skills. The BW has now been fully rolled out across Royal & SunAlliance's UK organisation (Fendall, 2006; Interim Director of HR Services, Royal and SunAlliance).

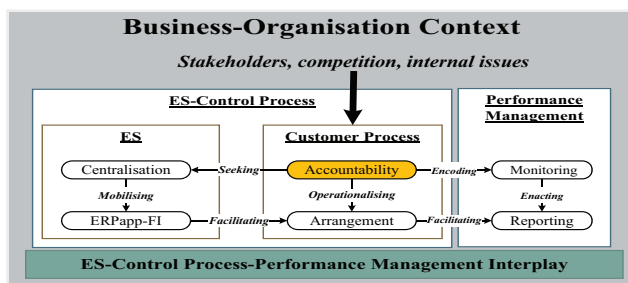


Figure 12. Accountability orientation interplay

Indicators against strategy driving the decision-making process and organisational response underline a concern across Aerospace & Defence and public fields. Rolls-Royce is a case of this sub-stream that has encountered numerous business challenges. Reacting quickly to customers' demands in changeable markets became an orientation upon which the control process is re-arranged and facilitated by ES-BW, as outlined by Shepherd:

BW has been proven to deliver the right information at the right time to Rolls-Royce decision makers. With BW, product planners and senior corporate executives alike can monitor and improve the company's supply chain processes to improve efficiency and ensure customer satisfaction. BW empowers users to glean the level of detail they need from the part level to the business unit performance level. (Shepherd, 2002; Director Market Support, Rolls-Royce plc).

Birmingham City Council shares Rolls-Royce's views. The authority intended to establish an integrated set of PM tools across the whole organisation. This was shaped by the Council's vision in providing residents with a better service and in meeting the key KPIs that are set by the government. Both BO and BSF have taken place, providing a dashboard that allows them to gain a deep understanding and to focus on key service areas, as Evans reported:

[...] Birmingham [is being seen] as a good example of what an organisation can do with software by recognising that it is not just about implementing the application itself. Rather, it is about using this as an enabler to change the way the organisations works and deliver performance and informational improvements across a broad scope of operations (Evans, 2010; Corporate Director of Business Change, Birmingham City Council).

This way of using PM enables the authority's employees to get insights into how well the organisation is actually operating against its strategy. Importantly, how conditions for citizens that pertain across key public services, including housing, planning, social care and environmental services, can be taken forward. To illustrate this, the council has framed its strategy by agreeing on five critical business activity areas. This, in turn, was divided into growth levers but was linked to business impact and key performance indicators upon which action plans were developed. Evans explained that:

Performance management information is vitally important for local government as it is how we measure our success against our goals. ES-Business Objects Strategy Management is invaluable at giving a picture of how the council is performing by area or type of property, allowing us to see where we can improve (Evans, 2010; Corporate Director of Business Change, Birmingham City Council).

Timely performance analysis seems to be a shared practice that is influenced by governmental pressure. GCC sought to implement ES-BI to obtain integration and to free accountants for alternative tasks. Tully stated that:

ES-CRM has made [...] job significantly easier. It constantly provides [...] very high level of accurate information on the performance of [...] customers, the performance of our personnel and the performance of our service levels. At any time we can, very quickly, get comprehensive information about what we are doing and how we are doing it (Tully, 2006; Deputy Director of Financial Services, Glasgow City Council).

Overall, the sub-interplay of the ES-PM practices that materialise focus on the control process around evaluation, and this is summarised in the following [Figure 13](#).

[Figure 13](#) shows that this set of cases exceeded data collection and became concerned with performance evaluations. While this organisations' orientation is triggered by competition pressure, it has implications for the intra-organisational level in two ways. First, this set of cases builds on existing ES, seeking both integration and centralisation through mobilising, respectively, ERP and BW. Second, analytics are the key concern of PM practices, which

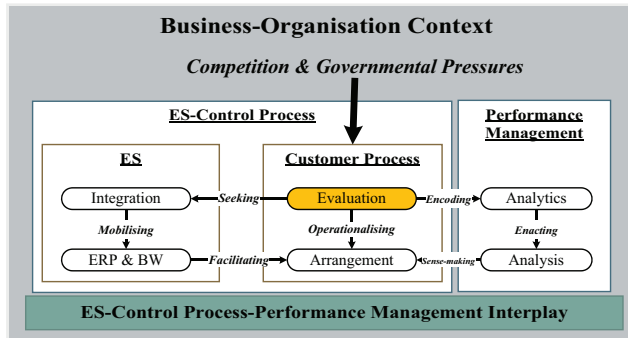


Figure 13.

relate to timely performance. Previously, managers waited for accountants to present managerial accounts on a periodic basis. This logic of PM is fundamentally changed. It has become focused on monitoring organisational performance on an on-going basis instead. Further, this performance is timely in analysing comparison with the organisational strategy. This reinforces *Scapens and Jazayeri's (2003)* case findings. The authors argued that managers have continuous access to performance information and variances, as information contained in the systems is captured on a real-time basis. Such change enables decision-makers to act quickly and effectively. More advanced roles for PM practices support the most advanced level of the organisational orientation of the control process, which is discussed in the subsequent section.

4.3.3 Strategising performance management. This is the most advanced level of the control process interplay that is oriented by strategising PM (Figure 11). The set of cases from across different sectors concern this proactive through seeking intelligence and mobilising the most advanced ES components upon which PM is strategised. It is a case which GCC considers to be a partnership between ES and strategy. Turner has clearly emphasised this:

[The] ES and organisation business process enable us to formulate and implement the business strategy. We do not see e-business strategy or IT strategy in isolation. It is a partnership with the business. Strategy has to turn into action, the tools we select have to ensure that the business strategy gets delivered (Tully, 2006; Deputy Director of Financial Services, Glasgow City Council).

In this context, Flybe is a case that offers insight. It was explicitly emphasised that Flybe's managers were dissatisfied with the role of information. However, being forward-looking in managing organisational performance was the key managerial problem of Flybe, due to its competitors. ES-BI is considered the most powerful tool for seeking intelligence, as Davies mentioned:

ES-BI tools essentially allowed us to move away from having access to static information to being able to use the data in an informed and intelligent way, delivering the right information to the right people at the right time (Davies, 2010; Business Intelligence Manager, Flybe).

