Barriers to the Adoption of Management Accounting (MA) Processes in Enterprise Resource Planning (ERP) Environments

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Abstract
Coupling of information technologies with management accounting (MA) processes is a proven method of exploiting their full potential. In spite of that, adoption of these processes embedded in enterprise resource planning (ERP) systems is limited. This study, using a cross-sectional field study conducted across four case study organizations, investigates the barriers to the adoption of MA processes in ERP environment and identifies challenges. Poor reporting capabilities of ES and ineffective upgrades and customization are some of the perceived technology related barriers, the study found. In addition, lack of resources and skills, work-arounds', uncontrolled excel use and accountants' generic preference to use excel are other organizational related barriers limiting the adoption. Either, because of the constrained resources for adoption or because of individual managerial preferences to use 'work-arounds' and/or inadequate ERP skills, managements do not attempt to exploit the full potential, the study observed.

1. Introduction
Enterprise Resource Planning systems (ERP) solutions are now firmly entrenched in most large and medium sized enterprises, and are considered the key infrastructure for managing enterprise-wide information. ERP systems offer comprehensive solutions to support planning, costing and other management accounting (MA) activities [1, 2]. SAP ERP, for example, features a very comprehensive and integrative cost and revenue accounting module, called Controlling which supports a large range of management accounting processes and practices. It ranges from conventional absorption costing and basic budgeting to activity based costing and multidimensional, hierarchical profitability analysis based on contribution margins. Considering the potential benefits of integration, process optimization and best practices in ERP-enabled environment, use of modern management accounting processes embedded in these solutions is expected to be higher than in discrete stand-alone environments [1, 2, 3, 4]. In spite of such widespread availability, and increasing importance of MA processes, a majority of organizations just use financial accounting components for compliance purposes and do not use management accounting components for performance analysis and controlling [5, 6, 7].

With many organizations now in a more mature stage of ERP use, understanding the barriers to the adoption of management accounting (MA) processes embedded in these ERP solutions will contribute to effective return on huge investments already made. Further, the knowledge will create opportunities for further improvement of the ERP suite of applications and increased adoption of modern management accounting processes. This paper will first present a review of the past literature and gaps. This is followed by the explanation of a theoretical framework and qualitative methodology adopted in the study. It will then present analysis, findings and conclusions.

2. Literature review
2.1. MA processes in ERPs
Use of management accounting components embedded in modern ERP systems is limited [5, 6]. In order to increase the adoption rate, ERP software vendors have shifted some of the MA functionality, such as profit centre accounting and cost of sales accounting into financial accounting module [5]. Even though MA functionality is available at no additional license cost, adoption of MA processes is still limited [8]. In addition, ERP vendors have offered support to other MA processes such as consolidations, integrated budgeting and balanced scorecard through add-on extensions and complemented ERP systems [9]. Business organizations have tried adopting these solutions [10].

Effective use and potential benefits of these add-on solutions, however, is dependent upon the quality and
nature of data coming from the ERP systems and the efficacy of parameter settings configured in the ERP system. In spite of these additions, adoption of MA processes is low across the world and particularly so in Australia [8]. The extent and use of MA processes embedded in these solutions and their effects on decision making and firm performance is still not known [7].

2.2. Gaps in past research

Although ERP systems have been entrenched in business organizations for more than two decades, management accounting (MA) and information systems (IS) research so far has focused only on ERPs that were in the early stages of adoption [5, 11] and on general ES implementation success and barriers [1, 11, 12]. Studies on the impact of ERPs on management accounting produced mixed results with some noticing an impact on the role and processes [3, 13, 14], while others have reported no significant impact [4, 15, 16].

For example, Hyvonen (2003) observed no discernible benefits to adopters on their budgeting process [15], while Kallunki et al. (2011) observed improvements in non-financial performance because of the introduction of formal management controls through ERP implementations [17]. Chapman and Kihn (2009) have observed the enabling role of ERPs in the use of management control systems [14]. Others have reported its contribution to improved quality of reporting, cost structures and visibility [2, 18].

