ACCOUNTING SOLUTIONS USE FOR BUDGETING IN ERP, HYBRID ERP, AND BoB: AN EXPLORATIVE STUDY

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Abstract

We explore whether off-the-shelf accounting solutions are used or not used in management control. This study explores the usage of accounting solutions such as ERP, “hybrid ERP”, and “best-of-breed” (BoB). Previous research highlights the problem that ERP has a “moderate” impact on management control but no study addresses whether hybrid ERP and BoB adopters experience the same problem. The explorative study investigates two budgeting activities – annual budget and rolling forecast construction, and variance analysis – in five case companies in order to explore and explain if and why off-the-shelf accounting solutions are used or not used. Due to a misfit between user intentions and system functionality, all the case companies use non-accounting solutions such as MS Excel and Hyperion business intelligence budgeting. In the first activity, users intend to achieve budgeting accuracy but the accounting solutions offer poor forecasting ability. In the second activity, users intend to identify management control problems but the accounting solutions offer poor analysis functions, for example poor visual presentation. We conclude that hybrid ERP and BoB accounting solution adopters experience the same problems as ERP adopters because accounting solution non-use or “workaround” is related to both technical and social problems.

Keywords: Budgeting, Enterprise resource planning system, MS Excel, Hyperion.
1 INTRODUCTION

Previous research (e.g., Catt 2008; Granlund & Malmi 2002; Hyvönen 2003) has addressed the opinion that a relationship between ERP (enterprise resource planning) and a management accounting function like budgeting is multifarious. Catt (2008) analyses SAP ERP forecasting functionality and concludes that it has several limitations in accordance with published business forecast practices. Therefore, he recommends practitioners to perform significant forecasting steps outside SAP ERP in order to improve forecasting accuracy. Granlund and Malmi (2002) find that fewer than half of their ten case companies operate budgeting in ERP systems. However these companies only use ERP to assist budget consolidation processes; as a result there is no significant change in the budgeting process after the ERP implementations in any case company. Hyvönen (2003) reports in a Finnish survey study on IS technologies and management accounting practices that budgeting is the only area in which ERP adopters seem to have more problems than non-ERP adopters. Nevertheless, thanks to the limited nature of a survey study, Hyvönen cannot further elaborate on the causes. Past research tends to conclude that there is something odd about using ERP for budgeting, but still offers a limited view on why this is the case.

A job advertisement for a senior analyst at Sony Ericsson (2010), for which the job description involves budget developments, rolling forecasts, and variance analysis, further confirms the complex relationship among ERP systems, non-ERP systems like Microsoft (MS) Excel and business intelligence (BI), and a management control system such as budgeting. The advertisement emphasizes the importance of applicants’ MS Excel spreadsheet skills to perform extensive analytical tasks and values ERP skills in the form of SAP knowledge significantly less (“must have” versus “good-to-have”). A quick search on the web page of SAP (2010), which is the biggest ERP vendor and also Sony Ericsson’s ERP vendor, shows that SAP’s ERP solution provides all the management control functions specified in the job advertisement. “SAP ERP provides powerful analytic software that enables powerful financial analysis to help you analyse your business. [SAP ERP] support[s] traditional budgeting, rolling forecasts, and collaborative planning.” That Sony Ericsson is searching for a person who has more knowledge and experience of a non-ERP system like MS Excel than of the SAP ERP system is a clear indication that in the work tasks related to the job a non-ERP system is of greater importance than the “expensively” implemented ERP system. The job advertisement example confirms earlier findings (e.g., Granlund & Malmi 2002) that ERP systems have an insignificant impact on management accounting practices because most advanced and traditional management accounting works are operated in separate systems, i.e., in MS Excel (Panko 2006) and BI (Granlund & Malmi 2002). Users are reported to download historical data from ERP systems, furbish the data outside the system, and load new data back into the system during the course of budgeting.

Such use practice of bypassing the ERP system is connected to the growing literature on workarounds, which are defined as “staff actions that do not follow explicit or implicit rules, assumptions, workflow regulations, or information system designers” (Koppel et al. 2008). The literature has acknowledged that users create workarounds when working with several IS technologies such as an ERP system (Alvarez 2008; Boudreau & Robey 2005; Ignatiadis & Nandhakumar 2009; Newman & Westrup 2005; Soh et al. 2000), a hotel reservation system (Davern & Wilkin 2008; 2009), and a health information system (Azad & King 2008; Koppel et al. 2008). Most papers attempt to classify these workarounds using various instances such as functionality and faithfulness (Davern & Wilkin 2008; 2009), context of use (Azad & King 2008; Ignatiadis & Nandhakumar 2009; Koppel et al. 2008), and stage of use (Soh et al. 2000). We find that the typologies of Davern and Wilkin (2008) are the most useful ones to date because of their general applicability and recognition of beneficial (Ciborra 2002) and harmful (Boudreau & Robey 2005) consequences of workarounds.