Infusing intelligence into the control process has made Flybe's control process focus on being forward-looking rather than backward-looking. IS-BI enables decision makers to interrogate data and offers ways to put forward decision processes that are informed by existing circumstances. In this sense, The Loft Shop case provides more detail on the implications of intelligence in relation to strategising PM. Such characteristics facilitate the monitoring and analysis of live performance across business units, as Darragh has said:

[we] can look at the volume of a certain key product to us [...] and track the moving annual total of that on a daily basis and can see whether we are moving the business forward on that day or we are not (Darragh, 2005; IT Manager, The Loft Shop).

Darragh adds:

[...] the benefits of accurate and timely information, we can measure each of our outlets [...] very accurately through the use of cost centres and profit centres. We can trace goods at any split second in time. We have cut down on stock shrinkage a thousand-fold compared to what we were used to with the old system. (Darragh, 2005; IT Manager, The Loft Shop).

Alongside monitoring live performance, the case of Yorkshire Water adds timely action that is driven by KPIs. Moving from information collection to analysis was involved in improving both FKPIs and NFKPIs. According to Yorkshire Water, the change in PM is attributed to ES-BW implementation, as reported:

This capability has been further enhanced by the implementation of ES-BW [...] subsequently Finance and HR, which provide managers with better performance analysis and the ability to identify areas for improvement using information from within both ERP and non-ERP systems (Harrison, 2005; Director of Information Technology and Customer Contact, Yorkshire Water).

The case of Alstom also contributes to this stream of strategising PM as a focus for the control process. Timely drilling of variance analysis and understanding organisational performance are overriding issues for Alstom. Haynes believes that:

[...] the most powerful feature of ERP is the ability to look at figures in overview and then drill down to the detail, where those figures are potentially at variance, and so quickly gain an understanding of what is going on within their particular role or function. Certainly, the user interface is much better than some of the traditional ERP systems that they have experienced (Haynes, 2003; Stafford Local Service, Alstom Centre Manager).

This quote shows that KPIs are produced in a dynamic, rather than a static way. This approach provides the capability not only to understand performance variance but also to improve decision-making in corrective action. The sub-interplay of ES-PM practices, centred on strategising as a core of the control process, is summarised in the following Figure 14. Figure 14 shows that this set of cases' control process orientation is at the most advanced level, as it is concerned with strategising PM. In extending prior studies, such an organisational vision is creating competitive pressures at the extra-organisational level to act strategically (Rom and Rohde, 2006; Spathis and Constantinides, 2004). The same applies also to the intra-organisational level in two ways. First, BI and APO are mobilised and are built on existing ES, i.e. ERP and BW, seeking intelligence. As speculated, benefiting BI and APO in the data warehouse and organisational inter-relations seems to be a changed logic of

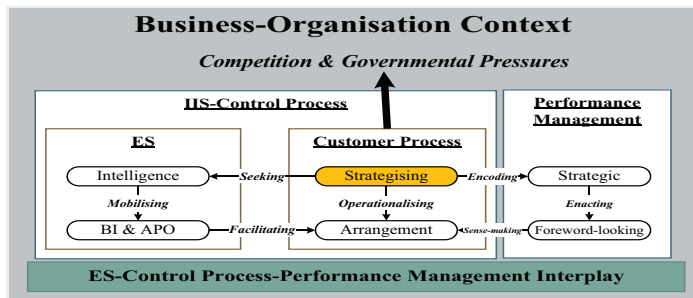


Figure 14.
Strategic orientation
interplay

the control process that empowers a proactive role (Rom and Rohde, 2006; Willis *et al.*, 2002). Second, strategising, rather than having a strategy, is the key concern of PM practices. The latter is being used not only to monitor performance but also to identify improvements and to act quickly and effectively. This supports the conclusion that strategic ES are superior tools that are motivated to support strategic management accounting, including decision-making (Fahy and Lynch, 1999; Rom and Rohde, 2006).

Overall, different patterns of orientations-based control process shape/are shaped by the extra and/or intra-organisational context. Externally, stakeholders' perceptions and the competition for change are caused by the proactive organisation that focuses on strategising the control process. By contrast, late organisational adopters respond to this pressure by reshaping the control process's orientation and by becoming more focused on accountability and/or evaluation. Internally, different attributes of ES and PM practices are mobilised to support these paths of control orientation, either accountability, evaluation and/or strategising, while the FI module, the ERP package and BW support, respectively, the standardisation and integration of the control process within an organisation. Using BI and APO to seek intelligence is an extension of the existing ES that is motivated by, and aids, strategic purposes (Hyvönen *et al.*, 2006). Again, this reinforces the conclusion that ERP is performing better in supporting breadth management relating to data collection, whereas strategic or intelligence systems are performing better in supporting the top management in strategic planning and decision-making (Fahy and Lynch, 1999; Rom and Rohde, 2006). Such a combination benefits from the data warehouse that is provided by ERP/BW in running data mining, and this facilitates changes in PM practices in planning and decision-making and indicates that different management accounting tasks are supported by different parts of the ES. In extending the prior literature on MA, there is a fundamental change in the ways (logic) of using PM practices (Granlund and Malmi, 2002; Willis *et al.*, 2002). Correspondingly, PM practices are being used not only to monitor organisational performance but also in relation to timely analysis and in acting upon the dashboards. It is noteworthy that strategising/sophisticating PM practices did not emerge as a revolutionary process. Rather, it is an evolutionary change that is facilitated by being forward-looking and through intelligence (Doran and Walsh, 2004; Scapens and Jazayeri, 2003).

5. Framework and discussion

Developing proceeding findings and discussions of patterns of ES-BPM-MAPs interplay into an analytical framework advances our understanding of ES-BPM-MAPs interplay is the second purpose of this paper. This aims to provide explanations contribute to the existing literature and society in two ways. First, it clarifies the interplay process. Second, it articulates outstanding issues that were revealed by the approaches of prior studies discussed in Section 2 (Arnold, 2006).

The framework is built on two cornerstones provide fundamentals to understand ES-BPM-MAPs interplay. First, management layers in which interplay is operating provides a way to understand managerial issues upon which ES components and characteristics are mobilised and sought, respectively. This is inspired by an insightful case study conducted by Scapens and Jazayeri (2003) and further classification articulated by Arnold (2006). The idea of management layers also supported by both (Booth *et al.*, 2000; Rom and Rohde, 2006). These provide inputs to this paper and arguing that ES-BPM-MAPs interplay existed to overcome three managerial challenges, namely, data processing, integrated reporting and strategising. These challenges are continuum encounter the breadth, middle and top management layers, respectively, as shown in the following Figure 15.