Past MA research on ERPs focused on management control, without any closer examination (or understanding) of the actual MA functionality in those systems and their actual adoption [14, 19]. Anecdotal evidence for this low adoption points to factors such as inadequate IT skills for management accountants [20, 21], lack of top management ‘belief’ in and ‘commitment’ to cost management and modern MA techniques [5, 22] and extensive usage of spreadsheets by accountants [23].

Most of the past research considered ERP as an independent variable [1], even though changes that increase the effectiveness of one innovation (i.e. MA techniques or ERP solutions) may promote the adoption and improved use of the other. It assumed a unidirectional relationship where the ERP system was expected to support the adoption of MA processes [7].

The full advantages of these technologies, whether they are MA processes and practices and/or ERP software solutions, are not derived by purchasing them. Rather, they are achieved by careful tailoring of the technologies themselves to the organizational context, and by the effective adaptation of skills, processes, structures, roles and procedures around them. Organizational research on adoption, diffusion and use of technologies has to date mostly focused either on technology effects or on interactions with technology and not much between various technologies/innovations [24]. Whether it is the use of MA processes available within the ERP environment or outside of this environment, or the modification of the ERP environment to suit the existing MA processes and logic, these processes are manifestations of organizational practices that are increasingly entangled with emerging ‘socio-materialities’.

Adopting MA processes requires the organization to have the ability to maintain information about the cost drivers, resources, activities and costs at different levels [13] that is typically enabled by an ERP system. It requires some degree of flexibility and control on the how these MA processes are embedded in the ERP solutions, adapted to organizational requirements and how other ERP functionality supports business needs.

Different MA processes are used for different purposes and may be required to perform dual roles [25]. When used interactively for decision making the MA process needs to be flexible. When used diagnostically for management control purposes, integration of the MA process is necessary. The degree of combination of these two roles varies from firm to firm and from one MA process to another and depends on the level of integration and flexibility enabled by the ERP environment. If the management accounting components embedded in ERP systems are not properly aligned in real-time and not interfaced with other applications such as production, sales, human resources and financial accounting, the quality of information produced will be compromised.

The majority of previous empirical studies focused on describing the changes in the role of management accountants resulting from ES implementations [26] rather than analyzing and understanding these changes. To make appropriate changes required to exploit full potential of ERP-environment, managements must have ‘belief’ in MA processes and willingness to change behavior, policies and business rules [27] in line with those enabled by the ERP solutions. In addition, managements must invest necessary resources to effect those changes to customize the MA processes embedded in ERP systems and/or change their current processes to suite dynamically changing business requirements.

As discussed above, past research mostly considered ERP system as an independent variable, focused on early stages of ERP adoption and on management control. Further empirical evidence analyzing the potential capacity of each of these two innovations to change the other is sketchy. A majority of previous studies focused on describing the changes...
in the MA processes, activities and roles rather than their analysis.

Effective exploitation of these two organizational innovations (ES solutions and MA processes) is only possible if this relationship and the barriers to the adoption of MA processes embedded in ES solutions is understood and carefully managed. Next section discusses the research framework and methodology.

3. Research framework and methodology

3.1. Theoretical framework

Adopting management accounting processes require the organization to possess ability to identify, measure and maintain information about the cost drivers, resources, activities and costs at different levels that is typically enabled by an ERP system. Implementation of ERP system though plays a complementary role in generating competitive advantage, barriers for their adoption and the nature of their impact varies from one organization to another. This is contingent upon varying contexts within which these adoptions are situated including external competitive factors, internal organizational factors and the technology innovations themselves.

There are several theories that deal with the adoption of innovations. Technology acceptance model (TAM) by Davis et al (1989) [28], theory of planned behavior (TPB) by Aizen (1991) [29], diffusion of innovation by Rogers (1995) [30] and unified theory of acceptance and use of technology (UTAUT) by Venkatesh et al (2003) [31] and the Technology-Organization-Environment (TOE) framework by Tornatzky and Fleischer (1990) [32] are the most common theories. The TAM, TPB and UTAUT models are at the individual level while DOI and TOE framework are at the firm level [33].