One thing we have noticed is that the limited literature on workarounds (Ignatiadis & Nandhakumar 2009) focuses attention on workaround typologies but does not attempt to open the black box (Azad & King 2008; Ciborra 2002) as to why they happen. The few examples that we have seen are
**interpretative flexibility**, which is a broad interpretation of the malleability of organisational artefacts unlike the specific interpretation of IS technologies addressed by Orlikowski (1992), in Azad and King (2008), and **misfits**, defined as the gaps between the functionalities offered by IS technologies and organisational requirements, in Soh et al. (2000).

When a workaround occurs in the context of budgeting, it might improve the efficiency of the process because users do not have to deal with inappropriately designed systems but it raises a concern for the ERP integration capability, data integrity, audit trails, and knowledge management within a company’s financial processes. The data contained in non-ERP systems like MS Excel or BI are often disconnected from ERP systems such that most data downloads and transfers from ERP systems to other systems are performed manually. This use practice is prone to errors, opens up an opportunity for fraud, and limits future learning opportunities (Panko 2006). These issues should concern both academia and practitioners.

ERP workarounds in budgeting, which we have addressed above, are not something new, but are taken for granted (Granlund & Mouritsen 2003). As a result, knowledge gaps exist in this line of study (Berry et al. 2008). First, although ERP systems are significant and critical systems that have been researched in many previous studies, they are certainly not panaceas in accounting (Rom and Rhode 2007). Many forms of accounting solutions exist for management and accounting purposes in real organisations. In accounting, IS applications were first introduced in general ledgers and financial reporting back in the 1960s, in the form of a standalone “best-of-breed” (BoB) solution (e.g., Markus 1983). Since then, IS applications have widened their functionalities to support other managerial purposes through data and software/hardware integration (Booth et al. 2000) or the “hybrid ERP” approach. Companies that adopt BoB and hybrid ERP approaches are not exposed to the same degree of constraint imposed by vanilla ERP implementation; at least they have a certain degree of freedom to pick and choose software packages from as many vendors as they would like to. As far as we know there is no other research that sets out to compare ERP, hybrid ERP, and BoB use in budgeting practice. Thus in this study we will set out to explore whether hybrid ERP and BoB adopters experience the same problem as ERP users, like prior research addresses (e.g., Catt 2008; Granlund & Malmi 2002; Hyvönen 2003). The second knowledge gap is that previous ERP research in management accounting often addresses this problem from either a technological- (Catt 2008; Granlund & Malmi 2002) or social-deterministic perspective (Hyvönen 2003). Previous research ignores the potential to offer “insightful accounts of IS phenomena” (Orlikowski 2005) from a soft-deterministic perspective, which defines technology as a product of human actions that is employed by humans to achieve certain actions (Orlikowski 1992).

Based on the two knowledge gaps identified, we undertake an explorative study to examine two activities in budgeting, which is a cornerstone in the management accounting and control process (Hansen et al. 2003) in order to explore and explain if and why off-the-shelf accounting solutions are used or not used. Budgeting is an umbrella term covering both the set of numbers used for management control purposes and the process of arriving at a budget, in contrast to the term “budget” or “budgeting process” (Covaleski et al. 2007). The Chartered Institute of Management Accountants’ (CIMA) official Terminology of Management Accounting defines a budget as: “a quantitative statement for a defined period of time, which may include revenues, assets, liabilities and cash flow” (CIMA 2004). A budget provides a framework for control. It is traditionally developed to cover a one-year financial period or to be produced annually. Due to volatile business environments in the current economy, it is more likely that an annual budget will quickly become obsolete for management control purposes. Thus a new innovation, a rolling forecast technique, is introduced to enhance the annual budget. A rolling forecast is similar to the annual budget but it is prepared at shorter time intervals, usually quarterly, monthly, or weekly, depending upon the business conditions. Since it is prepared over a shorter period of time it is more likely that a rolling forecast will be more useful for management control purposes than the annual budget (CIMA 2004). In the first activity, we treat annual budgeting and a rolling forecast as one due to the similarity between them, except for their time interval aspect. The second activity is variance analysis, which refers to the comparison of the annual
budget and the rolling forecast with the actual operation results after a period ends. Usually it is performed on a monthly basis but practices may vary based on management judgement about the business conditions.

The knowledge gaps guided us to address the major research question: if and why off-the-shelf accounting solutions are used or not used in budgeting.

The rest of this paper is structured as follows. The next section describes the human and machine agencies analysis framework used in this research. The third section addresses the research methods, case selection, and case information. The fourth section presents empirical data and analysis at both case and cross-sectional levels. The last section summarises our research and our contributions.

2 ANALYSIS FRAMEWORK: HUMAN AND MACHINE AGENCIES

Three streams of research exist on IS development and use in organisational studies: the technology-, social- and soft-deterministic perspectives. The technology- and social-deterministic perspectives hold that there is a single agency, either machine or human, respectively, that influences IS outcomes. The soft-deterministic perspective, on the contrary, holds the perspective that technology is a product of human action, which is employed by humans to achieve certain actions. Therefore it holds that the agency influencing IS outcomes lies in both humans and machines. Orlikowski (1992) calls this co-agency existence the duality of technology and argues that technology is interpretatively flexible due to interactions between human and machine agents in the development and use stages.