This continuum of managerial challenges is in turn shape interrelated development of ES. The latter could be conceptually recognised into three phases. In the first phase, reporting information either for internal and/or external accountability is the key managerial challenges face breadth management and may explain reason of mobilising individual components of ES to reengineer data processing to meet such task. By complementary, the second phase, reporting integrated information is more advanced managerial interest pursued by middle level of management to understand business environment, and this may explain reason of mobilising ES packages to streamline BPs and system connectivity to meet intended task. In final phase, acting strategically is the concern of top management upon which intelligent systems are mobilised to complement existing ES components and BPs to provide analytical information that enables strategic actions. In other words, decision of selection and adoption ES is driven by managerial issues and management intention of change. That are different layers of management have different focuses that are supported by the collection of ES, and these both shape and facilitate new ways of using MAPs.

This triggers the second fundamental of analytical framework, an organisation intention. This underline two types of organisational attention of change, namely, proactive and defensive organisations. Instead, an organisational intention is considered to be a continuum in proactive, conservative and defensive organisations in this study. While contextual changes are the outcomes of the proactive organisation that focuses on strategising and inventing new ways to manage BPs. By contrast, contextual changes are inputs that shape response of defensive organisations.

Both managerial issue and organisational intention of change profiles the third fundamental of the analytical framework. That is, ES-BPM-MAPs interplay process is

Key factors		Management layers			
		Breadth	Middle-level	Top	
IIS	BI, APO, BW	Characteristics		Intelligence	
	ERP Package			Integrated Apps	
	Apps/ Modules		Standalone		
BPM	Customer Logistics Control	Orientation		Strategizing	
			Standardisation	Understanding	
		Arrangements		Configuration	
			Reengineering	Streamline	
MAPs	Segmentation SCM PM	Purpose		Strategizing	
			Provision	Reporting	
		Characteristics		Analytical	
			Processing	Integrated	
			Phase 1	Phase 2	Phase 3
Phases and attributes					

Figure 15. ES-BPM-MAPs interplay and management layers

operating at the operational level, mid-level and/or top management level. This ES-BPM-UK-MAPs ES-BPM-MAPs' interplay consists of three interrelated processes, namely, the encoding, fabrication and sense-making processes as shown in Figure 16.

The subsequent sections outline organisational change that shapes, or is shaped, by the encoding, fabricating and sense-making processes.

5.1 Encoding processes

Encoding is a process that is initiated by an organisational intention for change. It is involved in operationalising a level of BPM orientations operate at different layers of management. In extending Sánchez-Rodríguez and Spraakman (2012), controlling, understanding and strategising are three levels of BPM orientation around which three processes, namely, customer, control and logistics are encoded (Grabski et al. 2011). Furthermore, encoding these processes is affected by the change intention of the breadth, middle and upper level of management. These orientations are however a continuum and identifying clear-cut borders is not intended.

Different levels of BPM orientations may shape ES characteristics and MAPs in-use. First, creating a customer culture, transparency and accountability are respectively basic BPM orientations of customer, control process and logistics processes at breadth management (Sections 4.1.1, 4.2.1 and 4.3.1). Individual modules of ES such as FI, SCM and CRM could be adopted targeting standardisation and routinisation. While standardisation involves introducing the new rules, procedures and routines of best practices into the customer, logistics and control processes. The routinisation involves computerising daily routine of organisational activities that pertain to the aforementioned processes (Scapens and Jazayeri, 2003). At this level, however, misalignment between the existing and ES preconfigured ways of managing processes is anticipated. BPR may emerge as a managerial solution to overcome misalignment as will be discussed Section 5.2.

Second, understanding customer behaviour, the life cycle and organisational performance are, respectively, middle BPM orientations of customer, control process and logistics processes (Sections 4.1.2, 4.2.2 and 4.3.2). As a concern of middle-management, it is seeking a consistent view of information across organisational units. Integration and communication are key characteristics that are sought through mobilising ES packages and EP. As argued, this integration involves systems and information integration (Booth et al., 2000). To balance this, communication involves interconnection across departments (intra-organisation) and the organisational field, including customers-suppliers

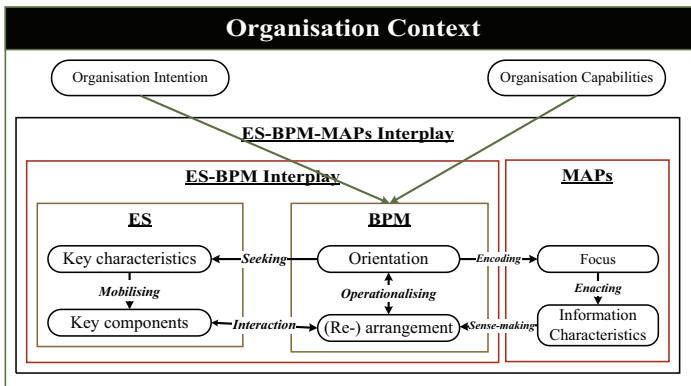


Figure 16. ES-BPM-MAPs interplay

(inter-organisations), especially for the logistics process (Davenport and Brooks, 2004). Therefore, the scope of this management level exceeds information provision to attain an analytical focus that enables to understand and analyse actual information against strategy.

Strategising customer, logistics and control processes is the highest level of BPM orientation. Such level is a concern of top management aims to act proactively (Sections 4.1.3, 4.2.3 and 4.3.3). Intelligence is the key characteristic sought though mobilising intelligent components of ES such as BI and APO. It enables the possibility of forward-looking that underlines the sustainability of customers (Cotteleer and Bendoly, 2006), alliances (Davenport and Brooks, 2004) and/or performance (Scapens and Jazayeri, 2003). This elaborates Hopwood's (2009, pp. 799-800) message that:

Strategies are also being constantly recast, illustrating in the process the importance of being strategic rather than merely having a strategy. Ad hoc analyses of a multitude of different aspects of the economic functioning of the organisation are becoming a form of standard practice. Management accounting is moving to operating in continuous time.