TOE framework offers a holistic view on the multiple facets of an organization from which a firm’s internal and external factors could be examined. These include organizational, technological and environmental related factors at the firm level and are consistent with the Roger’s (1995) theoretical analysis [30]. It is also one of the most popular and useful framework for information technology/systems implementation research [34]. This framework presents constraints as well as opportunities for technological innovation [32] and integrates contingent organizational and environmental factors that firms face. Several studies in the past used several factors in this framework. Factors include the technologies available to the firm both internally and externally, organizational factors such as scope, internal resources, culture and managerial structure; and environmental context that includes competition, heterogeneity, government regulation and environmental uncertainty [35]. Though specific factors identified within these three contexts may vary across different studies, the TOE framework has consistent empirical support as applied to various IS innovation domains and has a solid theoretical basis [33].

Therefore, Technology-Organization-Environment (TOE) framework developed by Tornatzky and Fleischer (1990) [32] is considered appropriate in this study. This framework is used in the data collection and analysis phases of the study.

3.2. Cross-sectional field study

Given the nature of questions, insufficient knowledge about the relationships between the two main constructs in this study — MA processes and ERP environments, and clear understanding and definition of these two innovations, a cross-sectional field study using multiple case study organizations is considered appropriate. Cross sectional field studies are limited depth studies typically conducted at sites non-randomly selected and lie between in-depth case studies and broad-based surveys. These studies are less structured in their data collection than surveys, and involve shorter, less intensive data collection on site than in-depth case studies [36]. Thus employing a cross-sectional field study approach deals with more complex ‘why’ and ‘how’ questions better than survey approaches [37]. Both the dimensions — MA processes, and ERP environment, are continuously evolving as the demand for increased adoption of modern MA processes grows and as the organizations assimilate and learn to use ERPs effectively with time. This will provide an opportunity to explore their co-evolution from multiple perspectives and facilitate understanding of the interpretations of the barriers to the adoption of MA processes [37].

3.3. Case study organizations and respondents

Selection of case study organizations is non-random and selected on the basis of location, accessibility and personal contacts and willingness of the organizations and respondents to help with the research process. All the companies studied were engaged in manufacturing and/or distribution and all had significant presence in their respective industries.

The focus of this study was on the barriers to the adoption of MA processes in ERP-enabled environment. Therefore, organizations that have an integrated enterprise systems environment for at least six years and have employed several management accounting techniques and practices listed in the Council of
Management Accountants (CIMA) bi-annual survey [8] were selected. Given that a newer version is made available by the large ERP software vendors every three years, six years was considered sufficient for an organization to assimilate the ERP environment and experience its benefits and challenges. Organizations from the membership list of SAP user group (www.SAUG.com.au) and Supply Chain Council (www.Supply-chain.org, a non-profit organization that has Fortune 500 members) were approached for this study. Table 1 gives a summary of the characteristics of the organizations and details of respondents that took part in this study.

Table 1. Case study organizations & respondents

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<th>Details about case study organizations</th>
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<td>Minco: Mining equipment manfg.:</td>
<td>• R1: Finance Director; 20 years of experience</td>
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<td>• 1000 employees;</td>
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<td>• R11 – Manager - accounts and reports</td>
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| Delco:                                  | Oil & petroleum                |
|                                        | • 5000 employees;              |
|                                        | • IBM Cognos TM1 and a software for ABC |
|                                        | • SAP FI, CO, MM, SD & HR modules |
|                                        | • Other software               |
|                                        | Oiico:                          |
|                                        | • 4000 employees.              |
|                                        | • ERP for 12 years             |
|                                        | • SAP FI, MM, PP and SD modules |

Organizations thus selected for study were non-random, accessibility and based on their willingness to participate in the research process. In each of the organizations, two to four key respondents that are actively involved in the finance/accounts function and have extensive experience of working in an ERP-enabled environment were selected. Accordingly, 11 senior managers from 4 different organizations in Australia and New Zealand participated in this study.