Although the soft-deterministic perspective offers major possibilities, the current theoretical grounds hinder the ability to offer “insightful accounts of IS phenomena” (Orlikowski 2005). For instance, the actor network theory (ANT) does not differentiate between human and non-human agents. Therefore it cannot be used to study the interaction between agents. Structuration theory (ST), on the other hand, assumes that the agency and structure specifically belong to humans in their social practice (Giddens 1979, p. 7); as a consequence it rules out the machine agency.

New theories based on the soft perspective are being developed to overcome the current limitations (e.g., Ignatiadis & Nandhakumar 2009; Markus & Silver 2008; Orlikowski 1992; Rose & Jones 2005). Ignatiadis and Nandhakumar’s concept of human and machine agency in ERP use based on ANT and ST is selected because it fits the nature of our explorative study. Although the institutional properties can be important, they are not addressed in this study. Ignatiadis and Nandhakumar’s framework differentiates between human and machine agencies, where both agencies perform actions with consequences but the characters are not equivalent. Human agency is superior because it has an intentionality to form awareness and purposes. Machine agency, on the contrary, is thought of in terms of affordance, which is the actual machine property, i.e., what it can or cannot do. The two kinds of agency are not separated but intertwined and propagated. Figure 1 depicts the framework.

![Figure 1. The human and machine agency in ERP use (Ignatiadis & Nandhakumar 2009)](image)

In this paper, we deem that a lack of coherence between a human agency’s intentionality and a machine agency’s affordance is a misfit similar to the definition by Soh et al. (2000) presented in the last section.
An explorative–interpretative case-study method was chosen to carry out this study as per Gregor’s (2006) suggestion that a case study is an appropriate method to develop a theory for explanation that aims at explaining how things are and why things are as they are according to our research question. The data were collected using qualitative semi-structured interviews with representatives who are directly responsible for the budgeting process in five companies. These five companies are presented as cases and they were selected based on the characteristics of their IS applications for management purposes. The characteristics are as follows: (1) using a fully integrated standardized software package such as a full ERP system; (2) using a sort of “best-of-breed” approach, meaning that the organisation adopts specific software for a specific purpose; and (3) using a hybrid ERP approach, meaning that the organisation cherry-picks a number of off-the-shelf applications and then integrates them in order to create management software. The selection followed this approach and one case was selected that follows the integrated standardised software package strategy (ConsumerGood), one case that follows the “best-of-breed” (BoB) strategy (RealEstate), and three cases that have adopted the “hybrid ERP” strategy (HotelChain, HotelBeach, FrozenFood). Regarding IS strategy and IS policy three of the cases (ConsumerGood, RealEstate, FrozenFood) are independent and free to establish their own strategy/policy. Two of the cases (HotelChain, HotelBeach) are part of a franchise organisation and therefore are forced to follow a specified strategy.

Interviewing was the major data collection technique employed in this study. Six interviews with five major informants (the informant in the HotelBeach case was interviewed twice) were conducted in the second half of 2010. Each interview lasted for approximately one to two hours. The interviews were recorded, transcribed, and then coded and analysed in NVivo 8. Informal interview follow-ups through telephone conversations and e-mails were also conducted with all the informants but they were not recorded because they were mainly used to clarify unclear topics. During the process we also came into contact with several “gatekeepers” such as managing directors, a financial analyst, accountants, and a marketing manager in the case companies, who are also involved in budgeting processes; however they are not deemed to be the main informants because the interactions were informal. Published materials, e.g., vendor websites, and between-case data triangulation were used to support the interviews. Information about the accounting solutions in each case company is shown in Table 1.

<table>
<thead>
<tr>
<th>IS solution type</th>
<th>Case</th>
<th>Accounting solution</th>
<th>Major informants</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP</td>
<td>ConsumerGood</td>
<td>SAP</td>
<td>Financial analyst manager</td>
</tr>
<tr>
<td>BoB</td>
<td>RealEstate</td>
<td>Express</td>
<td>Accounting analyst</td>
</tr>
<tr>
<td>Hybrid ERP</td>
<td>HotelChain</td>
<td>SunSystems</td>
<td>Business analyst</td>
</tr>
<tr>
<td>Hybrid ERP</td>
<td>HotelBeach</td>
<td>Carmen</td>
<td>Deputy general manager</td>
</tr>
<tr>
<td>Hybrid ERP</td>
<td>FrozenFood</td>
<td>Alpha(^1)</td>
<td>Accounting manager</td>
</tr>
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Table 1 Profiles of the companies and persons interviewed

The case in the full ERP application category, ConsumerGood, is a global consumer packaged goods manufacturer specialising in soap and shampoo products. The branch approached in this study is located in Bangkok, Thailand. The company is experiencing a high level of market competition and a slow yet stable growth rate. SAP is company-wide implemented management software that also includes an accounting module.