That is, the value of intelligence is to approach customers, rather than waiting to be approached, mediating customers-suppliers communication and strategising performance, rather than having a strategy. In sum, standardisation, integration and intelligence are characteristics that reflect different BPM orientations and layers of management. These characteristics shape the fabrication process and address the fundamental question about whether the ES supports BPs or is in itself a fundamentally new way of doing business? (Rikhardsson and Kræmmergaard, 2006).

5.2 Fabrication process

This process involves the selection and implementation process of ES components. The previously mentioned characteristics that were sought are key values that provide path-dependency upon which the selection of ES components can be mobilised. This addresses the role of ES as driver (Quattrone and Hopper, 2001) or facilitator of organisational change (Scapens and Jazayeri, 2003), in enabling strategic views (Fahy and Lynch, 1999) or sustaining an operational viewpoint (Hyvönen, 2003), associated with (Davenport *et al.*, 2004) or disassociated from re-engineering the organisational BPs (Scapens and Jazayeri, 2003). Implementing ES is, however, a continuing process (Granlund and Malmi, 2002; Quattrone and Hopper, 2001). Granlund and Malmi (2002, p. 304), in particular, found that:

In general, the level of system integration can be said to be a continuum. In cases where a company implements only some modules of the ERPS, it is somewhere in the middle of the continuum that goes from collection of standalones systems to a wholly integrated system.

In reinforcing the prior literature, ES implementation is an on-going and endless activity (Davenport *et al.*, 2004; Quattrone and Hopper, 2001; Rikhardsson and Kræmmergaard, 2006). It is a process through which different systems are mobilised and implemented at different stages and are exploited to overcome the technical and managerial challenges that face the layers of management (Cooper and Kaplan, 1998; Rom and Rohde, 2006). The integration is, in particular, a technical challenge that represents a continuum which includes types and levels of integration. As Booth *et al.* (2000) have argued, the types of integration include hardware, software and information integration, whereas the levels of integration extend to no integration, part-integration, full system integration and full information integration. Paired with this, managerial challenges are also a continuation of BPM orientations, which are outlined in Section 5.1, and which underline the different information characteristics that are sought by diverse layers of management (Arnold, 2006; Rom and

Rohde, 2006). In other words, this continuity is understood in two ways, namely, in the addition of ES components (Kaplan, 1990; Rom and Rohde, 2007) and in the discovery of these components over time by employees (Quattrone and Hopper, 2001; Rikhardsson and Kræmmergaard, 2006). Both are, however, used to overcome managerial challenges. Second, integration and communication are sought by *middle-level management* to understand customers' behaviour; life cycle and evaluation (Figure 15). This may involve organisations in proceeding to the second phase of ES activity (Kaplan, 1990). It does so by upgrading from modules to implement the full package of ERP or BS, targeting systems and information integration. Furthermore, implementing EP could also be intended to bridge not only the organisational department but also the gap between customers and suppliers.

Referring to Figure 15, third, ES intelligence is sought by the *top management* of proactive organisations. It aims to strategise the customer, logistics and PM processes to maintain, respectively, the sustainability of customers, alliances and performance. Unlike ERP, advanced components of ES, including APO and BI, are mobilised to support, respectively, planning and decision-making. BI benefits from data availability in running analysis and simulation that is based on historical data and that can be performed on a continuous as well as on an *ad hoc* basis. This reinforces the conclusion that discovered that strategic ES performed better than ERP in supporting strategic changes in MAPs (Fahy and Lynch, 1999; Gould, 2003; Rom and Rohde, 2006).

In sum, modifying the stage-model that is suggested by Kaplan (1990) into three stages could explain the development of ESs in relation to BPM orientations (Rom and Rohde 2007). Both of the sought characteristics and the ES components would also explain the development and informal changes in MAPs. Routinising accounting routines, analysis and simulation are ways of using MAPs that are associated, respectively, with breadth, middle and top management layers, as discussed in the subsequent section.

5.3 Sense-making process

This process involves MAPs in making sense of broader organisational changes, including the increasing emphasis given to BPM that has been outlined in some of the preceding sections (Figure 14). It discusses how the sought characteristics, mentioned above, are shaped by MA information needed by managers at different levels, on one hand, and how ES characteristics open up opportunities for change in MAPs on the other (Scapens and Jazayeri, 2003).

Reporting, analytics and strategising are three ways to use MAPs. While these roles provide sense-making of the arrangements of BPM, they are advanced by the implemented components of ES. As per Figure 15, first, the information provision and reporting are the focus of breadth management. Implementing standalone systems or modules, such as FI, CRM and/or SCM, materialise this orientation in customer information, producing periodic reports for the stakeholders, timely access to information by managers and the monitoring of purchasing behaviour.

Timely analysis of integrated information is the interest of middle-level management. This role is facilitated by implementing full packages of ERP or BS that feature the second phase of ES as an activity. Integrated information includes financial and non-financial information, as well as KPIs. This provides support for prior studies, which found that neither standalone systems nor the ERP package drive the adoption of new MAPs, rather than supporting the existing ones (Granlund and Malmi, 2002; Scapens and Jazayeri, 2003). Alternatively, findings indicate that ERP is a platform, rather than a technological aid to support analysis and decision-making, and such a role is promised by strategic ES, as discussed below.

Referring to Figure 15, strategising is an interest of the top management of proactive organisations. The role of MAPs enables a focus on both business and customer sustainability, including the maintenance of customer loyalty, forming partner alliances and dynamic performance (Table II). In extending the prior literature, all are facilitated by intelligence that is sought through the strategic components of ES, such as BI and APO (Fahy and Lynch, 1999; Rom and Rohde, 2006). While APO benefits from information accuracy in its rolling forecasts, and this forward-looking has been reported particularly by Scapens and Jazayeri (2003), BI benefits from the data warehouse in running simulations in relation to customers, suppliers and performance. This provides a contribution to the existing literature. Accuracy and intelligence have facilitated sophisticated changes in segmental practice, SCM and PM. Such characteristics enable an organisation to take a proactive role in approaching customers, in identifying strategic partnerships and in enabling timely performance-based action. This reinforces a positive relationship that is found between extensions of ES and is a strategic focus of management accounting (Fahy and Lynch, 1999; Rom and Rohde, 2006).