3.3. Data collection and analysis

Given the exploratory nature of the research, interviews based on perceptions and perspectives of the key individuals in the organization were considered more insightful. A semi-structured interview with a case study protocol was used to collect data from multiple respondents. Collecting data from multiple respondents from multiple organizations helps increase the validity of the data and in understanding the phenomenon [11]. Participants included senior managers responsible for accounting, reporting, analysis and transactions, and management of financial components of ERP systems.

Each interview was of 90 to 120 minutes duration and was recorded with prior permission from the organizations and the key respondents. These recorded interviews were transcribed verbatim for further analysis and sent to individual respondents for validation and corrections.

Interview questions were loosely structured, allowing managers flexibility in responding. The objective was to collect information about three key aspects: i) scope and extent of current adoption of MA processes embedded in enterprise systems ii) barriers for the adoption of MA processes and iii) challenges faced by organizations in effective use of information produced by these systems and their capabilities. Respondents were asked to respond with reference to organizational, technology and environmental contexts mentioned in the TOE framework when they were discussing barriers and challenges. In addition, information about the respondent’s background and experience with the enterprise systems environment were collected. Further additional secondary data from annual reports, companies’ web sites and other internal documents were used to supplement analysis.

4. Analysis and findings

The analysis starts with the perceived benefits of adopting MA processes embedded in ES environment and identifies the extent of adoption of management accounting processes in case study organizations. It will then discuss barriers to the adoption of the MA processes as observed in the four case study organizations and their implications considering TOE framework as the basis. Insights generated from this research study, despite the risk of generalization, can deliver some pointers and offer foundations for further research. Therefore a conceptual model was developed from the study findings and TOE framework and proposed at the end for further empirical testing.
4.1. Extent of adoption of MA processes

Reasons for their adoption and use though are different for different organizations, techniques such as budgeting, forecasting, variance analysis, marginal costing, balanced scorecard and strategic performance measurement are implemented completely outside the ES environment. Techniques such as absorption costing, job costing, standard costing, transfer pricing, integrated cost and financial accounts, however, are completely carried out within the ES environment. It is clear from the analysis all the organizations recognized the value of the information produced by the ERP system – its integrity, accuracy and real-time nature. Therefore, the above processes which derive most of the cost information from the financial accounting components of enterprise system are adopted by all the case study organizations.

It is however, different when the processes require extensive use of non-financial information and significant manipulation and analysis of that information. Techniques such as profitability analysis, for example, are carried out by extracting basic information from the enterprise system and then manipulated in Excel. Similarly, activity based costing is well embedded in all the modern ERP software solutions, but it is not being used by all the organizations studied. Similarly, overhead cost allocation methods, considered to be well sophisticated in the modern enterprise systems solutions are also not being used. The offer mechanisms and logic for every possible method of allocation including cause-effect analysis and real-time allocation. In spite of that, organizations still continue to use a simple ‘direct’ method of allocation that is typically carried out at the end of financial year.

All the case study organizations studied allocate overhead costs by simply using labor rate, number of employees and/or as a percentage of standard cost as the allocation base. Reasons identified for such low use of overhead cost allocation methods from this study are two. Firstly, management’s belief that it is very “difficult and cumbersome to establish cause-and-effect relationships for each of these overhead costs (R1, R11), and then allocate them accordingly. Secondly, overhead costs are not considered relatively high when compared with direct costs that are traceable by the system (R2, R4 and R10). Therefore, managers do not think it necessary to use sophisticated methods of allocating such overhead costs to cost centres and/or to other cost objects. It, however, could be different for other organizations in resources and other industry sectors that will have tax implications for accurate classification of direct and indirect costs and their cause-effect relationships.

The key challenges identified in this study for organizations are that, in addition to the unique nature of MA processes that require flexibility, they must also contend with ineffective ERP software upgrades, poor reporting capabilities of ERP solutions, extensive use of Excel in firms and poorly linked BI tools.