The second case, RealEstate, is the best-of-breed (BoB) type. RealEstate is an independent housing development company in the south of Thailand. Its builds and sells detached houses and commercial buildings for the medium to low-end market. Due to its small operation and stable market condition,

\(^1\) The real software name has been removed and replaced with the fictional ‘Alpha’ name to ensure the anonymity of the case company.
the company does not employ any other software for management purposes but the packaged Express accounting software.

The remaining cases fall into the hybrid-ERP group. They do not buy a specific ERP solution but hand pick the off-the-shelf solutions that best fit their management needs. This category deserves more cases than the previous two because the IS integration structures across the cases are diverse; some employ only packaged software; some employ a combination of in-house with packaged software. We believe that more cases will help highlight some interesting aspects of this group. The third case, HotelChain, which is the first company in this group, is a worldwide hotel management company that has a regional head office in Thailand. It manages a wide range of hotel brands from budget to luxury brands. The company offers hotel franchises and provides human resources, marketing, management, and consulting services to franchisees in return for a fee based upon gross operating incomes (GOI). HotelChain adopts and encourages its franchisees to employ a standard Micros Fedilio property management system and SunSystems accounting software. The fourth case, HotelBeach, manages two three-star hotel properties at a popular resort destination in Thailand. One hotel is operated under its own brand; the other is under HotelChain’s brand. Altogether it operates five hundred hotel rooms, restaurants, bars, shops, and spas. The company uses the Micros Fedilio system for hotel management purposes but adopts the packaged Carmen system for accounting. The fifth case, FrozenFood, is a leading frozen seafood processor and exporter in Thailand. It implements an integrated supply-chain strategy from fishing and processing to sales and marketing. Most sales are from contracted manufacturing for US and European markets. It employs a mix of in-house and packaged software for various purposes and integrates them all in order to create a system that best fits its unique requirements. For accounting, it adopts the Alpha packaged accounting software.

4 EMPirical DATA AND ANALYSIS

This paper sets out to explore and explain if and why off-the-shelf accounting solutions are used or not used in budgeting throughout different kinds of management information system arrangements, from ERP and hybrid ERP to BoB. The analysis is conducted on two levels – case analysis and cross-sectional analysis. We first present the case-level analysis then follow this with the cross-sectional analysis.

4.1 Case-level analysis

In the case-level analysis, data from the five case companies are analysed using the framework presented in Section 2 considering two activities, annual budget and rolling forecast (A1) and variance analysis (A2), following the human agency (HA) and machine agency (MA) domains. The analysis shows the following results.

4.1.1 The human agency and intentionality

The role is a tri-concept: (1) identities assumed by social participants, (2) patterned social behaviours, and (3) the expectations that are understood by all the participants and govern their behaviours (Biddle 1986). The concepts are useful to establish the human agency in budgeting. Accounting and finance personnel typically assume a business controller social identity in organisational budgeting. They use annual budget, rolling forecast, and analysis tools as the patterned social behaviours to govern business performance and monitor organisational members’ behaviours, which is expected and understood by all the organisational members. This is true in all the cases except for the ConsumerGood case, in which the role of human agency advances to that of a business partner who gives strategic advice on investment decisions. In line with the role definition, budgeting exercised by human agency is a social process. It is equipped with power, self-interest, and political advocacy (Covaleski & Dirsmith 1988; Hofstede 1981).
A1: Annual budget and rolling forecast – Annual budget construction is the first activity considered. A budget is a business roadmap, as the accounting manager at FrozenFood notes: “a budget is a plan for the company, it tells us in financial terms […] how the business operation will be and if we face this kind of situation or this kind of risk, how we will deal with it”. It is vital that a budget is constructed to reflect strategic goals so that it can be benchmarked against future operations. Therefore the most important intention for budget construction is to create a budget that best forecasts future operations, or to achieve a budget accuracy aim. The HotelChain case makes this point explicit; it includes budget accuracy as a key performance indicator (KPI). However, in order to achieve the budget accuracy aim, several intentions of the human agency (HA) are explicated in the case companies:

- HA1: Participation – To achieve the goal, budgets are typically constructed through a bottom-up participative approach. Forecast techniques are applied based on a specific business and product nature: “we have to use many technical resources at different points […] because the forecast or estimation process for each business area is totally different from others”, states the accounting manager at FrozenFood.
- HA2: Attention to detail – Budgets are developed in a detail-oriented manner, e.g., a sales revenue budget is typically constructed by customer and product types. “Here we have [differentiated customer types into groups:] business individual, business group, leisure individual, leisure group, crew, conference and [conference attendances]…. The more detailed information we get about our customers, the better we can prepare budget and forecast”, notes the business analyst at HotelChain. This information is usually complemented with market and industry analysis reports prior to budget construction.
- HA3: Reviews and revisions – The process involves several rounds of reviews and revisions, which usually take between two and six months to complete. The HotelBeach case highlights the social aspect of budgeting in the review and revision process (Covaleski & Dirsmith 1988; Hofstede 1981), which entails trust and politics. “[The HotelChain] typically do[es] not [reject our budget]. Our general manager […] knows trends and estimations better than the [HotelChain] group. … [Besides] we need to lobby the process beforehand”, states the deputy general manager at HotelBeach. Therefore, a budget is a product of negotiation through social interaction.