It is argued here that this sophistication in MAPs has gone through a process of evolutionary change, rather than a revolutionary one. In line with Scapens and Jazayeri (2003), it is shaped by the continuity of an organisation's intention for change (Rom and Rohde, 2006), and this change is achieved by the continuity of ES components. Unlike the prior literature, instead of examining which innovations have been introduced by ERP, this study delineates the interrelations between the BPM orientations, ES components and the information characteristics that have all facilitated innovation in MAPs (Doran and Walsh, 2004). In other words, ES and MAPs are not independent of one another, as the development of MAPs seems to drive the development of the ES (Cooper and Kaplan, 1998; Kaplan, 1990; Rom and Rohde, 2007).

6. Conclusion

This paper has examined the ES-BPM-MAPs interplay across (89) cases that operate within different organisational fields in the UK context. Insights drawn from these cases contribute to the existing literature by clarifying several issues that surround the ES relationship, not only with MAPs but also with BPM. Complexity, a bi-directional relationship and nonlinearity are the overall features of these interrelated processes. ES-MAPs interplay is more complex, and drawing borders across ES-MAPs and within MAPs is far too simplistic. Rather, there is interdependence not only across ES-BPM-MAPs but also within the MAPs in-use. This complexity could be understood in the broader context of the organisational parameters of which BPM is the *fulcrum*. The BPM is delineated to include processes, namely, customer, logistics and control processes, which are built around a continuum of orientations, including controlling, understanding and strategising, that depends on an organisational intention for change.

Processes and orientations constituted different patterns of ES-BPM-MAPs interplay, and this is the first key contribution of this study. Creating customer culture, transparency and accountability are basic BPM orientations that shape the interest of breadth management. The latter is seeking standardisation and routinisation through modules/standalone systems that target data processing and information provision. Understanding customer behaviour, product/service life cycle and organisational performance are on a higher orientation level. This is a focus of middle-management, which seeks to have a consistent view (integration and communication) across organisational units through implementing packages of ERP, EP and/or business suite. Strategising customer, logistics and control processes is the third and the highest level of the BPM orientation that

is undertaken by a proactive organisation. Intelligence is a key characteristic that is sought through BI and APO to enable the company to be forward-looking and to maintain the sustainability of customers, alliances and/or performance.

Different systems are implemented at diverse stages and are used for dissimilar purposes, and this is the second key contribution of this study. While this study supports prior literature's conclusions that consider implementation to be an on-going and endless activity, it elaborates on the development of ES mobilisations at different stages, in line with organisational changes, especially BPM orientations. It also contributes to the debate over the (dis)association between ES and BP changes/reengineering. ES is a driver of BP change at the operational level of BPM orientation, whereas it is a facilitator of organisational change at the strategic level that enables proactive organisations to focus on strategising, rather than on having a strategy (Hopwood, 2009).

Reporting, analytics and strategising are three ways in which MAPs can be used, and this is the third key contribution of this study. Data processing, information provision and reporting are the intention of the breadth of management that is facilitated by standalone systems or modules, such as FI, CRM and/or SCM. This occurs not only by having integrated information but also through timely analysis that is an interest of middle-level management. It is sought through integration and communication, which is facilitated by implementing full packages of ERP or business suites. However, neither standalone systems nor the ERP package drives the adoption of new MAPs, rather than supporting the prevailing ones. Alternatively, ERP is a platform, rather than a technological aid to support analysis and decision-making and strategic ES promise such a role. Strategising is an interest of the top management of proactive organisations that focus on both business and customer sustainability, including the maintenance of customer loyalty, the forming of partner alliances and dynamic performance. All are facilitated by intelligence that is sought through the strategic components of ES, such as BI and APO. Importantly, this sophistication in MAPs went through a process of evolutionary change, rather than a revolutionary one. It is shaped by the continuity of organisational intent for change that is driven by the sought characteristics and that is enabled by continuity and the ES components upon which the sophistication of MAPs have taken place. Instead of examining which innovations are introduced by ERP, this study delineates the interrelations between the BPM processes and orientations, ES components and characteristics; the information characteristics that together facilitate innovation in MAPs (Doran and Walsh, 2004). In other words, there are interdependencies across ES-BPM-MAPs.

This study is similar to others in having research limitations upon which future avenues of research are outlined. First, conclusion of this study is shaped by interviewees' reflections on managerial and information challenges, ES components and BP across (89) case studies captured by ES vendors and consultants. While these reports provided valuable insights especially when research biases are minimised at the lowest levels by steps articulated in Sections 3.2 and 3.3. These reports did not provide dynamic approach though which research insights could be optimised through having broader contextual understandings, following up more interesting research issues discovered during interviews and proposing more research puzzles for future research. By contrast, it might be hard, if not impossible, to get access to such number of case studies. Second, ES-BPM-MAPs' interplay was examined only in the context of the UK. Different contexts including cases, vendors and consultants may offer different insights (Messner, 2015). Future research may explore impact of different and cooperation between vendors and consultants (professionals) in influencing not only process of ES implementation but also ES selection (Greenwood *et al.*, 2002). Another limitation, third, is that this examination was not a process over time, rather than using a retrospective approach in reconstituting the story of this

interplay. As out of the scope, it might be fruitful to explore in process of ES utilisation in day-to-day organisations life. Instead of breadth, or in-depth case studies, using multiple case studies supported by triangulation among the organisational archive, semi-structured interviews and observations, may provide close contact and fruitful insights. This is not only limited to understanding how MAPs are sophisticated but also to capturing the influence of power and politics. Using a quantitative approach, it would be also interesting to examine how different combinations of ES-BPM-MAPs may influence organisational performance. This study has advanced our understanding of the ways in which ES-MAPs interplay and communicate indirectly through BPM. Further, it offers an analytical framework by use of which practitioners' attention (organisations and consultants) can be advised. That is, the starting point is not a matter of which systems should be implemented, rather than of managerial challenges that include the way in which the customer, logistics and control processes should be oriented and managed.

Notes

1. ERP is defined as 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).
2. The BI system is query-based and built on a data warehouse (Grabski *et al.*, 2011).