4.2 Organizational barrier - resources

Lack of knowledge about the ERP system’s capabilities, and inadequate ERP skills and limited ability to exploit their full potential are barriers in case study organizations. In all the case study organizations, the focus of ERP implementation was primarily on financial accounting and for compliance purposes and management accounting processes were not a priority. Therefore, capabilities of the ERP systems in general and the management accounting functionality and features in particular are not very well known. As noted in one organization, “many times, we did not know that it can be done in SAP, so we went off and did it our own customized way.. we often re-invented the wheel.” When new people are coming into the organization with sufficient SAP skills and knowledge, we are discovering new capabilities. We often have used SAP to accumulate data and not implemented in a way that we could have maximized the benefits” (R5).

As an example, one respondent observed, “prior to 1999, we had a different account number for every product, we go into SAP, set-up a different account number for every product and don’t bother having CO-PA. Because we have not investigated the potential within SAP... because SAP is so complicated and the implementation consulting cost is so expensive, managers try to bypass it... you can get the raw data and do it yourself using Excel – which is a lot cheaper. So, even if I say it can be done in SAP, I know that it is difficult to train people, it will be complicated in some areas and in some areas we have not researched the potential in SAP and therefore did not try to use it”.

Inadequate IT resources to customize and exploit the MA functionality and processes embedded in ERP solutions is another challenge. As noted by one respondent, “our problem is we don’t know what SAP can do and if so how cost effective it would be.” It really means deciding what to customize, what not to customize, what extent to customize, how to take advantage of SAP, to what extent give value to what you want and try to get something out of SAP – it is a struggle; as you work through system, you are constantly balancing these two things.” (R1).

Lack of ERP software skills in the case study organizations is another barrier. When employees do not have skills, they cannot perform management accounting functions using the software. Consequently,
they tend to bypass the system and use other tools such as Excel. Further, employee turnover, limited investment in training and lack of proper documentation on the customizing done are some of the factors discouraging managers to use the MA processes available within the ERP system.

4.3 Organizational barrier – ‘work-arounds’

Given the lack of resources to customize the management accounting processes in the ERP system, poor knowledge of the solution, lack of specific ERP software skills and expedient nature of the workplace, individual managers, over time, tend to develop ‘work-arounds’ using Excel and other tools for implementing MA logic and processes. These ‘work-arounds’ continue to exist because sometimes they are perceived as a simple solution from a management perspective or from a timing perspective and/or from resources perspective.

Any change to the system in an ERP environment involves documentation, approval, budget and other resources. These rigorous checks and controls, imposed for good reasons, take considerable time and resources. Managers will therefore deploy certain ‘work-arounds’ as a temporary measure. As pointed out by one manager, “at the moment, I don’t have all my legal entities in SAP. So, they are done in Excel, we do the consolidation in Excel. I don’t find that ideal, so I have a project that will actually get approval for all these new configurations. So, my work-around at the moment is Excel” (R6).

These work-arounds are not a norm and managements are aware of the risks. As noted by one respondent, “we have lots of ‘work-arounds’; and we are trying very hard to stop them (R1); any work-around is just making it easier to individual manager. But if it makes it easier to one, it is actually causing a pain to someone else” (R6). As pointed out by another respondent, “we have to stop these workarounds; because these are normal manual processes and anything manual has a failure point” (R4). Another noted, “if either by omission, or if someone is on leave, or someone has forgotten... it just makes us into robots.. we just continue doing it without thinking and without knowing” (R7).

Measures to control the ‘work-arounds’ are in place. For example in one organization, the management would measure on a “daily basis how many times goods are receipted after the invoice has come through and use it as a control measure (R2) to make behavioural changes. Such useful measures however are temporary. It is necessary for managements to demonstrate resolve to prevent such ‘work-arounds’ and at least reduce their uncontrolled growth. If such discipline and management resolve is not found, as in the case study organizations, individual managers, over time, will continue to work with and develop new ‘work-arounds’ bypassing the ERP system. Consequently, managements not only underutilize the potential of the MA processes as well as ERP capabilities but also waste time. Importantly, they are taking significant process and data risks and fail to achieve a good return in the long run, on huge investments already made.