Once budgets become effective, a rolling forecast allows businesses to keep their fingers on the pulse of a changing environment. The increasing use of rolling forecasts means that budgets have become more forward-looking and are better aligned with strategic plans because the assumptions on which the budget numbers are based change at a fast pace (CIMA 2004).

- HA4: Consideration of the nature and state of business operations – Three out of five case companies employ a three-month rolling forecast practice. The exceptions are the FrozenFood and RealEstate cases. FrozenFood prepares a rolling forecast on a weekly basis because of high volatility in the agriculture business, especially from raw material cost fluctuations. RealEstate does not employ a rolling forecast due to stable market conditions. As a result, it is fair to conclude that business controllers consider the nature and condition of business operations in order to determine the frequency of a rolling forecast.
- HA5: Consideration of the rolling forecast in business control – Since a rolling forecast is a future projection at a shorter time interval, i.e., on a weekly, monthly, or quarterly basis rather than annually, it is more likely that a rolling forecast will provide a better estimation. As a result, a rolling forecast is more helpful from a business control perspective (CIMA 2004), as noted by the business analyst at HotelChain: “we understand that a[n] [annual] budget is something that they have prepared over a year ago. If there is a big variance between a budget and an actual [result], it is okay. What is more important is that on the average level, it stays on the budget. However if there is a big variance between an actual [result] and a [rolling] forecast, there is a problem.” All things considered an annual detail-oriented budget is still significant because it provides a basis on which to work, especially when something does not go as planned. It is important not to lose sight of what was budgeted before.
In conclusion a rolling forecast is similar to an annual budget but is performed at more frequent time intervals depending on the nature of the business, thus the aim of a rolling forecast is similar to that of an annual budget: accuracy.

**A2: Variance analysis** – After the month ends, business controllers debrief the operation results for the month. They compare the actual operation results with the budgeted and/or rolling forecast figures in order to conclude whether operations went as planned or not. If not, it is asked what caused the actual performance to deviate from the estimations.

- **HA6:** Quantitative analysis – Variance analysis is typically monitored on a monthly basis in all the cases except for the FrozenFood case. FrozenFood’s variance analysis is similar to its rolling forecast practice, which is performed on a weekly basis. The aim for business controllers at this point is to highlight the results that are not as planned, as the business analyst at HotelChain suggests: “I don’t analyse budget in details. I am concentrating my efforts in monitoring variances.” To investigate variance causes, business controllers usually rely on expertise and knowledge from specific departments. “I will have to ask the sales department. The sales and marketing department can best explain what happened”, reveals the financial analyst manager at ConsumerGood. In the variance analysis process, human knowledge and expertise are placed above those of a machine. The deputy general manager at HotelBeach notes that “the program cannot tell us what happened”, the program only shows us historical data and calculates for us how much our last year’s expenses were and how much more this year’s expenses are than last year. But it cannot give reasons why it is over or under our budgets. We have to rely on people from that particular department to explain why it happened.” It is clear that business controllers intend to highlight variances in this activity, thereby identifying management control problems.

**4.1.2 The machine agency and affordance**

In order to fulfil a business controller role, human agency employs machine agency – different kinds of IS solutions such as accounting solutions, Hyperion BI, and MS Excel – to achieve the task it wants to accomplish. In all the cases accounting solutions are implemented and used for accounting purposes. However their influences on budgeting practices are “moderate” according to Granlund and Malmi (2002). We interpret the situations for the machine agency (MA), the accounting solutions, in terms of what the systems allow human agency to do or not to do in relation to budgeting tasks. Once again we consider the two activities, annual budget and rolling forecast (A1) and variance analysis (A2). The analysis shows the following results.

**A1: Annual budget and rolling forecast** – Referring back to the accuracy aim described in relation to the human agency in this activity set, numerous forecasts must be conducted to assist the planning and forecasting process. Despite the existence of accounting solutions, none of the case companies, regardless of their IS structures, use accounting solutions for this task. All the case companies use MS Excel except for ConsumerGood, which employs Hyperion budgeting BI in addition to MS Excel. We interpret the workaround of accounting solutions as follows:

- **MA1:** Poor forecasting ability – The systems sometimes do not allow users to enter certain key information, which is crucial for budgeting and forecasting purposes. The accounting manager at FrozenFood reveals: “there are also cases where the main system does not allow us to key in numbers, e.g., billing cycle, we might calculate for estimation on the secondary system [e.g., MS Excel]”. The accounting solutions are not flexible enough to accommodate budgeting and rolling forecast needs for extensive ad-hoc calculations: “I can use old data and consider the industrial trend but I think it is a lot more than putting in the percentage and multiplying it with the old numbers. […] Working on budgeting is not something like that. We need to see more than that; we need to calculate more than that”, comments the financial analyst manager at ConsumerGood. The bottom line is that users feel that accounting solutions cannot accommodate their forecasting needs so they turn to MS Excel. Even though Hyperion budgeting BI is present in the ConsumerGood case, MS Excel is still the primary tool used in the budget construction and forecasting process. Only final results are entered into Hyperion for budget consolidation purposes. The analyst at
ConsumerGood reveals: “I use data from [MS] Excel and put it into Hyperion. [MS] Excel is the working file, but when I get the result I put it into Hyperion. [To prevent confusion between MS Excel and Hyperion], I design a form on [MS] Excel that looks like the form on Hyperion, then I can link the information from [MS] Excel to Hyperion.” The conclusion that accounting solutions offer limited forecasting ability is in line with previous research by Catt (2008) and Granlund and Malmi (2002). However we believe that the fact that budgeting BI does not have an influence on the budget construction and forecasting process is new. At this point we conclude that Hyperion is not used in the budgeting construction process since the use practice is for consolidation purposes only. Unfortunately we do not have enough data to elaborate more on why this is the case but we will follow up this point in later studies.

- **MA2: Unfamiliarity** – As mentioned earlier, budgets are often constructed through a participation process, in which several departments are involved. People outside an accounting department are not typically familiar with the accounting solutions: “there are not many people who know how to use the system” notes the deputy general manager at HotelBeach. For those outside the accounting and finance world, an accounting solution can be quite threatening. The financial analyst manager at ConsumerGood comments: “I think [MS] Excel is more user-friendly than SAP. I think people who use [MS] Excel do not find it threatening. They do not have to think if they should put a number in this and that gap or not.” An inadequate training policy is the source of this problem. In most cases, no official system training policy is in place. Training usually comes in the form of informal advice and suggestions from colleagues. However, once users are familiar with the system, they often admit that accounting solutions are straightforward. The business analyst at HotelChain even remarks that it is “too easy to use”.

- **MA3: Inaccessibility or unavailability** – Accounting solutions are not accessible to other departments. This is the situation in all the case companies except for ConsumerGood, which employs an ERP solution. This is especially true for RealEstate, which only adopts accounting software in which access to the system is strictly limited to accounting personnel. Budgeting functionality unavailability is true in all the hybrid ERP cases: HotelChain, HotelBeach, and FrozenFood. HotelChain has the possibility to purchase this function from its software vendor but since it cannot enforce its hotel chains to comply with the IT policy, this function will be of little value. The deputy general manager at HotelBeach admits: “Well, the [HotelChain] do[es] want us to use SunSystems but I do not comply. I am not using it and other hotels are not using it either. It is not a 100% enforcement.” Since they are not using the same software, it is impossible to use accounting software for budgeting. HotelBeach and FrozenFood on the contrary employ locally developed accounting software specifically developed for their business areas, thus the function is not available in the packages. However we are not convinced that a lack of budgeting functionality is a truly convincing factor that explains accounting solution workarounds with regard to budgeting. Had this budgeting function been available, other departments would neither have access to the systems nor be interested in using the systems due to unfamiliarity and poor forecasting ability, as suggested earlier.

Three reasons for workarounds based on a machine agency perspective are suggested above. The next section proceeds to analyse the other activity in budgeting, variance analysis (A2), based on the same machine perspective.

**A2: Variance analysis** – The intention for business controllers at this point is to highlight the operational results that are not as planned. They are able to perform a preliminary quantitative analysis to detect the causes but they typically depend on knowledge and expertise from departments that are related to the issues in order to investigate the causes. Similar to budgeting and rolling forecasts, none of the case companies use accounting solutions. Instead MS Excel and Hyperion BI are called upon for this task. We interpret the situations as follows:

- **MA4: Presentation rigidity** – Visual presentation such as graphs, colours, shading, underlining, and formatting play an important role in helping users to identify critical and deviating information and/or understand the information better. Accounting solutions often offer limited
possibilities for users to display data for analysis purposes. The financial analysis manager at ConsumerGood notes: “If I want to do a gross profit analysis [...]. I can choose variances to be shown in green or red colours. I can do this in [MS Excel]. I am not sure if SAP can do that.” The business analyst at HotelChain states: “[with MS Excel] you can arrange columns and rows as you wish. You can select the period that you want it to display. You can choose to use local currency or global currency. [...] Compare it with SAP, you cannot customise it. You cannot take this to compare with that in SAP.”