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Industry	Cases	N
Aerospace and defence	Rolls-Royce, RyanAir, Westland Helicopters, Flybe	4
Banking	Bank of Ireland, Lloyds TSB	2
Chemicals	Bespak	1
Consumer products	British American Tobacco, Cadbury Schweppes, Diageo plc, Glanbia, JD Wetherspoon, Kimberly-Clark, Matalan, Rexam, SABMILLER PLC, Scottish and Newcastle, Syngenta, Tetley Group, Unilever	12
Discrete industries	3M, Alstom	2
Engineering and construction	Unipart Logistics	1
Healthcare	Midland Health Board, Tower Hamlets Primary Care Trust, University College London Hospitals	3
High tech	Hewlett-Packard (HP), Microsoft, Sony Europe, Xerox Europe	4
Higher education	University of Newcastle Upon Tyne, University of Stirling, University of Westminster	3
Insurance	Royal and SunAlliance	2
Manufacturing	Heatmiser, Howdens Joinery, ICI, Kingspan, Morgan Crucible's Financials, Unicorn	6
Media	AngelNews, Oxford University Press, Smiths News Plc, Telegraph Media Group	4
Mill products	Finnforest UK	1
Oil and gas	Amerada Hess, British Gas Hydrocarbon Resources, Subsea 7 Ltd	3
Public sector	Birmingham City Council, Glasgow City Council, Gloucestershire County Council, NHS Wales, Nottinghamshire County Council, Staffordshire County Council, The London Borough of Croydon, The London Borough of Haringey, The London Borough of Southwark, The London Borough of Waltham Forest, The Metropolitan Police Service, The Ministry of Defence, Trafford Metropolitan Borough Council of Manchester, Westminster City Council	14
Retail	B&Q, Boots, Dixons, Figleaves.com, Home base, Somerfield Stores, The Body Shop, The Loft Shop, Vision Express, WH Smith News	10
Service providers	Arriva, British Waterways, Forensic Science Service, Linklaters, QMH, Royal Mail Group, The Royal National Lifeboat Institution, Virgin Trains, Consignia	9
Telecom	Colt, Eircom, THUS a Cable and Wireless Business, Vodafone	4
Utilities	Anglian Water, The Electricity Supply Board, Yorkshire Water, Consignia	3
Total		89

Table AI.
Cross-sectional case studies list

Cases	ES components	Business processes	Information characteristics
Consignia	app Financials (FI); app Human Resources (HR); Enterprise System Programme (ESP); Business Planning and Consolidation (BPC); Business Planning and Simulation (BPS); Enterprise Portals (EP)	Standardising OBP ^a	Accuracy, timely access and consistent view
Westland Helicopters	Enterprise Resource Planning (ERP)	Not mentioned	Accuracy and timely access
RyanAir	SAP R/3	Standardising OBP	Timely access
Flybe	Business Intelligence (BI); Business Objects (BO)	Improve OBP of Operations	Accuracy, timely access and consistent view
Rolls-Royce	Enterprise Resource Planning (ERP); Enterprise Portals (EP); Customer Relationship Management (CRM)	Competition and Consistent View of Data	Accuracy, timely access and consistent view
Bank of Ireland	Enterprise Resource Planning (ERP); Business Suite Family (BSF); Supplier Relationship Management (SRM)	Improve/Streamline OBP and Cost Practices	Accuracy, timely access and consistent view
Lloyds TSB	Supplier Relationship Management (SRM); Enterprise Buyer Professional (EBP)	Improve OBP of Operations	Not mentioned
Bespak	Business Suite All-in-One	Not mentioned	Accuracy, timely access and consistent view
Rexam	NetWeaver Platform (NWP); Customer Relationship Management (CRM); Supply Chain Management (SCM)	Consistent view of data	Timely access
Syngenta	Not Applicable	Improve/Streamline OBP	Not mentioned (continued)

Table AII.
Cross-sectional case studies-based attributes of ES components, business process change and MA information characteristics

Cases	ES components	Business processes	Information characteristics
Matalan	Not Applicable	Competition and growth	Accuracy, timely access and consistent view
Scottish and Newcastle	SAP R/3	Competition and Customer Orientation	Consistent View
JD Wetherspoon	Enterprise Resource Planning (ERP)	Improve/Streamline OBP	Not mentioned
Tetley Group	Enterprise Resource Planning (ERP)	Improve/Streamline OBP	Accuracy, timely access and consistent view
SABMILLER PLC	Enterprise Resource Planning (ERP)	Competition and customer orientation	Not mentioned
Unilever	Enterprise Resource Planning (ERP); Customer Relationship Management (CRM)	Improve/Streamline OBP of Customer Services	Accuracy, timely access and consistent view
Diageo plc	Enterprise Services Architecture (ESA); Business Suite Family (BSF); NetWeaver (NW)	Merger and Acquisition	Not mentioned
Kimberly-Clark	SAP R/2; SAP R/3; Advanced Planner and Optimizer (APO)	Improve/Streamline OBP of Customer Services	Timely access
Cadbury Schweppes	Enterprise Resource Planning (ERP)	Customer Orientation	Not mentioned
British American Tobacco	SAP R/3	Merger and Acquisition	Accuracy, timely access and consistent view
Alstom	Enterprise Resource Planning (ERP); Customer Relationship Management (CRM)	Merger and Acquisition & Customer Orientation	Accuracy and timely access
3M	Business Suite Family (BSF); Advanced Planner and Optimizer (APO)	Globalising OBP & Customer Orientation	Accuracy and timely access
Unipart Logistics	Enterprise Resource Planning (ERP); Supply Chain Management (SCM); NetWeaver Platform (NWP)	Customer Orientation, Consistent View of Data & Cost Practices	Accuracy and timely access
Tower Hamlets Primary Care Trust	Not Applicable	Improve/Streamline OBP	Not mentioned
University College London Hospitals	Not Applicable	Improve OBP of Operations	Accuracy and timely access

(continued)

Table AII.