4.4 Organizational barrier - excel

Excel is a trusted weapon for accountants in all the case study organizations in spite of data integrity at risk. Despite the convenience it offers, continued uncontrolled use of excel for management accounting purposes is a problem for all case study organizations. Instead of using the MA processes in the ERP systems, many accountants use excel to extract cost and other information from the ERP system and then manipulate it for reporting and management accounting purposes.

As pointed out by one manager, “we are an excel organization, we love to get everything into excel, manipulate it, run macros...and drive the system to give us what we want rather than use the system (R8). As noted by one respondent, “when you write macro, you change your master data in the system, and you forget to change the macro; you are gone or when the employee moves to another organization, we are gone....unfortunately this company is driven by excel” (R4). Even though the focus is to get as much as possible from the system either with excel or without, “human tendency in our company is always to get to excel...but we are trying to curb that as much as possible” (R3) noted one respondent.

With version control, individual preferences, excel versions, macros and informal way of developing reports are some of the challenges in managing excel-dominated environment, all the case study organizations claim that they are trying to curb the uncontrolled usage of excel. With new versions and upgrades of enterprise systems, managements are hoping to achieve a shift away from excel to ERP systems.

For example, the data for sales analysis comes out of CO-PA (Profitability analysis) component of SAP and is manipulated as needed for reporting purposes. For reporting manufacturing performance, there are standard reports available in SAP. But managers prefer to use excel to manipulate them for ease of reading, and for production of graphs and for comparative analysis with budgets, efficiencies and recoveries. Thus, excel plays a critical role.
From a compliance perspective also management would want everything come from an integrated ERP system. "While we may use Excel or other business intelligence tool to translate and manipulate the output from SAP, we still would like to get the source data come from SAP. It is important to ensure data integrity and reliability – whenever you run that report with same parameters, you will get the same report and this is critical to assure the quality and integrity of our data," (R5) a senior manager commented.

Although Excel is the most preferred tool, there are considerable concerns relating to how spreadsheets are used for the purposes of consolidation, reporting and planning purposes in the case study organizations. As noted by one respondent, “when you write macro, you change your master data in the system, and you forget to change the macro; you are gone or when the employee moves to another organization, we are gone ...” (R4). Even though case study organizations continue to use Excel, their managements are fully aware of the risks of Excel, and generally concerned about the validity and accuracy of the information produced from spreadsheets. Some of the issues managements are grappling with include human errors, macros, lack of integration with the master data and inadequate policies controlling the use of spreadsheets.

4.5 Technology barrier – complexity

Inherent complexity of the ERP system, complicated further by the extent of changes made to the ERP software through customization and technical focus of the software upgrades are observed to be technology-related barriers for adopting MA processes. When ERP system is customized and software code is changed, the benefits of standard vanilla SAP applications and reporting is not available. As noted by one respondent, “we could get a lot of these management accounting applications and reports from SAP, things like overhead cost allocation, but we just can’t get to that because we have changed SAP” (R4).

For example, “as we have too many engineers, they were saying we should try that, we should do this, we should do that, and we can do that if we use this field for this etc, therefore it went out of control.” (R1). Consequently, as pointed out by one senior manager, “we were getting a muddled through report which was not accurate... there was never a perfect fit between the data we are reporting for management, for sales analysis and what was coming out of the general ledger for financial accounting” (R2). Therefore, the reports are ‘out of sync’ with each other, with accountants’ number different from sales and warehouse managers’ number. “We from management accounting side would be spending lot of our time arguing we think the number is this and you think the number is that,” (R2) a senior finance manager pointed out.