MA5: Analysis task inappropriateness from a system design perspective – Analysis work in management accounting is significantly different from accounting work (Anthony 1965, p. 114; Granlund & Mouritsen 2003). Analysis decomposes a situation, i.e., a budget variance, and seeks the underlying relationships among the elements in order to account for why it happened. This analysis must be performed in a timely manner or it will lose the relevancy aspect. Financial accounting, on the contrary, focuses on reporting historical financial events. Timeliness is not critical but information accuracy and completeness are: “the thing is we do not need much accuracy and completeness for budgeting [i.e., management accounting]. It is not substance for budgeting. given that accuracy and completeness do not affect budgeting. But it is not the same for [financial] accounting. Accuracy and completeness are the main substances in [financial] accounting” comments the accounting manager at FrozenFood. Hence accounting solutions are designed for data-gathering and reporting purposes, not data analysis, as the business analyst at HotelChain points out: “SAP is good because it allows you to link many things. [...] Anything [...] can be keyed in to SAP in order to store the data. But SAP does not have the brain to analyse or compare data in order to tell you that this happens then that happens. It just cannot be used like that.” In the case of ConsumerGood, where users have access to Hyperion budgeting BI, we interpret that users prefer Hyperion to MS Excel for analysis tasks as the business analyst manager reveals: “[I prefer Hyperion to MS Excel because] when I upload budgets into Hyperion, I can retrieve them later for comparison purposes. If I use [MS] Excel I will have to [manually] pull data from many sources and I will have to write my own formulas.” We conclude that MS Excel and Hyperion budgeting BI are more appropriate for analysis tasks, although there is a slight preference for Hyperion over MS Excel for these tasks since Hyperion can automatically retrieve past data for analysis purposes.

4.2 Cross-sectional analysis

Before we proceed to present a cross-sectional analysis, we first summarize the findings presented in the last section. The analysis conducted from the soft-deterministic perspective based on the interaction between human and machine has provided an insightful account into accounting solution workarounds for budgeting purposes. It shows that users do not use or workaround accounting solutions because the system cannot respond to the goals that users would like to achieve. We describe this situation as misfits between a user’s intentionality and a system’s affordance, according to Soh et al.’s (2000) definition in Table 2.

In the first activity, annual budget and rolling forecast (A1), business controllers (users) would like to achieve budget and forecast accuracy. Therefore they employ a participative approach to budgeting (HA1) in which each department employs various forecasting techniques (HA2) suitable for its own respective area and proposes a budget/rolling forecast to top management for review (HA3). An annual budget is typically prepared once a year but users will consider the business nature in order to determine the frequency (HA4) and significance (HA5) of a rolling forecast to complement the annual budget. Accounting solutions cannot respond to these requirements because they do not allow users to insert certain key information that users believe to be very important for budget accuracy (MA1). Budgeting collaboration within organisations means that all the departments are part of the process and thus they must collaborate using a similar IS platform. However this is not easy for two reasons. First, budget construction teams outside accounting/finance departments are often not familiar with accounting solutions (MA2). Second, accounting solutions are not available outside
accounting/finance departments (MA3). The only case company where accounting solutions can be made available outside an accounting domain is ConsumerGood, which employs a full ERP. Even though both MS Excel and Hyperion BI are reported to be involved in this process, we only conclude that MS Excel is useful in this activity since it is suggested that Hyperion only serves data integration purposes and not budget construction purposes.

In the second activity, variance analysis (A2), business controllers aim to identify management control problems. Therefore, they conduct a quantitative analysis among an annual budget, a rolling forecast, and an actual performance result (HA6). Accounting solutions cannot respond to user needs. Accounting solutions do not allow users to achieve the kind of visual presentation that they would like to achieve. Colours, such as red and green, play a very crucial role in helping users identify business problems (MA4). Some users note that accounting solutions are not best designed for data analysis purposes (MA5) but they accept that accounting solutions are excellent for transactional data storage. Therefore they choose MS Excel and Hyperion budgeting BI to perform an analysis task instead.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Business controllers’ intention</th>
<th>Accounting solutions’ affordance</th>
<th>IS use practices for budgeting to overcome misfits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1: Budget and rolling forecast</td>
<td>To achieve budgeting accuracy by means of:</td>
<td>Misfits that result in non-achievement of business controllers’ intentions:</td>
<td>- Budgeting and rolling forecast practice in MS Excel</td>
</tr>
<tr>
<td></td>
<td>- HA1: Participation</td>
<td>- MA1: Poor forecasting ability</td>
<td>- Extract of transactional data from accounting solutions</td>
</tr>
<tr>
<td></td>
<td>- HA2: Attention to detail</td>
<td>- MA2: Unfamiliarity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- HA3: Reviews and revisions</td>
<td>- MA3: Inaccessibility or unavailability outside accounting/finance departments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- HA4: Consideration of the nature and state of business operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- HA5: Consideration of the rolling forecast in business control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2: Variance analysis</td>
<td>To monitor business control problems by means of:</td>
<td>Misfits that result in non-achievement of business controllers’ intentions:</td>
<td>- Variance analysis in MS Excel and Hyperion BI</td>
</tr>
<tr>
<td></td>
<td>- HA6: Quantitative comparison between an actual result and an annual budget and/or a rolling forecast</td>
<td>- MA4: Presentation rigidity</td>
<td>- Extract of transactional data from accounting solutions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- MA5: Analysis task inappropriateness from a system design perspective</td>
<td></td>
</tr>
</tbody>
</table>

Table 2  Misfits between human and machine agencies in budgeting

Having represented the general conclusion, Table 3 tabulates the empirical data by case in order to identify patterns among the case companies. We find good consistency across the cases and concluding points except for poor forecasting ability (MA1), which is presented in only two cases, ConsumerGood and FrozenFood.