Cases	ES components	Business processes	Information characteristics
Midland Health Board	SAP R/3; Business Warehouse (BW)	Consistent View of Data	Not mentioned
Microsoft	Advanced Planner and Optimizer (APO)	Improve OBP of Planning and Competition	Accuracy, timely access and consistent view
Sony Europe	SAP R/3; Business Warehouse (BW)	Customer Orientation	Consistent View
Xerox Europe	Not Applicable	Improve OBP of Control	Not mentioned
Hewlett-Packard (HP)	SAP R/3; Advanced Planner and Optimizer; Supply Chain Management (SCM)	Competition, Improve OBP of Operation and Planning	Accuracy
University of Stirling	SAP R/3	Improve OBP of Finance	Accuracy
University of Newcastle Upon Tyne	Customer Relationship Management (CRM); NetWeaver Platform (NWP); Business Intelligence (BI); Enterprise Portals (EP)	Competition, Improve OBP of Operation and Planning	Accuracy and timely access
University of Westminster	SAP Human Capital Management (HCM)	Improve OBP of Finance and Consistent View of Data	Accuracy and timely access
Glanbia	Enterprise Resource Planning (ERP); Customer Relationship Management (CRM)	Improve OBP of Finance and Customer Services	Accuracy, timely access and consistent view
Royal & SunAlliance	Human Capital Management (HCM)	Consistent view of data and customer orientation	Accuracy, timely access and consistent view
Unicorn	SAP R/3	Supporting Existing OBP	Not mentioned
Morgan Crucible's Financials	Business Planning and Consolidation (BPC)	Improve OBP of Finance	Not mentioned
ICI	app Financials (FI); SAP R/3	Improve OBP of Finance	Not mentioned
Howdens Joinery	Enterprise Resource Planning (ERP)	Improve/Streamline OBP	Not mentioned
Heatmiser	Business Suite All-in-One; app Materials Management (MM); Customer Relationship Management (CRM)	Customer Orientation	Not mentioned
Kingspan	app Financials (FI); app Materials Management (MM); app Production Planning (PP); app Variant Reporting (VR); app Sales Distribution Reporting (SD)	Consistent View of Data	Accuracy and timely access

(continued)

Table AII.

Cases	ES components	Business processes	Information characteristics
Telegraph Media Group	Enterprise Resource Planning (ERP); Customer Relationship Management (CRM)	Improve/Streamline OBP of Customer Services	Not mentioned
AngelNews	Customer Relationship Management (CRM)	Not mentioned	Accuracy and timely access
Smiths News Plc	Enterprise Resource Planning (ERP); NetWeaver Platform (NWP)	Customer Orientation	Accuracy and timely access
Oxford University Press	Supply Chain Management (SCM); Demand Planning Application (DPA)	Improve OBP of Planning	Accuracy, timely access and consistent view
Finnforest UK	SAP R/3; Advanced Planner and Optimizer (APO)	Improve OBP of Planning	Not mentioned
British Gas Hydrocarbon Resources Subsea 7 Ltd	Enterprise Resource Planning (ERP)	Improve/Streamline OBP of Customer Services	Not mentioned
	Enterprise Resource Planning (ERP); NetWeaver Platform (NWP); Business Warehouse (BW); Enterprise Portals (EP); NetWeaver Mobile (NWM)	Improve OBP of Operations	Accuracy, timely access and consistent view
Amerada Hess	Enterprise Buyer Professional (EBP)	Standardising OBP	Not mentioned
Westminster City Council	Not Applicable	Customer Orientation	Not mentioned
The Ministry of Defence	Defence Electronic Commerce Service (DECS)	Improve/Streamline OBP and Cost Practices	Timely Access
NHS Wales	Not Applicable	Improve/Streamline OBP, Consistent View of Data and Cost Practices	Accuracy, timely access and consistent view
The London Borough of Croydon	Not Applicable	Improve/Streamline OBP	Not mentioned
Gloucestershire County Council	Enterprise Resource Planning (ERP)	Improve/Streamline OBP of Customer Services	Accuracy and timely access
The Metropolitan Police Service	Enterprise Resource Planning (ERP)	Improve/Streamline OBP and Cost Practices	Not mentioned
The London Borough of Haringey	Customer Relationship Management (CRM); Governance, Risk, and Compliance (GRC)	Customer Orientation	Not mentioned

Table AII.

(continued)

Cases	ES components	Business processes	Information characteristics
Staffordshire County Council	Enterprise Resource Planning (ERP); Customer Relationship Management (CRM); Enterprise Buyer Professional (EBP); NetWeaver Platform (NWP); Business Intelligence (BI)	Consistent View of Data and Customer Orientation	Accuracy and timely access
The London Borough of Waltham Forest	Customer Relationship Management (CRM); NetWeaver Platform (NWP); Business Warehouse (BW); Business Intelligence (BI); Enterprise Portals (EP)	Customer Orientation, Consistent View of Data and Cost Practices	Accuracy, timely access and consistent view
Nottinghamshire County Council	Enterprise Resource Planning (ERP); Business Intelligence (BI)	Improve OBP of Planning	Not mentioned
Birmingham City Council	Business Objects (BO); Business Suite Family (BSF)	Consistent View of Data and Customer Orientation	Decentralised access and consistent view
Trafford Metropolitan Borough Council of Manchester	Enterprise Resource Planning (ERP); Business Suite Family (BSF); Customer Relationship Management (CRM); NetWeaver Platform (NWP); Business Intelligence (BI)	Improve OBP of Finance and Customer Services	Decentralised Access and Consistent View
Glasgow City Council	Business Suite Family (BSF); Product Lifecycle Management (PLM); Enterprise Portals (EP); Business Intelligence (BI); Human Capital Management (HCM)	Customer Orientation, Consistent View of Data and Cost Practices	Accuracy and timely access
The London Borough of Southwark	Enterprise Resource Planning (ERP); Customer Relationship Management (CRM); SAP NetWeaver Platform (NWP); SAP Business Warehouse (BW); SAP Business Intelligence (BI)	Improve OBP of Operations and Customer Services	Accuracy, timely access and consistent view

(continued)

Table AII.