As noted by one respondent, “every time we want a report, we have to go through IT to get all that specific reports setup” (R2) and this costs money. “Adopting a technique embedded in ERP is sometimes a lot of work, and would impact our resources. So, the question is always what is the benefit compared to the cost” (R3). If it is a priority, management will have to invest resources in setting this up. ERP system is supposed to result in standardization of processes and practices. But the data standardization is not a guaranteed outcome. In addition, customization of ERP solution made this further hard and lead to unreliable and inaccurate production of information for decision making in case study organizations. Managers therefore are forced to use other means of obtaining accurate and reliable information and processes (such as excel and other tools) for executing management accounting processes.

In addition, case study organizations have recognized the need for BI tools, especially for reporting. As noted by one respondent, “we could use these BI tools to download SAP data straight into BW, which we can then use to have these fancy reports” (R1). As pointed out by another, “we certainly don’t have dashboard reporting, that tells us what was the sales compared to budget... etc.” (R3).

Upgrades, although considered essential, are viewed as technical upgrades in all the case study organizations (R1, R5, R7, R10 and R11). Even though upgrades, released by ERP software vendors, promise to deliver new, expanded and/or improved functionality and processes, the reality is different. When an ERP upgrade is released, business organizations expect the new version to be better having addressed their problems with the previous version and that the required improvements are incorporated. This is not the case in reality, with business organizations going through the upgrades when it is essential, and only when forced by the withdrawal of technical support from the software vendors. As pointed out by one senior manager, “ES upgrade is viewed as an IT-sponsored change, with the threat of losing support from the vendor if not carried out in time” (R10). When a new version is made available before the firm has fully exploited the existing version, the entire upgrade becomes a routine technical upgrade.

As noted by another manager, management does not “invest sufficient time and resources in training the users on the improvements in the functionality and new features available in the new version” (R5). The improvement that could have contributed to the enhanced adoption of a particular MA process is not
known to the business users. As observed by a manager, “we have never promoted the change in functionality and educated our people in how to use it better” (R7).

In many enterprises, customization is gradual and is offered as a piece-meal solution for individual problems. As pointed out by one respondent, “people then might not have resources or intention to actually review all our processes and work out whether their existing processes were to be improved by following vanilla SAP processes” (R7) and therefore must have decided to customize from time to time. But when the company decides to go for an upgrade, organizations tend to realize the implications of early customization in terms of costs and loss of functionality. “What we have done customization wise as opposed to what SAP could do if we hadn’t customized it” (R5), is an important consideration, as noted by one manager.

4.6 Technology barriers – reporting

Reporting tools available in ERP systems are generally considered inadequate. It, however, can deliver consistent data for performance reporting. It means “we now have one set of numbers, and if it does not reconcile, then we fix it up rather than just ignoring it. With CO-PA (controlling – profitability analysis) the business manager’s data and accounting records data are from single source and same. Now the company does daily reporting from CO-PA for some of the key products, customers, sales persons and margins” (R4). Pointing out the complexity in generating the required reports, one respondent observed that the “ERP system has the capability to produce reports, but in order to get what I want from the system, I need to run several reports in the ERP system and then combine them using excel or some other tool” (R7). Further, “none of the reports produced from SAP are user-friendly and without an exception, every report has to be manipulated and further analyzed using Excel” (R2), observed another respondent. In order to overcome the reporting weaknesses of ERP systems, managements, take the CO-PA reports into excel format and do comparative analysis with budgets and forecasts.

ERP system has a capability to do a detailed profitability analysis, a key MA process. It, however, lacks in reporting capabilities. Therefore, managements consider it complex and resource intensive to adopt those MA processes such as profitability analysis, budgeting and forecasting, which are critical for performance management. As noted by one respondent, “our problem is we don’t know what SAP can do and if so how cost effective it would be.” It really means deciding what reports to customize, what not to customize, what extent to customize, how to take advantage of SAP standard reports – it is a struggle; as you work through system, you are constantly balancing these things” (R1).

Reporting is such a unique management need that many ES software vendors are not able to deliver a standard set of reporting tools that are useful to all in the same industry. Despite their efforts over time to incorporate customer needs into their upgrades and newer versions, ERP software vendors are still not able to meet the business requirements. In general reporting is a unique need and instead of viewing the ERP system as an enabler of change in the MA and performance reporting processes, management accountants typically viewed this as a change dictated by an information system.