In the business controllers’ domain, budgeting reviews and revisions (HA3) and quantitative comparison (HA6) are empirically found in all the cases. Three additional concluding points are found in at least four out of the five cases, which are participation (HA1), attention to detail (HA2), and consideration of the nature and state of business operations (HA4). In the accounting solutions’ affordance, we do not find any concluding point that our empirical data thoroughly support in all the cases. However we believe that there is good data consistency among the cases since all the concluding points except for poor forecasting ability (MA1) are shown in at least four out of the five cases.
At present, we do not find any workaround patterns across the five cases representing ERP, BoB, and hybrid BoB adopters. Consequently we conclude that hybrid ERP and BoB adopters experience the same problem as ERP adopters that accounting solutions do not have an impact on the budgeting process.

5 CONCLUSION AND CONTRIBUTION

Thirty years on from Markus’s (1983) publication little seems to have changed in the relationship between accounting solutions and management accounting. Markus’s conclusion, which states that “many felt strongly that the [accounting solution] […] was inadequate as a tool for managerial accounting, even though it ([then]) functioned adequately as a tool for performing financial accounting” still applies in the twenty-first-century IS landscape where accounting solution vendors, especially ERP vendors, typically boast their world-class software quality for management accounting purposes (cf. SAP’s statement in Section 1).

A technological deterministic-based analysis, e.g., those by Catt (2008) and Granlund and Malmi (2002), reveals that accounting solution workarounds happen because the system is not yet well designed for budgeting purposes. Solutions to the problem focus on achieving better-designed software through actions such as software customisation, software-designer education, and user participation in the software design. On the contrary, a social-deterministic-centred analysis such as those by Alvarez (2008) and Hyvönen (2003) reveals that software workarounds take place because people simply do not comply with the system or due to the case of resistance. Policies such as formal software training, user participation, and management persuasion and/or enforcement are encouraged to remedy the workarounds.

In comparison with previous literature, our analysis based on the soft-deterministic perspective that persists in interaction between human and machine agencies has provided an insightful account (Orlikowski 2005) of the problem of whether and why users use or do not use accounting solutions for budgeting purposes, which is not revealed from either the technological- or the social-deterministic perspectives. It shows that a workaround is a mixture of both technical and social problems. It is a technical problem because accounting solutions do not provide users with enough flexibility and functionality, e.g., the data input, data display, and data retrieval options are often very limited. MS Excel and Hyperion budgeting are more suitable for budgeting, even though we note that we find Hyperion BI’s functionality to be rather limited for budget construction but better than MS Excel in terms of automatic data retrieval and data comparison in variance analysis. It is a social problem because accounting solutions do not align with organisational structures and people. Accounting solutions are typically accessible only in accounting/finance department(s) when they should be made available to all the departments that take part in the budgeting process. The knowledge and skills to use accounting solutions are often scarce outside accounting/finance domains, even though experienced users often admit that using accounting solutions is easy.

Though we can identify the causes of the problem, the remedies are not clear cut. In theory, software vendors should improve the software quality for management accounting purposes to allow the level
of flexibility desired by users. However there is a big question mark regarding whether it will ever be possible. Typically management accounting users construct reports and analyses in an ad-hoc manner. How can we ever create standard software for non-standard practices? At the opposite end, organisations could hypothetically embrace a centralised management accounting approach at the risk of losing relevant and insightful information, which is at the heart and soul of management accounting. Alternatively they could promote a decentralised management accounting policy by making accounting solutions available everywhere at the risk of financial information security and bear hefty training fees in real money and time spent so that all the users learn how to use the system. We are not sure that there is a better solution to the problem of accounting solution workarounds since it seems that a solution cannot be achieved except at the cost of something more significant. Is it better to accept that MS Excel and BI software like QlikView or Hyperion are a de-facto standard? They are here to stay regardless of accounting solution vendors’ statements, especially those from ERP vendors, about their superior systems.

From an academic perspective, this study contributes to a theoretical account of accounting solution weakness in management control functions. We do not only confirm earlier findings that ERP is not appropriate for budgeting, but we also report that accounting solution weakness is present regardless of a company’s choice of adopting ERP, BoB, or hybrid ERP IS solutions. We conclude that different sets of tools such as MS Excel and BI are needed for budgeting. From a practitioner perspective, this study informs managers to set realistic expectations of accounting solutions so that they can develop informed strategies for IS investments, including training, recruitment policy, and software and hardware investments.

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References