Cases	ES components	Business processes	Information characteristics
Figleaves.com	Enterprise Resource Planning (ERP)	Supporting Existing OBP	Not mentioned
WH Smith News	Business Objects (BO)	Improve/Streamline OBP of Customer Services	Not mentioned
The Loft Shop	Not Applicable	Consistent View of Data	Accuracy and Timely Access
Somerfield Stores	app Human Resources (HR)	Improve OBP of Finance	Decentralised access and timely access
The Body Shop	Retails; NetWeaver (NW)	Improve OBP of Planning	Accuracy, timely access and consistent view
Vision Express Boots	Not Applicable Customer Relationship Management (CRM); Business Intelligence (BI)	Customer Orientation Improve OBP of Operations and Customer Services	Accuracy Not mentioned
Homebase	Business Warehouse (BW); Enterprise Portals (EP)	Consistent View of Data	Accuracy, timely access and consistent view
Dixons	SAPapp Materials Management (MM); SAP Supply Chain Management (SCM)	Improve/Streamline OBP, Customer Services, Consistent View of Data and Cost Practices	Not mentioned
B&Q	SAP R/3; SAPapp Financials (FI); SAPapp Human Resources (HR)	Not mentioned	Accuracy
Royal Mail Group British Waterways	Not Applicable Business Suite Family (BSF); NetWeaver Platform (NWP); Business Intelligence (BI); Enterprise Portals (EP)	Improve/Streamline OBP Standardising OBP	Not mentioned Accuracy, timely access and consistent view
Virgin Trains	Not Applicable	Improve/Streamline OBP of Customer Services	Accuracy, timely access and consistent view
Forensic Science Service	SAP	Customer Orientation, Consistent View of Data and Cost Practices	Accuracy, timely access and consistent view
Arriva	Enterprise Resource Planning (ERP)	Competition and cost practices	Not mentioned

Table AII.

(continued)

Cases	ES components	Business processes	Information characteristics
The Royal National Lifeboat Institution	Not Applicable	Not mentioned	Accuracy, timely access and consistent view
Linklaters	Enterprise Resource Planning (ERP)	Improve/Streamline OBP	Accuracy, timely access and consistent view
QMH	app Financials (FI)	Customer Orientation, Consistent View of Data and Cost Practices	Timely access and consistent view
Colt	Business Objects (BO); Business Planning and Consolidation (BPC)	Improve OBP of Planning	Accuracy, timely access and consistent view
THUS a Cable and Wireless Business	Enterprise Resource Planning (ERP)	Improve OBP of Finance	Accuracy, timely access and consistent view
Vodafone	Enterprise Resource Planning (ERP)	Competition, Customer Orientation and Improve/Streamline OBP	Not mentioned
Eircom	SAP R/3; app Materials Management (MM)	Improve/Streamline OBP and Cost Practices	Timely Access
Yorkshire Water	Enterprise Resource Planning (ERP)	Consistent View of Data and Customer Orientation	Accuracy, timely access and consistent view
Anglian Water	SAP R/3; Customer Relationship Management (CRM)	Customer Orientation	Accuracy and timely access
The Electricity Supply Board (ESB)	SAP R/3; app Financials (FI); Customer Relationship Management (CRM); Business Warehouse (BW)	Competition and Improve OBP of Finance	Accuracy, timely access and consistent view

Note: ^aOBP is abbreviation for operation business process

Table AII.

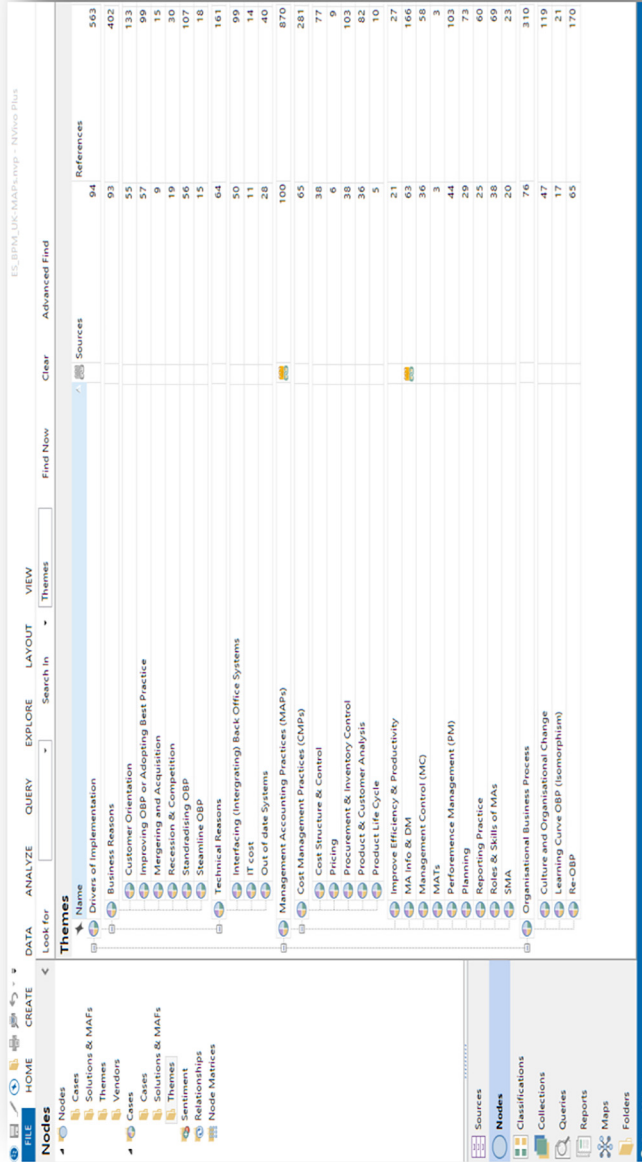


Figure A1.
NVivo outcomes
analysis of
ES-BPM-UK-MAPs
interplay

Name	Industry	Location	Duration	Component
Alton	Discrete Industries	UK & Ireland	Unknown	Advanced Planner and Optimizer (SAP APO)
Amesbury News	Discrete Industries	UK	Unknown	Not Applicable
Amesbury	Discrete Industries	UK	Unknown	Enterprise Buyer Professional (EBP)
Amesbury (2)	Discrete Industries	UK	Unknown	SAP-FC
Amesbury (3)	Discrete Industries	UK	Unknown	Customer Relationship Management (CRM)
Amesbury (4)	Discrete Industries	UK	Unknown	Customer Relationship Management (CRM)
Amesbury (5)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (6)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (7)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (8)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (9)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (10)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (11)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (12)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (13)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (14)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (15)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (16)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (17)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (18)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (19)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (20)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (21)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (22)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (23)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (24)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (25)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (26)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (27)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (28)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (29)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (30)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (31)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (32)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (33)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (34)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (35)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (36)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (37)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (38)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (39)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (40)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (41)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (42)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (43)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (44)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (45)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (46)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (47)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (48)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (49)	Discrete Industries	UK	Unknown	Not Applicable
Amesbury (50)	Discrete Industries	UK	Unknown	Not Applicable

Figure A2. NVivo classification sheet of cross-sectional case studies

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