4.7 Proposed model

Analysis of data, as discussed above, revealed the influence of several factors on the case study firms’ adoption and/or non-adoption of management accounting processes and practices embedded in enterprise systems software solutions. External factors such as competition, industry and government regulations, that are part of a TOE framework, have no impact on the adoption decision of firms according to this study. Management accounting processes are internal and are not governed or influenced by external factors. Therefore, a conceptual model revising the TOE framework is proposed. As shown below, it depicts the relationship between various internal factors and a firm’s decision to adopt MA processes.

![Figure 1. Model for adoption of MA processes](image-url)

Poor reporting capabilities of ES, and ineffective upgrades and customization are some of the perceived technology related barriers, while ‘lack of resources, skills, work-arounds’, uncontrolled excel use and accountants’ preference to use excel are other
organizational related barriers. Generic benefits of integrated information and processes, best practices and visibility enabled by the ES solutions, and the benefits of employing MA techniques and processes, however, are observed to be drivers in the adoption.

4.8 Discussion

Adaptation of technologies takes time and their use is expected to improve with time. But, as discovered in this study, it often does not happen on a gradual and continuous basis as desired by management. Once an ERP software solution is implemented with certain capabilities, the focus on technology fades, and the technology, as well as the way it is used, is taken for granted with no apparent attempt to exploit its full and hidden potential. Recognizing the limitations of the technologies in enabling effective adoption and use of MA processes and resource constraints, managers continue to find ‘work-arounds’ and employ Excel and other specific tools. When periodic upgrades are carried out, there is an opportunity for organisations to re-examine these ‘work-arounds’ and external tools and bring the processes, controls, reports and routines back into the ES environment.

Fortunately, firms neither recognise these opportunities nor manage those changes effectively with appropriate resource allocation. ES software vendors are also responsible for this, failing to advertise the improvements in functionality and features in newer versions, reinforcing management’s view that these software upgrades as purely ‘technical’. In the user group meetings and at the launch of new versions, ERP software vendors typically explain how they have taken into consideration the issues and requirements of users and how functionality has improved as a result, while highlighting the new features of the upgraded version. But in reality, when the upgrades are done, all these issues are lost with the focus mainly on mere technological change rather than on the education and training of new enhanced capabilities and business benefits.

Consequently, this lack of knowledge about the new versions, and non-availability of necessary resources and time required to discover, educate, implement and train users, means that many firms continue to use the ERP solution and ‘work-arounds’ as previously, thereby losing an excellent opportunity to innovate and improve.

5. Conclusions

Taking advantage of the enhanced quality of financial information produced from the ES environment, managements have successfully adopted and are using several MA techniques such as absorption costing, standard costing, profitability analysis and transfer pricing within ERP environments. But budgeting, forecasting, variance analysis and performance reporting require much more than the ERP-enabled capabilities and are not widely used.

Poor reporting capabilities of the ERP solutions, varying management information needs in dynamic business contexts, accountants’ preferred use of Excel as a convenient tool to manipulate the information for consolidation and reporting purposes because of its transmissibility from firm to firm and from one ERP context to another, and the ineffective upgrades and customization of the ERP solutions, are key barriers managers face in the effective adoption of MA processes. In addition, availability of ‘work-arounds’, inadequate ERP skills and lack of resources for adopting MA processes are other barriers.

Whether it is the use of processes embedded in the information systems environment today or modification of the both to suit each other – all are problematic and shape the way they are organized and carried out. Assimilation is not just a mere adoption or deployment rather it is a continuously evolving process through which the system and its use are diffused into management accounting processes in an organizational context. Further research on the complementarity between ERP and BI solutions and empirical testing of the proposed model and challenges in the adoption of specific MA process such as budgeting are necessary to develop strategies for deriving effective returns on huge IT investments firms make.

6. References